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# Academic Calendar 1999-2000

## Autumn Quarter

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<tr>
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<td>Conferral of degrees—Autumn Quarter</td>
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<tr>
<td>17 (Mon)</td>
<td>Observance of Martin Luther King Day (holiday, no classes); last day for filing Study List</td>
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<td>30 (Sun)</td>
<td>Last day for adding courses or units</td>
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<tr>
<td>6 (Sun)</td>
<td>Last day for dropping courses or units</td>
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<tr>
<td>21 (Mon)</td>
<td>Observance of Presidents’ Day (holiday, no classes); last day for declaring or dropping CR/no credit grading option; last day for filing A.B., B.S., and B.A.S. application for April (Winter Quarter) and June (Spring Quarter) conferral; last day for filing Graduate Application for April (Winter Quarter) conferral of graduate degree</td>
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<tr>
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<td>At last class, last opportunity to arrange Incomplete in a course</td>
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<tr>
<td>28 (Sun)</td>
<td>Last day to withdraw from courses</td>
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<td>28-30 (Sun-Wed)</td>
<td>At last class, last opportunity to arrange Incomplete in a course</td>
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<td>29 (Mon)</td>
<td>Observance of Memorial Day (holiday, no classes)</td>
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<tr>
<td>31 (Wed)</td>
<td>Last day for filing candidacy applications for Educational Specialist or Engineer degree for September (Summer Quarter) conferral; last day for filing University thesis, D.M.A. final project, Ph.D. dissertation, and Graduation Application for June (Spring Quarter) conferral of graduate degree</td>
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<td>1 (Thu)</td>
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<td>Instruction begins</td>
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<tr>
<td>25 (Sun)</td>
<td>Last day for filing Study List</td>
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<tr>
<td>3 (Mon)</td>
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<tr>
<td>4 (Tue)</td>
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<td>9 (Sun)</td>
<td>Last day for dropping courses or units</td>
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<td>Last day for declaring or dropping CR/no credit grading option</td>
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<td>4-10 (Fri-Thu)</td>
<td>At last class, last opportunity to arrange Incomplete in a course</td>
</tr>
<tr>
<td>5 (Sat)</td>
<td>Last day for withdrawing from courses</td>
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<tr>
<td>5-10 (Sat-Thu)</td>
<td>End-Quarter Period</td>
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<tr>
<td>11-12 (Fri-Sat)</td>
<td>Eight-week term examinations</td>
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<tr>
<td>21 (Mon)</td>
<td>Last day for filing candidacy applications for Educational Specialist or Engineer degree for January (Autumn Quarter) conferral; last day for filing University thesis, D.M.A. final project, Ph.D. dissertation, and Graduation Application for October (Summer Quarter) conferral of graduate degree</td>
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Welcome to Stanford

On October 1, 1891, nearly 500 enthusiastic young men and women were on hand for opening day ceremonies at Leland Stanford Junior University. They came from all over: many from California, some who followed professors hired from other colleges and universities, and some simply seeking adventure in the West. They came to seize a special opportunity, to be part of the pioneer class in a brand new university. They stayed to help turn an ambitious dream into a thriving reality. As a pioneer faculty member recalled, "Hope was in every heart, and the presiding spirit of freedom prompted us to dare greatly."

For Leland and Jane Stanford on that day, the University was the realization of a dream and a fitting tribute to the memory of their only son, who had died of typhoid fever weeks before his 16th birthday, at an age when many young men and women were planning their college educations.

From the beginning, it was clear that Stanford would be different. It was coeducational at a time when single-sex colleges were the norm. It was non-sectarian when most private college were still affiliated with a church. And it offered a broad, flexible program of study while most schools insisted on a rigid curriculum of classical studies. Though there were many difficulties during the first months (housing was inadequate, microscopes and books were late in arriving from the East) the first year foretold greatness. As Jane Stanford wrote in the summer of 1892, "Even our fondest hopes have been realized."

What manner of people were this man and this woman who had the intelligence, the means, the faith, and the daring to plan a major university in Pacific soil, far from the nation's center of culture?

ABOUT LELAND STANFORD

Although he was educated as a lawyer, Leland Stanford, together with Jane, came to California in 1852 to join his five brothers in their mercantile business in the gold fields. They established large-scale operations in Sacramento, where Mr. Stanford became a leading figure in California business and politics. One of the "Big Four" who built the western link of the first transcontinental railroad, he was elected Governor of California and later United States Senator. One of the founders of the Republican Party in California, he was an ardent follower of Abraham Lincoln and is credited with keeping California in the Union during the Civil War.

THE CASE FOR A LIBERAL EDUCATION

Despite the enormous success they achieved in their lives, Governor and Mrs. Stanford had come from families of modest means and had built their way up through a life of hard work. So it was natural that their first thoughts were to establish an institution where young men and women could "grapple successfully with the practicalities of life." As their thoughts matured, however, theses ideas of "practical education" enlarged to the concept of producing cultured and useful citizens who were well-prepared for professional success. In a statement of the case for liberal education that was remarkable for its time, Leland Stanford wrote, "I attach great importance to general literature for the enlargement of the mind and for giving business capacity. I think I have noticed that technically educated boys do not make the most successful businessmen. The imagination needs to be cultivated and developed to assure success in life. A man will never construct anything he cannot conceive."

STANFORD LANDS AND ARCHITECTURE

The campus occupies what was once Leland Stanford's Palo Alto farm and the favorite residence of the Stanford family. The Stanfords purchased an existing estate in 1876 and later acquired much of the land in the local watershed for their stock farm, orchards, and vineyards.

The name of the farm came from the tree El Palo Alto, a coast redwood (Sequoia sempervirens) that still stands near the northwest corner of the property on the edge of San Francisquito Creek. Many years ago, one of the winter floods that periodically rushed down the arroyo tore off one of its twin trunks, but half of the venerable old tree lives on, a gaunt and time-scared monument. Named in 1700 by Spanish explorers, El Palo Alto has been the University's symbol and the centerpiece of its official seal.

The Stanfords gave their farm to the university in the Founding Grant of 1885. They personally financed the entire cost of construction and operation of the University until 1903, when surviving founder Jane Stanford turned over control to the Board of Trustees. The founding gift was in excess of $21 million, not including the land and buildings.

The general concept for the University grounds and buildings was conceived by Frederick Law Olmsted, the designer of Central Park in New York. A brilliant young Boston architect, Charles Allerton Coldidge, further developed the concept in the style of his late mentor, Henry Hobson Richardson. The style, called Richardsonian Romanesque, is a blend of Romanesque and Mission Revival architecture. It is characterized by rectilinear sandstone buildings joined by covered arcades formed of successive half-circle arches, the latter supported by short columns with decorated capitals.

More than one hundred years later, the University still enjoys the original 8,180 acres (almost 13 square miles) of grassy fields, eucalyptus groves, and rolling hills that were the Stanfords' generous legacy, as well as the Quadrangle of "long corridors with their stately pillars" at the center of campus. It is still true, as the philosopher William James said, during his stint as a visiting professor, that the climate is "so friendly . . . that every morning wakes one fresh for new amounts of work."

CURRENT PERSPECTIVES

In other ways, the University has changed tremendously on its way to recognition as one of the world's great universities. At the hub of a vital and diverse Bay Area, Stanford is an hour's drive south of San Francisco and just a few miles north of the Silicon Valley, an area dotted with computer and high technology firms largely spawned by the University's faculty and graduates. On campus, students and faculty enjoy new libraries, modern laboratories, sports facilities, and comfortable residences. Contemporary sculpture, as well as pieces from the Stanford Museum's extensive collection of sculpture by Auguste Rodin, is placed throughout the campus, providing unexpected pleasures at many turns.

The Iris and B. Gerald Cantor Center for Visual Arts at Stanford University opened in January 1999. The center includes the historic museum building, the Rodin Sculpture Garden and a new wing with spacious galleries, auditorium, cafe, and bookshop. At the Stanford Medical Center, world-renowned for its research, teaching, and patient care, scientists and physicians are searching for answers to fundamental questions about health and disease. Ninety miles down the coast, at Stanford's Hopkins Marine Station on the Monterey Bay, scientists are working to better understand the mechanisms of evolution, human development, and ecological systems.

The University is organized into seven schools: Earth Sciences, Education, Engineering, the Graduate School of Business, Humanities and Sciences, Law, and Medicine. In addition, there are more than 30 interdisciplinary centers, programs, and research laboratories (including the Hoover Institution on War, Revolution and Peace; the Institute for International Studies; the Stanford Linear Accelerator Center; and the Stanford Center for the Study of Families, Children, and Youth) where faculty from a wide range of fields bring different perspectives to bear on issues and problems. Stanford's Overseas Studies Program offers students in all fields remarkable opportunities for study abroad, with campuses in Berlin, Buenos Aires, Florence, Kyoto, Oxford, Paris, Puebla, Rome, and Santiago.

STANFORD PEOPLE

By any measure, Stanford's faculty, which numbers approximately 1,595, is one of the most distinguished in the nation. It includes 16 Nobel laureates, 3 Pulitzer Prize winners, 20 National Medal of Science winners, 114 members of the National Academy of Sciences, 204 members of the American Academy of Arts and Sciences, 72 members of the National Academy of Engineering, and 25 members of the National Academy of Education. Yet beyond their array of honors, what truly distin-
guishes Stanford faculty is their commitment to sharing knowledge with their students. The great majority of professors teach undergraduates both in introductory lecture classes and in small advanced seminars.

Enrollment in Autumn Quarter, 1998 totaled 14,144, of whom 6,591 were undergraduates and 7,553 were graduate students. Like the faculty, the Stanford student body is distinguished. Approximately eight students apply to Stanford for every place in the freshman class. Seventy-one Stanford students have been named Rhodes Scholars and 39 have been named Marshall Scholars. In 1997-98, the completion or graduation rate for students who entered Stanford University full-time in 1992 was 93 percent. Stanford awarded 4,557 degrees in 1997-98, of which 1,694 were baccalaureate and 2,863 were advanced degrees.

Stanford students also shine in a tremendous array of activities outside the classroom from student government to music, theater, and journalism. Through the Haas Center for Public Service, students participate in dozens of community service activities, such as tutoring programs for children in nearby East Palo Alto, the Hunger Project, and the Arbor Free Clinic.

In the athletic arena, Stanford students have enjoyed tremendous success as well. Stanford fields teams in 33 Division I varsity sports. Of Stanford’s 59 NCAA team titles, 14 have been captured in the past four years, placing Stanford at the top among the nation’s most title-winning schools of the early ’90s. In 1998-99, Stanford won one NCAA team title in women’s tennis and a collegiate championship in synchronized swimming. Seven teams placed second in the nation, including men’s cross country, men’s soccer, men’s and women’s swimming, men’s track and field, and men’s and women’s water polo. Last year’s success once again affirmed Stanford as one of the nation’s top athletic programs, as the Cardinal captured a fifth consecutive Sears Director’s Cup title. Athletic success has reached beyond The Farm, as well, with 49 Stanford athletes and coaches taking part in the 1996 Olympics in Atlanta. Intramural and club sports are also popular; over 1,000 students take part in the club sports program, while participation in the intramural program has reached 9,000, with many students active in more than one sport.

Stanford graduates can be found in an extraordinary variety of places: in space (Sally Ride, ’73, Ph.D. ’78, was the first American woman in space); on the news (Ted Koppel, A.M. ’62, created the successful program Nightline); off-Broadway (David Henry Hwang, ’79, received a Tony Award for his celebrated work, M. Butterfly); at the helm of major corporations (Bill Hewlett and David Packard, both ’34, Engr. ’39, started their multi-billion dollar company, Hewlett-Packard, in a nearby garage, and, more recently, Scott McNealy, ’80, founded Sun Microsystems, and Chih-yuan (Jerry) Yang, ’94, and David Filo, ’90, founded Yahoo); and on the U.S. Supreme Court (four Stanford graduates, Sandra Day O’Connor, ’50, J.D. ’53; Anthony Kennedy, ’58; William Rehnquist, ’48, J.D. ’52; and Stephen Breyer, ’59, currently sit on the high court).

LOOKING AHEAD

In her address to the Board of Trustees, in 1904, Jane Stanford said, “Let us not be afraid to outgrow old thoughts and ways, and dare to think on new lines as to the future of the work under our care.” Her thoughts echo in the words of current Stanford President Gerhard Casper, who has said, “The true University must reinvent itself every day. . . . At Stanford, these are days of such reconsideration and fresh support for our fundamental tasks, teaching, learning, and research.”
THE BOARD OF TRUSTEES

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ORGANIZATION

BOARD OF TRUSTEES

Powers and Duties—The Board of Trustees is custodian of the endowment and all properties of the University. The Board administers the invested funds, sets the annual budget, and determines policies for operation and control of the University. The powers and duties of the Board of Trustees derive from the Founding Grant, amendments, legislation, and court decrees. In addition, the Board operates under its own bylaws and a series of resolutions on major policy.

Membership—Board membership is set at 35, including the President of the University who serves ex officio and with vote. Trustees serve a five-year term and are eligible for appointment to one additional five-year term. At the conclusion of that term, a Trustee is not eligible for reelection until after a lapse of one year. Eight of the Trustees are elected or appointed in accordance with the Rules Governing the Election or Appointment of Alumni Nominated Trustees. Four of the Alumni Nominated Trustees must be 35 years of age or under and four older than 35 when elected. They serve a five-year term.

Officers of the Board—The officers of the board are a chair, one or more vice chairs, and a secretary. Officers are elected to one-year terms at the annual meeting in June. Their terms of office begin July 1.
THE PRESIDENT

The Founding Grant prescribes that the Board of Trustees shall appoint the President of the University and that the Board shall give to the President the following powers:

To prescribe and enforce the course of study and the mode and manner of teaching.

Such other powers as will enable the President to control the educational part of the University to such an extent that the President may justly be held responsible for the course of study therein and for the good conduct and capacity of the professors and teachers.

The President is also responsible for the management of financial and business affairs of the University, including operation of the physical plant.

The President appoints the following, subject to confirmation by the Board: Provost, Vice President for Business Affairs and Chief Financial Officer, Vice President for Development, and General Counsel.

COMMITTEES AND PANELS

University committees are appointed by and are primarily responsible to the President. Such committees deal with matters on which the responsibility for recommendation or action is clearly diffused among different constituencies of the University. In accordance with the Report on the Committee Structure of the University, Academic Council members are appointed to University committees on nomination of the Senate Committee on Committees and student members on nomination of the Associated Students of Stanford University (ASSU) Committee on Nominations. The President takes the initiative in the appointment of staff members to such committees. Although immediately responsible to the President, University committees may be called upon to report to the Senate of the Academic Council or the ASSU Senate. Charges to such committees are set by the President on recommendation of the Committee on Committees and others. There are nine standing University committees, as follows:

Advisory Panel on Investment Responsibility (APIR)
Committee on Athletics, Physical Education, and Recreation (C-APER)
Committee on Faculty and Staff Benefits (C-FSB)
Committee on Health and Safety (C-HS)
Committee on Land and Building Development (C-LBD)
Committee on Public Events (C-PE)
Editorial Board of the Stanford University Press (EB-SUP)
KZSU Board of Directors
Panel on Outdoor Art

Additionally there are six standing administrative panels which are appointed by the Vice Provost and Dean of Research and Graduate Study, and which report through him to the President.

Administrative Panel on Biosafety
Administrative Panel on Human Subjects in Medical Research-A
Administrative Panel on Human Subjects in Medical Research-D
Administrative Panel on Human Subjects in Non-Medical Research
Administrative Panel on Laboratory Animal Care
Administrative Panel on Radiological Safety

PROVOST

The Provost, as the chief academic and budget officer, administers the academic program (instruction and research in schools and other unaffiliated units) and University services in support of the academic program (student affairs, libraries and information resources, and institutional planning). In the absence or inability of the President to act, the Provost becomes the Acting President of the University. The Provost shares with the President conduct of the University’s relations with other educational institutions, groups, and associations.

Schools of the University—The program of instruction in the University is organized into seven schools: Graduate School of Business, School of Earth Sciences, School of Education, School of Engineering, School of Humanities and Sciences, School of Law, School of Medicine.

The deans of the schools report to the Provost.

THE ACADEMIC COUNCIL

According to the Articles of Organization of the Faculty, originally adopted by the Board of Trustees in 1904 and revised in 1977, the powers and authority of the faculty are vested in the Academic Council consisting of: (1) the President of the University; (2) tenure-line faculty—Assistant, Associate, and Full Professor; (3) nontenure-line faculty—Associate and Full Professor followed by the parenthetical notation (Teaching), (Performance), (Applied Research), or (Clinical); (4) nontenure-line research faculty—Research Assistant Professor, Associate Professor (Research), Professor (Research); (5) Senior Fellows in specified policy centers and institutes; and (6) certain specified officers of academic administration.

In the Spring of 1968, the Academic Council approved the charter for a Senate to be composed of 55 representatives elected by the Hare System of Proportional Representation and, as ex officio nonvoting members, certain major officers of academic administration.

In the allocation of representation, each school constitutes a major constituency. The Senate may create from time to time other major constituencies as conditions warrant. Approximately one-half of the representatives are allocated to constituencies on the basis of the number of students registered in those constituencies and the remainder on the basis of the number of members of the Academic Council from each constituency.

COMMITTEES

Committees of the Academic Council are created by and responsible to the Senate of the Academic Council and are appointed by the Committee on Academic Committees of the Senate. Such committees deal with matters on which the primary responsibility for action and decision lies with the Academic Council or, by delegation, the Senate. Pursuant to the Senate’s acceptance on September 25, 1969 of the Report from the Committee on Committees on the Committee Structure of the University and subsequent Senate action, the Senate has established seven standing Committees of the Academic Council, as follows:

Committee on Academic Appraisal and Achievement (C-AAA)
Committee on Academic Computing and Information Systems (C-ACIS)
Committee on Graduate Studies (C-GS)
Committee on Libraries (C-Lib)
Committee on Research (C-Res)
Committee on Undergraduate Admissions and Financial Aids (C-UAFA)
Committee on Undergraduate Studies (C-US)

Information regarding charges to these committees is available from the Office of the Academic Secretary to the University.

ASSOCIATED STUDENTS

Two weeks after the University opened in 1891, students met to form the Associated Students of Stanford University (ASSU). All registered students are members of the Association. They are governed by the ASSU Constitution and Bylaws, which was last revised and approved by student vote in April 1996, and approved by the President in May 1996.

Executive—The President and Vice President serve as the chief executives and representatives for the Association. The Financial Manager acts as business manager of the ASSU and controller of the Students’ Organizations Fund, wherein ASSU and student organization funds are deposited.

Legislative—The ASSU Senate is composed of 30 elected representatives, 15 from the undergraduate and graduate communities. The Senate elects its own chair and meets every other week to discuss and act on
issues pertinent to student life at Stanford. The Senate has responsibility to determine the budget of the Association and its agencies, and their budgetary, financial, investment, business, and operating policies, and to establish rules ensuring that funds derived from fees levied upon the members of the Association are expended and accounted for properly.

Judicial—An ASSU Constitutional Council evaluates the constitutionality of acts of the Senate or President. For information about University judicial policies, see "The Legislative and Judicial Charter" section of this bulletin.

Note—Revisions to the ASSU Constitution were under construction at the time the Stanford Bulletin went to press.
ADMISSION

UNDERGRADUATE

MATRICULATED STUDY

In order to preserve the residential character of the University and to maintain a favorable student-faculty ratio, Stanford has a limited undergraduate enrollment. The anticipated size of the freshman class is 1,600 students. Between 100 and 120 transfer students, entering either the sophomore or junior class, are also admitted each year. For both freshman and transfer admission, the University receives many more applications from qualified students than there are places available.

Stanford's undergraduate community is drawn from throughout the United States and many other countries. It includes men and women whose abilities, intellectual interests, and personal qualities will allow them to benefit from and contribute to the University's wide range of teaching and research programs in the humanities, sciences, and engineering. The University admits students with highly developed skills in particular areas, as well as those with versatility in a number of fields. A comprehensive financial aid program aims to promote broad socioeconomic representation. Stanford is committed to meeting the University-computed financial need of each admitted student, and admission decisions are made without regard to the applicant's economic resources except in the case of some international students.

Affirmative action programs encourage development of a truly multicultural community, and special effort is made to attract, enroll, and provide support services for a group of undergraduates that is diverse in many ways. Admission practices are in accordance with University policies on nondiscrimination, and there are no restrictive quotas of any kind.

The primary criterion for admission is academic excellence: a compound of exceptional ability, scholastic performance in relation to available opportunities, and promise of intellectual growth. A secondary criterion is personal achievement outside the classroom in a range of pursuits including academic activities, the creative and performing arts, community service and leadership, athletics, and other extracurricular areas. Persistence and marked effectiveness in one or more distinct areas of personal achievement count for more than scattered involvement; initiative, curiosity, and vigor are also valued. The consideration of applicants for admission focuses on scholastic performance (grades, honors, and strength of program); scores on standardized national tests; documented perseverance and attainment in activities outside the classroom; quality of conception and writing in the personal statement; and enthusiasm of recommendations from staff at the secondary school. Admission officers base their comparative evaluation of each applicant on these criteria.

Applicants in certain categories may receive special consideration provided they meet the basic requirements of academic excellence and personal achievement. The University is committed to a substantial representation in the undergraduate community of African Americans, Mexican Americans, and Native American Indians, as well as others whose backgrounds and experience provide additional dimensions that will enhance the University's programs. Children of Stanford graduates receive preferential consideration in choices among applicants with approximately equal qualifications, and children of eligible Stanford faculty and staff receive favorable consideration provided they too meet basic requirements. The Department of Athletics may request special consideration for outstanding athletes. In all cases, the final decision on an application rests with the Dean of Admission and Financial Aid.

Stanford expects students to adhere to the principles of its Fundamental Standard: "to show both within and without the University such respect for order, morality, personal honor, and the rights of others as is demanded of good citizens." Admission officers seek undergraduates they believe will benefit most from the University's resources, contribute to its community and to the education of their fellow students, and proceed to a lifetime of intellectual, personal, and societal accomplishment.

Since application procedures and requirements vary from year to year, specific information regarding application for admission as either a freshman or transfer student should be obtained by writing to the Office of Undergraduate Admission, Stanford University, Stanford, CA 94305-3005.

NONMATRICULATED STUDY

Admission to Stanford as a nonmatriculated student during Autumn, Winter, and Spring Quarters is not routinely approved except under extenuating circumstances. Nonmatriculated students authorized to enroll at Stanford University are not admitted to any Stanford degree program and are permitted to register for a specific period, usually one, two, or three quarters. Financial assistance from Stanford University is not available. Acceptance as a nonmatriculated student does not guarantee subsequent admission as a matriculated student. Students interested in nonmatriculated status during the Autumn, Winter, and Spring Quarters should contact the Registrar's Office. The two most common categories of nonmatriculated undergraduate status are described below.

High School Nonmatriculated Students—Local high school students are eligible to be considered to attend Stanford as nonmatriculated students on a limited basis when they have exhausted all of the courses in a given discipline offered by their high school. Nonmatriculated high school students are permitted to enroll in one course per quarter and are required to pay the applicable tuition if admitted.

Post-High School Nonmatriculated Students—Stanford admits nonmatriculated undergraduates, who have already earned a high school degree or equivalent, only under extraordinary circumstances. Such students are required to pay full tuition if admitted, and are not eligible for financial assistance from Stanford University.

Students wishing to enroll as nonmatriculated students during Summer Quarter should contact the Summer Visitor Program. Admission to the Summer Visitor Program does not imply regular admission to Stanford for subsequent quarters or to one of Stanford's regular degree programs.

GRADUATE

MATRICULATED STUDY

Applicants from colleges and universities of recognized standing who hold a U.S. bachelor's degree or its equivalent are eligible to be considered for admission for graduate study. Details regarding degrees offered in specific departments are given in the Guide to Graduate Admission included with application materials. The number of applicants who can be admitted for work in a particular field of study at any time is limited by the facilities of the school or department and by the number of matriculated students who continue their work in that field.

The Coterminal Degree Program—This program permits matriculated Stanford undergraduates to study for bachelor's and master's degrees simultaneously in the same or different departments. Application procedures are established by each master's department. Applications must be submitted no earlier than the student's completion of 105 units, or eighth quarter of undergraduate study. Stanford quarters and transfer quarters are included (calculated by dividing the total transferred units by 15). Applications must be submitted at least four quarters before the expected conferral of the master's degree, and approved no later than the eleventh quarter of undergraduate study (Stanford quarters and transfer quarters included and calculated as above). Students who decide to apply for admission to master's programs after these deadlines are not eligible for the coterminal program and must apply through the regular graduate admission process.
APPLICATION PROCESS

Specific information regarding test requirements, other application procedures and requirements, and closing dates for filing applications and supporting credentials for admission and financial aid are listed in the Guide to Graduate Admission.

Graduate fellowship funds and assistantships are generally committed in March for the entire period comprising Autumn, Winter, and Spring Quarters of the next academic year. Awards are seldom made to students who enter the University in Winter, Spring, and Summer Quarters; such applicants must meet the same financial aid application requirements as those entering in Autumn Quarter.

Applications may be submitted electronically for graduate programs in the schools of Earth Sciences, Education, Engineering, Humanities and Sciences, and the Biosciences (non-M.D. programs in Medicine). Application instructions may be found at www.stanford.edu.

The Guide to Graduate Admission and application forms for graduate matriculated study may be obtained from Graduate Admissions, Registrar’s Office, Old Union, Stanford University, Stanford, California 94305-3005, except for the following programs:

Business—Applicants should write to Director of Admissions of the M.B.A., Ph.D., or Sloan Program, Graduate School of Business, Stanford University, Stanford, California 94305-5015 for information and application forms.

Law—Applicants should write to Director of Admissions, School of Law, Stanford University, Stanford, California 94305. The Law School Admissions Test is required.

M.D. Program—Applicants should write to Admissions Committee, School of Medicine, 851 Welch Road, Palo Alto, California 94304 for an AMCAS (American Medical College Application Service) application request card and information about the M.D. program. Applications and transcripts must be received by AMCAS by November 1. The Medical College Admissions Test is required.

Coterminal Master’s Program—Interested Stanford undergraduate students should contact directly the department in which they wish to pursue a master’s degree and must adhere to the application deadlines described in The Coterminal Degree Program above.

UNIVERSITY DIVISION

Under exceptional circumstances, students may be accepted for matriculated graduate study without having obtained the bachelor’s (or equivalent foreign) degree. These exceptional admissions are classified as “University Division” students. Applicants are considered for University Division admission if (1) a normal course of study has not been followed but high professional skills in the field of interest have been demonstrated; (2) the undergraduate record is exceptional and the applicant has obtained at least senior standing at an educational institution of recognized standing; or (3) the undergraduate record at a foreign institution is exceptional and is considered by Stanford to represent an amount of work that is the equivalent of a bachelor’s degree. University Division students may be required to complete additional course work to fulfill degree requirements.

NONMATRICULATED STUDY

Graduates of colleges and universities of recognized standing who hold a U.S. bachelor’s degree or its equivalent are eligible to apply for nonmatriculated graduate student status. This status may be granted to graduates of the University who have not yet enrolled or who have not been admitted to a graduate program. Applicants must meet the standard admission requirements and should not anticipate special priority because of work completed as a nonmatriculated student. Students who are admitted to a graduate program may apply for housing but will have a low priority for assignment. No fellowships, assistantships, or Stanford loans are available for nonmatriculated students.

Nonmatriculated students who later apply for admission to a degree program must meet the standard admission requirements and should not anticipate special priority because of work completed as a nonmatriculated student. Students who are admitted to a degree program may apply for a maximum of one quarter of nonmatriculated study toward the residency requirement for a master’s degree and two quarters for the Engineer or Ph.D. degree.

Application forms for nonmatriculated status during the regular academic year are available from Graduate Admissions, Registrar’s Office, Old Union, Stanford, CA 94305-3005. Deadlines for applying are included with the forms and are generally two months before the start of the quarter.

Applications interested in nonmatriculated student status for the Summer Quarter only should contact the Summer Session Office, Building 590, Room 104, Stanford University, Stanford, CA 94305-3005.

POSTDOCTORAL SCHOLARS

Prospective postdoctoral scholars should write directly to the department in which they wish to study.

Postdoctoral scholars who are paid as Research Affiliates through Stanford grants and contracts must enroll as nonmatriculated graduate students each quarter of their appointments. They are thereby eligible for most student benefits. Scholars who are supported by other funds have the option of registering, except in the School of Medicine which requires that all postdoctoral scholars be registered. Postdoctoral scholars must have received the Ph.D. within the last three years or the M.D. within the last six years.

The School of Medicine has an additional special student category, the School of Medicine Fellow, which is open to those holding the M.D. for more than six years or the Ph.D. for more than three years and who have been invited to Stanford to undertake further training in modern medical technology.

Postdoctoral scholars who are not required to register as nonmatriculated students may request Visiting Scholar status. This option is available only to an individual who is visiting from an outside institution or organization, who has a doctoral degree or is a recognized expert in his or her field, and whose source of funding is not Stanford. Appointments are authorized by department chairs. Visiting scholars are not eligible for student benefits.

VISITING RESEARCHERS

In limited instances, it is to the benefit of Stanford faculty to permit persons who have not yet obtained a Ph.D. (or its foreign equivalent) or who are not recognized experts in their fields to engage in research on the Stanford campus using Stanford research facilities. Such instances might include students at other universities who are engaged in doctoral research in a field of interest to the faculty member, a person doing a laboratory rotation as part of a larger research study or grant, or employees of companies who are conducting research which requires specialized equipment available only at Stanford.

In these instances, since the person is not eligible for Visiting Scholar status, they may be eligible to register as nonmatriculated graduate students in the Visiting Researcher category for a maximum of one year. Invited persons must be qualified to conduct research at a level comparable to that of other Stanford graduate students, and the research must be of benefit to Stanford as well as to the visitor. Admission forms for visiting researchers are submitted to the Registrar’s Office by the department issuing the invitation.

Visiting researchers are charged the Permit to Attend for Services Only tuition rate quarterly and may waive the University’s student medical insurance plan only if they have comparable coverage with another
carrier. They may not enroll in or audit any courses, but in quarters they are registered, are eligible for the usual student benefits of nonmatriculated student status. Visiting researchers may apply for housing, but will have a low priority for assignments. No fellowships, assistantships, or Stanford loans are available for visiting researchers. Stanford cannot certify visiting researchers for deferment of U.S. educational loans. Citizens of other countries who enter the United States to be visiting researchers at Stanford must have an IAP-66 issued by the Bechtel International Center and must register each quarter, including Summer Quarter, to maintain their visa status.

**VISAS FOR FOREIGN STUDENTS**

All students who are not U.S. citizens or permanent residents must obtain visas for their stay in the United States. The types of visas available for students are the following:

1. **Student Visa (F-1)**, obtained with an I-20 Certificate of Eligibility issued by Stanford University. The graduate student on an F-1 visa must enroll in a full course of study. The accompanying spouse or child enters on an F-2 visa. F-2 visa holders may not work.
2. **Exchange-Visitor Visa (J-1)**, obtained with an IAP-66 Certificate of Eligibility issued by Stanford University or a sponsoring agency. This visa is issued to graduate students supported by certain agencies, foundations, and governments. In some cases, Exchange-Visitors must leave the United States at the conclusion of their programs, may not change visa status, and may not apply for permanent residency in the United States until they have returned to their home countries for at least two years. The spouse of an Exchange-Visitor enters on a J-2 visa and may, in some cases, obtain permission to work.

The certificate of eligibility is issued to a student accepted for admission only upon receipt of evidence of satisfactory proficiency in the English language and certification of adequate financial support. A student transferring from another school must obtain a new visa with a Stanford certificate of eligibility.

Information on visas is sent to admitted graduate students from the Graduate Admissions Office. Information on visas for postdoctoral scholars may be obtained from the Bechtel International Center.

The University requires that all students who are not U.S. citizens or permanent residents maintain a visa status that allows registration as students.

**FINANCIAL AID**

**UNDERGRADUATE**

The University has a comprehensive need-based financial aid program for its undergraduate students (except some international students) who meet various conditions required by the state or federal government, the University, and other outside donors.

In awarding its own funds, the University assumes that students and their parents (or spouse, in the case of married students) accept the first and primary responsibility for meeting the standard educational costs established by the University. Additionally, Stanford expects financial aid applicants to apply for and use resources from state, federal, and private funding sources, contribute from their earnings during enrollment periods, for example, summer, and use student loans and earnings from part-time employment during the academic year to meet educational expenses. If Stanford determines that an applicant and his or her family cannot meet these expenses, the University may offer student loans, recommend part-time employment during the academic year, and/or award scholarships or grants to help meet these costs. Stanford’s policy generally is to exclude undergraduates from being considered financially independent of their parents for University-administered scholarship and grant aid unless the student is an orphan, a ward of the court, or at least age 25, or has an extremely adverse home situation.

In awarding Stanford financial aid funds to meet need, that is, any gap remaining after reducing the standard budget by the University-determined need, any outside resources to which the student is entitled such as state or Pell grants, tuition benefits, and so on, Stanford first offers "self-help," which includes student loans and an academic year earnings expectation. The University normally expects that during enrollment periods, students will work and borrow up to approximately 20 percent of the standard budget. The self-help expectation may be lower for certain categories of students including those from very low-income families, those who are academically in the top five to ten percent of an entering class, and those who bring diversity to the Stanford student body. If the University-determined need is greater than the self-help expectation, Stanford awards scholarship or grant funds to meet the remaining need.

Scholarships or grants from outside private sources may change the University’s financial aid award. If the total in outside scholarships exceeds the need-based earnings expectation and loan portion of the financial aid package, the University then reduces its own scholarship or grant offer dollar for dollar.

The University considers applicants for its own scholarship and grant support beyond the twelfth quarter only if enrollment is essential in order to complete the minimum requirements for the first baccalaureate degree or major; a total of fifteen quarters is the limit for such aid. Students who enroll for a fifth year in pursuit of a coterminous program, a minor, a second major, a second degree, or the B.A.S. degree are not eligible for University scholarship and grant consideration but may apply for student loans.

**APPLICATION AND AWARD NOTIFICATION PROCESS**

**FILING DEADLINES**

- **Prospective freshmen**: Early Decision, November 1, 1999
- **Prospective freshmen**: Regular Review, February 1, 2000
- **Prospective transfers**: March 15, 2000
- **Returning students**: April 15, 2000

**APPLICANT DOCUMENTS**

The documents the applicant must submit each year for financial aid consideration vary depending on the applicant’s nationality and the type of funds sought.

- U.S. citizens and permanent residents who wish to be considered for all available funding administered by Stanford should submit the following documents. Canadians file the following except the FAFSA.
  1. **Free Application for Federal Student Aid (FAFSA)**, which must be processed by the federal processor. California residents must also submit a GPA Verification Form or SAT scores to the California Student Aid Commission (CSAC) by March 2, 2000, for Cal Grant consideration.
  2. **The PROFILE processed by the College Scholarship Service (CSS)**.
  3. **Copies of 1998 W-2 forms from the applicant’s parents for continuing students. Copies of 1998 W-2 forms and tax statements from the applicant’s parents for new students.**

A complete application for U.S. citizens and permanent residents applying for Stafford loan consideration only include:

- **Free Application For Federal Student Aid (FAFSA)**, which must be processed by the federal processor
- **Copies of 1998 W-2 forms from the applicant’s parents for continuing students. Copies of 1998 W-2 forms and tax statements from applicant’s parents for new students.**

A complete application for international students (except Canadians) includes the Foreign Student Financial Aid Application and the Certificate of Finances.

Students whose application materials are filed after the published deadlines, who have not borrowed or worked in prior years, who have not secured all external funds such as Pell and Cal Grants, can expect higher levels of self-help in their financial aid packages.

Applicants and their parents are required to submit accurate and complete information on all application documents. To monitor for accuracy and reliability of information, the University participates in a U.S. Department of Education project that samples the reliability of the data.
on a number of applications. The FAO may request documents, in addition to the application materials, to verify this information. Students will have their financial aid funds withheld or canceled and their future registration held if they fail to submit the information requested. Financial aid awards may change as a result of the verification process.

NOTIFICATION DATES

The FAO will notify early decision applicants who apply by the November filing date in December. The FAO will notify the freshman applicants who apply by the February 1 filing date in early April. Transfer applicants who submit complete applications by the March 15 filing date are normally notified of their financial aid award within 10 days of their notice of admission.

The FAO begins mailing award notices to continuing and returning applicants approximately the middle of July. Applicants who file after the filing date may not have a financial aid award or funds secured for disbursement by the Autumn Quarter payment due date.

PAYMENT AND FINANCING OPTIONS

Students whose financial aid is not available at the time registration fees are due may use the University's Deferred Payment Plan.

Parent loan and financing options may help families of students receiving financial aid meet the expected parent contribution. Many of these options are also available to families who do not qualify or apply for financial aid but feel the need for some extended financial credit to help meet the costs of attendance. Parents should also contact their employers for information about programs that may be available to them as employees' benefits to help meet college costs.

GRADUATE

Academic departments at Stanford University offer financial support to many graduate students. Funds are most often targeted to doctoral candidates and rarely cover all of a student's expenses. In addition to Stanford support, students usually need to use long-term loans, savings, liquidated assets, a spouse's earnings, or parental support. They are expected to study full time in order to attain the degree as soon as possible. Students with families to support or with medical or other special needs should budget income and expenses carefully. Loan funds alone may be insufficient to meet the expenses not covered by the Stanford award.

Students should consider part-time employment only after consultation with their department advisers and if no other alternative is possible. Students fully supported by Stanford are limited to additional employment of no more than eight hours per week; due to visa restrictions, international students may not be similarly employed.

Note—No fellowships, assistantships, or loans are available for nonmatriculated students.

FELLOWSHIPS AND ASSISTANTSHIPS

Fellowships, research assistantships, and teaching assistantships provide funds for graduate student support. Departments determine the disposition of funds available for graduate fellowship and assistantship appointments. Academic merit and availability of funds are the primary considerations in the awarding of graduate financial support. The availability of aid varies considerably among departments and programs. Support offers range from partial tuition fellowships to awards that provide full tuition and a living stipend. Some departments admit only those students to whom they can offer support or who have guaranteed funds from outside sources. Other departments may offer admission but are unable to provide financial assistance due to limited financial resources. Very few awards are given for study toward terminal master's degrees.

Application procedures and deadlines for admission and financial aid are described in the Guide to Graduate Admission. Fellowships and assistantships are normally awarded between March 15 and April 15, in accordance with the Council of Graduate Schools resolution. Acceptance of a Stanford award obliges the student to inform the department of any other support received. The Stanford award may be adjusted (see "Outside Fellowships" below). Recipients of all graduate fellowships and assistantships must register each quarter of their appointment.

POSTDOCTORAL FELLOWSHIPS

Stanford has two categories of postdoctoral scholars. Postdoctoral Research Affiliates are classified as advanced students who are employed on contracts and on research and training grants. Postdoctoral Fellows are categorized as advanced students whose funding is from outside sources, typically foundations and foreign governments. Inquiry should be made directly to the department.

OUTSIDE FELLOWSHIPS

Many Stanford graduate students hold fellowships won in national competition from outside agencies such as the National Science Foundation. Information on application procedures and terms of such fellowship programs may be obtained from reference materials in the applicant's current academic institution. If not, the student should write for information directly to the national office of the agency or foundation administering the program. A student who receives support from an outside source must notify the department immediately. The Stanford award may be adjusted.

LOANS

Graduate students who believe they will require loan assistance can apply for Federal Stafford Student Loan, Federal Perkins Loan, and University Loan programs. Inquiries for publications outlining loan program terms can be directed to Financial Aid Office, 520 Lasuen Mall, Old Union, Room 322, Stanford, CA 94305-3021; phone (888) FAO-3773 from outside the Bay Area and (650) 723-3058 locally. International students who are not permanent residents are not eligible for long-term loans.

Application—(The following information applies to all graduate students, except those in the schools of Law and Business and in the M.D. program in the School of Medicine, who should receive information about the aid application process through their respective schools.) Graduate student loan information is sent after admission; a tear off portion of that brochure may be used to request a graduate loan application packet, including detailed loan program information, forms, and instructions. Required application documents are:

1. The results of filing the Free Application for Federal Student Aid (FAFSA) with the federal processor.
2. Stanford Graduate Supplemental Application

Students who anticipate the need to use loan proceeds to pay Autumn Quarter bills should have their completed application filed with the FAO by the June prior to the beginning of the academic year. The FAO will notify the student of loan eligibility, which is based on a review of computed financial need, satisfactory academic progress, level of indebtedness, credit history, and availability of funds.

Debt Management—The University encourages wise debt management. Software is available to help students plan for future repayment.

Short-Term Loans—Emergency loans are available to all students with a good credit history, including international students, upon demonstration of ability to repay the loan within three months. These loans are not available to pay University bills.

COTERMINAL STUDENTS

Stanford undergraduate scholarship and grants are reserved for students in their first four years of undergraduate study at Stanford. University graduate fellowships are rarely given to coterminous students, but some departments award research and teaching assistantships to coterminous master's students who are eligible for such appointments in the quarter after they have completed 180 units. Students on 50 percent assistantships register for 9 units per quarter and accrue 62 percent of a full-tuition quarter of residency; such assistantships provide a salary and coverage. Most private and federal graduate fellowships are awarded only to students who have received the bachelor's degree.
HONORS COOPERATIVE PROGRAM

Under a graduate cooperative program in engineering and science, employees from over 200 companies in the San Francisco Bay area are released from work, with full compensation, to attend regular classes at Stanford. Most of these companies have joined a Stanford four-channel television network that enables students to observe live lectures with talk-back privileges in their own plants. For a list of participating companies, write to the Stanford Center for Professional Development, 496 Lomita Mall/Durand Building, Stanford University, Stanford, CA 94305-4036.

VETERANS' BENEFITS

Liaison between the University, its students, and the various federal, state, and local agencies concerned with veterans' benefits is provided by the Office of the Registrar located in the Old Union Building. All students eligible to receive veterans' benefits while attending the University...
Tuition, Fees, and Housing

ASSESSMENTS

TUITION

Regular tuition for the 1999-2000 academic year, payable Autumn, Winter, and Spring Quarters, is as follows:

<table>
<thead>
<tr>
<th>Department/Program</th>
<th>Tuition Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All departments and schools (except those below)</td>
<td>$7,686</td>
</tr>
<tr>
<td>Graduate Division in Engineering</td>
<td>$8,196</td>
</tr>
<tr>
<td>Graduate School of Business</td>
<td>$9,081</td>
</tr>
<tr>
<td>School of Medicine (M.D. Program)</td>
<td>$9,516</td>
</tr>
<tr>
<td>School of Law (payable Autumn and Spring semesters)</td>
<td>$13,079</td>
</tr>
<tr>
<td>J.D./M.B.A. Program (payable Autumn and Spring semesters)</td>
<td>$13,269</td>
</tr>
</tbody>
</table>

Regular tuition fees apply to the undergraduate Overseas Studies and Stanford in Washington programs. For Summer Quarter tuition rates and policies, see the Stanford University bulletin, Summer Session Catalogue, 2000.

GRADUATE STUDENTS

Advanced Graduate Registration (AGR): doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the University oral exam and dissertation, accrued 10.5 quarters of residency, and submitted a Doctoral Dissertation Reading Committee form may request Advanced Graduate Registration status to complete their dissertations. Students pursuing Engineer degrees may apply for TGR status after admission to candidacy, completion of all required courses, and six quarters of residency. Students enrolled in master's programs may apply for TGR status upon completion of all required courses and three quarters of residency only if their program requires a final master's project.

TGR status may also be granted for one quarter only to a graduate student who is returning after a leave of absence or after reinstatement, or to graduate students who register for one final term to take a University Oral Examination, submit a thesis or dissertation, or file an Application to Graduate. Doctoral students applying for a one-quarter TGR status must also meet the doctoral criteria above except that they need only nine quarters of residency. Requirements for one-quarter TGR for master's and Engineer students are as above, but master's students need not be in a program with a final writing project requirement to qualify.

Each quarter, all TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. After the first TGR quarter, this enrollment will be conducted by the Registrar's Office if the TGR student is registered by the Friday before the study list deadline and if the TGR student has an 801 or 802 enrollment in a previous quarter. Enrollments will not be created for the TGR student who is attending a professional school. TGR students register at a special tuition rate: $940 in 1999-2000. Within certain restrictions, TGR students may enroll in additional courses, at the appropriate unit rate.

Graduate Final Requirement Registration: graduate students who need only a few remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 8 units) to cover the deficiency. This status may be used only once during a degree program.

Additional information on these registration categories is available from the Degree Progress Office in the Old Union.

Matriculated graduate students who have Stanford fellowships or assistantships that require less than full-tuition registration may register at the unit rate required by their award. Honors Cooperative students register at the unit rate.

During the Autumn, Winter, and Spring Quarters, matriculated graduate students in most departments may register at the 8-, 9-, or 10-unit rate if their enrollment plans are accepted by their departments. Students in the departments of Applied Physics, Mathematics, and Statistics, because of department affiliation with the Honors Cooperative program, are not eligible to register at less than the full-tuition rate, unless they are eligible for one of the special categories above or a departmentally-approved exception. Students in the School of Engineering may register at the 9-unit rate. Students in the schools of Law and Business, or the M.D. program in the School of Medicine, should consult appropriate school officials about tuition reduction eligibility.

Tuition exceptions may also be available for students who are faculty spouses, regular Stanford employees, or full-time educators in the Bay Area.

During Summer Quarter, most matriculated graduate students may register on the unit basis for 3 or more units. Students in schools and departments affiliated with the Honors Cooperative program, as listed above, may not register below the 12-unit rate (9-unit minimum in Statistics only).

Nonmatriculated graduate students may pay the same tuition rates as matriculated students, but must register at the 8-unit rate or above. Post-doctoral scholars who are registered as students and Visiting Researchers enroll in no courses and pay the TGR rate. Within certain restrictions,
postdoctoral students may enroll in courses if the appropriate unit rate for tuition is paid.

INTERNATIONAL STUDENTS

F1 or J1 visas are required by the U.S. Immigration and Naturalization Service. International students must be registered as full-time students during the academic year. Summer Quarter registration is not required. International graduate students comply with immigration regulations while enrolled for partial tuition if their Stanford fellowships or assistantships require part-time enrollment, if they are in AGR or TGR status, or if they are in the final quarter of a degree program. Nonmatriculated international students must register for at least 8 units.

FEES

APPLICATION FEE

Contact the Undergraduate Admissions Office for information about the undergraduate application fee and the Graduate Admissions section of the Registrar’s Office for the current graduate application fee. Application fees for the School of Law, the School of Medicine, and the Graduate School of Business vary by program. Fees are payable at the time of application and are not refundable.

ASSU FEES

The Associated Students of Stanford University (ASSU) fees are established by student vote in Spring Quarter. Fees directly fund activities of student organizations and not operations of ASSU. The 1999-2000 fees are:

- Undergraduates—Autumn, $56; Winter, $55; Spring, $60
- Graduates—Autumn, $23; Winter, $24; Spring, $25
- Law—Autumn, $23; Spring, $49

Fees are assessed each term. All fees are refundable. Refunds can be requested during the first three weeks of each quarter per instructions advertised in the Stanford Daily. Those eligible are mailed refund checks by the eighth week of the quarter or receive credit on their University bill.

DOCUMENT FEE

Stanford charges a one-time Document Fee to all students admitted to new degree or non-degree programs in 1993 or later. The fee is paid once only, regardless of the number of degrees a student may ultimately pursue. It covers the cost of a variety of University administrative services such as enrollment and degree certification, course drops and adds, diplomas, and official transcripts and their production.

HEALTH INSURANCE FEE

The University requires all registered students to carry medical insurance to provide coverage for services not provided by Cowell Student Health Services. Students are enrolled in and charged for the Stanford student health insurance plan, unless they have completed waiver procedures by the second day of instruction. Those who carry medical insurance through an alternate carrier are generally eligible for waiver of the health insurance fee.

SPECIAL FEES

New Student Orientation Fee—A fee is charged to all entering undergraduates for the costs of orientation, including room and board, and for the cost of class dues to provide funds for later activities of the class.

School of Law Course Materials Fee—A fee is charged each semester to School of Law students for supplementary course materials.

Late Fees—Charges are imposed for late registration and late submission of study lists. Amounts are listed in the quarterly Time Schedule.

Laboratory Fee—Students in chemistry laboratory courses are charged a nonrefundable fee.

Music Practice; Athletics, Physical Education, Recreation; and Dance—Courses for which special fees are charged are indicated in the Time Schedule.

Dissertation Fee—Each Ph.D., D.M.A., and Ed.D. candidate is charged a fee to cover the cost of microfilming and binding the dissertation and the cost of publishing the abstract.

International Scholar Service Fee—A one-time fee for Visa authorization documents is charged to international postdoctoral and visiting scholars.

Vehicle Registration Fee—Students must register their motor vehicles with the campus Department of Public Safety. Parking permits may be purchased at Parking and Transportation, 855 Serra Street.

HOUSING

Bulletins with further information on housing rates are Summer Session Catalogue, 2000, for Summer Quarter; School of Law for Law School; Overseas Studies for Overseas Centers.

Campus housing rates are generally below local area market rents. The approximate room rates for the 1999-2000 academic year are as follows:

<table>
<thead>
<tr>
<th>Residences</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate Single Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dormitories and University-operated houses</td>
<td>$1,372</td>
<td>$1,256</td>
<td>$1,223</td>
<td>$3,851</td>
</tr>
<tr>
<td>Theme or self-operated houses</td>
<td>$1,646</td>
<td>$1,507</td>
<td>$1,468</td>
<td>$4,621</td>
</tr>
<tr>
<td>Co-ops, Fraternity, Sorority, or student-cleaned houses with professional cooks</td>
<td>$1,468</td>
<td>$1,344</td>
<td>$1,309</td>
<td>$4,121</td>
</tr>
<tr>
<td>Mirrielee (apartments)</td>
<td>$1,549</td>
<td>$1,419</td>
<td>$1,382</td>
<td>$4,351</td>
</tr>
<tr>
<td>Suites</td>
<td>$1,533</td>
<td>$1,404</td>
<td>$1,367</td>
<td>$4,304</td>
</tr>
<tr>
<td>Graduate Single Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dormitories (single occupancy)</td>
<td>$1,247</td>
<td>$1,142</td>
<td>$1,112</td>
<td>$3,502</td>
</tr>
<tr>
<td>Dormitories (double occupancy)</td>
<td>$910</td>
<td>$833</td>
<td>$811</td>
<td>$2,554</td>
</tr>
<tr>
<td>Liliore Green Rains Houses (apartments)</td>
<td>$1,538</td>
<td>$1,409</td>
<td>$1,372</td>
<td>$4,319</td>
</tr>
<tr>
<td>Richard W. Lyman (apartments)</td>
<td>$1,538</td>
<td>$1,409</td>
<td>$1,372</td>
<td>$4,319</td>
</tr>
<tr>
<td>Schwab Residential Center (apartments)</td>
<td>$2,231</td>
<td>$2,043</td>
<td>$1,989</td>
<td>$6,264</td>
</tr>
<tr>
<td>Escondido Village (single student apartments)</td>
<td>$2,705</td>
<td>$2,477</td>
<td>$2,412</td>
<td>$7,594</td>
</tr>
<tr>
<td>1 bedroom (single occupancy)</td>
<td>$1,079</td>
<td>$988</td>
<td>$962</td>
<td>$3,030</td>
</tr>
<tr>
<td>2 bedroom (double occupancy)</td>
<td>$1,538</td>
<td>$1,409</td>
<td>$1,372</td>
<td>$4,319</td>
</tr>
<tr>
<td>2 bedroom (triple occupancy)</td>
<td>$1,079</td>
<td>$988</td>
<td>$962</td>
<td>$3,030</td>
</tr>
<tr>
<td>3 bedroom</td>
<td>$1,391</td>
<td>$1,274</td>
<td>$1,241</td>
<td>$3,906</td>
</tr>
<tr>
<td>Couples without Children:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escondido Village</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 bedroom</td>
<td>$2,705</td>
<td>$2,477</td>
<td>$2,412</td>
<td>$7,594</td>
</tr>
<tr>
<td>2 bedroom loft</td>
<td>$3,078</td>
<td>$2,816</td>
<td>$2,744</td>
<td>$8,638</td>
</tr>
<tr>
<td>Students with Children:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escondido Village</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 bedroom</td>
<td>$863 per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 bedroom</td>
<td>$989 per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 bedroom</td>
<td>$1,195 per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 bedroom</td>
<td>$1,420 per month</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* All rates are approximate and subject to minor changes.

All rates are per student. Room rates are charged quarterly on the University Bill. Information on payment options and procedures is discussed in housing assignment information from Housing Assignment Services and is available in complete detail from the Bursar’s Office, Old Union, Room 105, Stanford University, Stanford, CA 94305.

A quarterly house dues fee for students is generally determined by the local staff and/or residents of the house and may be included with room and board charges on the University Bill.
MEAL PLANS*

Meal plan rates are as follows for the 1999-2000 academic year:

<table>
<thead>
<tr>
<th>Meal Plans</th>
<th>Quarterly Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aut</td>
<td>Win</td>
</tr>
<tr>
<td>&quot;Traditional&quot; Meal Plans (all-you-can-eat): for residents of Branner, Lagunita, Moore, Roble, Sterling Quad, Stern, and Wilbur</td>
<td>$1,437</td>
</tr>
<tr>
<td>19 meals/week</td>
<td>14 meals/week</td>
</tr>
<tr>
<td>&quot;A La Carte&quot; Plans† (declining balance): for residents of Manzanita Park</td>
<td>$1,437</td>
</tr>
<tr>
<td>Premium a la Carte</td>
<td>Regular a la Carte</td>
</tr>
<tr>
<td>Open Kitchen Plans: for residents of American Studies and Yost</td>
<td>$1,274</td>
</tr>
</tbody>
</table>

* All rates are approximate and subject to change.  
† An administrative fee is withheld from the a la carte dollars given to spend. Up to $50 in a la carte points may be carried over each quarter until Spring Quarter.

Cardinal Dollars may be purchased through University Dining Services by non-meal plan members and meal plan members who wish to supplement their plan. Cardinal Dollars may be used at any University Dining Services facility for regular meals, afternoon service, late night pizza, and the Sports Cafe in the Arrillaga Family Sports Center. Cardinal Dollars carry over until the end of the academic year and are not refundable, except for the first two weeks of the quarter in which they were purchased. Cardinal Dollars are not accepted at Tresidder Memorial Union. The minimum buy-in is $10.00.

All University Dining Services locations also accept the Stanford Card, which is available through the Cashier’s Office, Old Union, room 107.

PAYMENTS

All charges and credits from offices within the University are aggregated in a student’s individual account and presented on the University Bill. The bill may include tuition, housing, food service, ASSU fees (special student-approved association fees set by the ASSU Senate), health insurance, and any miscellaneous charges incurred such as music lessons, cleaning, or re-keying charges. All amounts are due and payable upon receipt of the University Bill, but term-based charges (that is, tuition, room and board, ASSU, and health insurance fees) are always due by the day preceding the first day of instruction whether or not a bill has been received. Payment made on a Student Account after that date is subject to late fees 30 days after the first bill for it has been issued.

A Student Account (and its associated University Bill) may be paid with personal check (drawn on U.S. banks in U.S. funds), cash, scholarships, loan proceeds (for example, Perkins, Stafford, or University-issued), or proceeds of loans to parents (for example, CLAS, PLUS). Payments must be made in a form acceptable to the University. Shortfalls from any of the above categories may be made up in whole or in part from the University’s Deferment Loan Program (described below) for matriculated students. The University does not accept credit card payments.

LATE PAYMENT

All charges recorded in a Student Account must be paid by 5 p.m. on the day preceding the first day of instruction whether or not a bill has been received. Payment made on a Student Account after that date is subject to an additional charge in accord with the following fee schedule:

- $25 if payment is made on or after the first day of instruction, but during the first week of the term
- $40 if payment is made during the second week of the term
- $55 if payment is made during the third week of the term
- $75 if payment is made during the fourth week of the term
- $100 if payment is made during the fifth week of the term
- $125 if payment is made during the sixth week of the term or later

DEFERMENT LOAN PROGRAM

Deferment Loans (also known as “deferments”) are short-term loans and are available to matriculated students at the beginning of each term. The proceeds from a Deferment Loan may only be used to pay current term fees. The Deferment Loan may be used to avoid the application of Late Payment Fees described above. The terms of the Deferment Loan are:

1. $20 Deferment Loan Application Fee.
2. An annual interest rate of 10 percent assessed on the Deferment Loan principal until the date payment is received or until the due date, whichever comes first, in accord with the following schedule:

   - **Quarter** | **Deferment Due Date**
   - Winter | November 5, 1999
   - Spring | May 11, 2000
   - Summer | July 19, 2000

3. Any portion of the amount of the loan may be prepaid before the due date without prepayment penalty.
4. Amounts remaining unpaid after the due date are delinquent and subject to a late charge of $25.00, and additional interest at the maximum rate permitted by California law (including California Financial Code §28000), or such lesser rate as the University may determine, in its sole discretion, from the due date until paid.

DELINQUENT ACCOUNTS

Delinquent accounts (such as for tuition, fees, housing, meal plans, or for other amounts owed to the University) are reported to the Registrar’s Office, which places a “hold” on the student’s further registration and on the release of transcripts and diplomas until the past-due account has been paid. In addition, delinquent accounts may be reported to one or more national credit bureaus and/or commercial collection agencies.

REFUNDS

TUITION

Students who withdraw from the University before the end of a term may receive refunds of portions of their tuition as described below.

ANNULED REGISTRATION

Students who withdraw from the University voluntarily on or before the first day of instruction may have their registrations annulled. Tuition is refunded in full. Such students are not included in University records as having registered for the term and new students will not secure any privileges for admission for any subsequent quarter as returning students. An annulment does not automatically cancel health coverage unless the annulment is granted by the first day of instruction. Financial aid recipients should be aware that a proportion of any refund is returned to the various sources of aid.

CANCELLATION OF REGISTRATION OR SUSPENSION FOR CAUSE

Students who have their registrations canceled or are suspended from the University for cause receive refunds on the same basis as those receiving leaves of absence unless otherwise specified in the disciplinary action taken. A student whose registration is canceled less than one week after the first day of instruction for an offense committed during a preceding quarter receives a full refund of tuition fees.
INSTITUTIONAL INTERRUPTION OF INSTRUCTION

It is the University’s intention to do everything possible to avoid taking the actions described in this paragraph. However, should the University determine that continuation of some or all academic and other campus activities is impracticable, or that their continuation involves a high degree of physical danger to persons or property, activities may be curtailed and students requested or required to leave the campus. In such an event, arrangements will be made as soon as possible to offer students the opportunity to complete their courses, or substantially equivalent work, so that appropriate credit may be given. Alternatively, the University may determine that students will receive refunds on the same basis as those receiving leaves of absence, or on some other appropriate basis.

LEAVE OF ABSENCE

A student in good standing who voluntarily withdraws voluntarily from the University after the first day of instruction, but before the end of the first 50 percent of the quarter, may file a petition for a leave of absence with the Registrar’s Office. A leave of absence after the first 50 percent of the quarter is only granted for approved health and emergency reasons. Students granted a leave of absence are shown on the University transcript as having registered for the term. Courses in which the student was enrolled after the drop deadline will appear on the students record and will show the grade of ‘W’ (withdraw). Undergraduates who take a leave while in good standing may enroll in the University for a subsequent quarter with the privileges of a returning student. Graduate students are subject to special registration requirements (see Leave of Absence in the “Graduate Degrees” section of this bulletin).

TUITION REFUND SCHEDULE

Students who take a leave of absence are eligible for a tuition refund during the first 50 percent of the term according to the following schedule:

<table>
<thead>
<tr>
<th>Date of Withdrawal</th>
<th>Refund Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st day of classes</td>
<td>100</td>
</tr>
<tr>
<td>2nd day of classes through first 10 percent of the quarter</td>
<td>90</td>
</tr>
<tr>
<td>First 11 percent of quarter through first 25 percent</td>
<td>50</td>
</tr>
<tr>
<td>First 26 percent of quarter through first 50 percent</td>
<td>25</td>
</tr>
<tr>
<td>After the first 50 percent of quarter</td>
<td>0</td>
</tr>
</tbody>
</table>

To illustrate, the refund schedule for the Autumn Quarter 1999, is as follows:

<table>
<thead>
<tr>
<th>Autumn Quarter</th>
<th>Standard Tuition</th>
<th>9-Unit Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 22</td>
<td>$7,686</td>
<td>$4,782</td>
</tr>
<tr>
<td>Sept. 23-Sept. 29</td>
<td>6,917</td>
<td>4,304</td>
</tr>
<tr>
<td>Sept. 30-Oct. 12</td>
<td>3,843</td>
<td>2,391</td>
</tr>
<tr>
<td>Oct. 13-Nov. 1</td>
<td>1,922</td>
<td>1,196</td>
</tr>
<tr>
<td>Nov. 2-Dec. 10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Different refund rates are applicable for students paying the graduate department, medical, law, and graduate business tuition rates. The full tuition refund schedule for each quarter (including the Summer Quarter), and for each tuition rate, is available from the Registrar’s Office and at http://www.stanford.edu/dept/registrar/registration. Tuition refunds are based on the last date of attendance in classes.

A student in the first quarter of matriculated enrollment is subject to a slightly different refund schedule and should consult with the Registrar’s Office for details.

ROOM AND MEAL PLAN REFUNDS

Students assigned to a University residence are subject to the conditions of the University Residence Agreement. Under this agreement, single students and couples without children are required to live somewhere in the University residence system for the entire academic year. Students with children may give notice of termination of occupancy for the end of each academic term. Room refunds are made only when students move out of the residence system and withdraw from the University. Students in all-male fraternities or all-female sororities are billed directly by the fraternity or sorority, and refunds are arranged between the student and the fraternity or sorority.

A meal plan refund is based on the date when a student moves out of his or her University residence. If a student uses the meal plan after that date, an additional daily charge will incur.

Any decision to refund prepaid room and meal plan charges or to waive liability for deferred charges shall ultimately be made at the sole discretion of the University. Students with questions about refunds should contact Housing Assignment Services (for room refunds) or the central office of University Dining Services (for meal plan refunds).

HOUSING

University housing is available to registered Stanford students. Planning of educational programs, counseling and crisis intervention by residence deans, and administration of residence offices is coordinated by the department of Residential Education and Graduate Residences (http://rescomp.stanford.edu/resed.html), or telephone (650) 725-2800.

University housing assignments, community housing services, custodial services and maintenance, and dining services are provided by Student Housing and Dining Services (http://www.stanford.edu/dept/ hds/), or telephone (650) 723-2287.

Information on housing assignments, options, policies, application procedures, and deadlines may be obtained from Housing Assignment Services, Old Union, Room 214, Stanford University, Stanford, CA 94305-3012, or telephone (650) 725-2810.

UNDERGRADUATE STUDENT RESIDENCES

RESIDENTIAL EDUCATION PROGRAM

The program in Residential Education provides for undergraduates certain dimensions of a college experience within a large research university. The essential conviction behind the Stanford residence program is that formal teaching, informal learning, and personal support in residences play an important role in a Stanford education. Residential Education programs extend the classroom into the residences and complement the academic curriculum with activities and experiences that contribute to students’ preparation for a life of leadership, intellectual engagement, citizenship, and service.

ASSIGNMENT TO UNDERGRADUATE RESIDENCES

Approximately 94 percent of undergraduates live in University housing (excepting students studying abroad during the academic year). All freshmen are required to live in University residences for educational reasons and are automatically assigned housing following admission. Residence assignments for continuing undergraduates are made on the basis of an annual lottery (called the Draw) and quarterly waiting lists. Undergraduates who enter Stanford as freshmen are guaranteed four years of University housing if they are willing to live anywhere on campus. Transfer students are guaranteed two or three years of housing, based on their entering class standing.

Undergraduate residences include traditional dormitories, academic theme, cross cultural and focus houses, ethnic theme houses, student-managed and cooperative houses, apartments, suites, fraternities, and sororities.

GRADUATE STUDENT RESIDENCES

RESIDENCE PROGRAM

The University’s philosophy of graduate student housing is based on the premise that supporting high quality graduate scholarship and research is central to the mission of the University. By providing affordable housing in proximity to academic resources, the University creates an environment conducive to research and intellectual dialogue among students, their peers, and faculty members.
ASSIGNMENT TO GRADUATE RESIDENCES

Approximately 46 percent of matriculated graduate students at the home campus live in University housing. Residence assignments are made on the basis of an annual lottery and quarterly waiting lists. New matriculated single students and couples without children who apply for housing by the May deadline and are willing to live in any residence for which they are eligible are guaranteed housing their first year at Stanford. New matriculated master's students with children who apply by the May deadline are assured two years of on-campus housing while registered, and new matriculated doctoral students with children who apply by the May deadline are assured six years of on-campus housing while registered. At Stanford University, new matriculated students are students who are in a graduate program for the first time. Students starting a second graduate degree are not considered new matriculated students and therefore are not guaranteed housing.

Single graduate students may request assignment to graduate apartments and dormitories, or to spaces in six undergraduate cooperative houses.

One-, two-, three-, and four-bedroom apartments are provided for couples without children and students with children, both graduate and undergraduate, based on student status and the number of dependents. Couple housing is available to students who are married and to students who have a same-sex or opposite-sex domestic partner. At Stanford University, a domestic partnership is defined as an established, long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare. Housing for students with children is available to married couples, domestic partners, and single parents who have dependent children living with them. Housing is not provided for extended families, including the parents and siblings of students, or live-in day care staff.

COMMUNITY HOUSING

Community Housing Services maintains computerized listings of private rooms, houses, and apartments in surrounding communities that are available to students desiring to live off campus. Students must make rental arrangements directly with landlords. Information and publications on community housing may be obtained from Community Housing Services, Old Union, Room 214, Stanford University, Stanford, CA 94305-3012 or telephone (650) 723-3906. During early September, temporary accommodations are available in a student dormitory at a modest charge for students searching for off-campus housing for Autumn Quarter. Contact Summer Conference Services for more information at (650) 725-1429.

RESIDENCE DEANS

Residence Deans provide assistance to on- and off-campus students. They can advise students about academic and personal matters, occasionally intervene directly in behavioral problems, and assist with personal emergencies. Advice is also available on issues of academic probation or suspension, leaves of absence, special concerns of women or minorities, and administrative matters. Residence Deans work closely with the Dean of Students and other University offices. Residence Deans are assigned to specific residences and to off-campus students; for further information, call Residential Education at (650) 725-2800.
Undergraduate Degrees

DEGREE PROGRAMS

BACHELOR OF ARTS (A.B.), BACHELOR OF SCIENCE (B.S.)

Stanford University confers the degree of Bachelor of Arts (A.B.) or the degree of Bachelor of Science (B.S.) on those candidates who have been recommended by the Committee on Academic Appraisal and Achievement (C-AAA), who have applied in advance for conferral of the degree, and who have fulfilled the following requirements:

1. A minimum of 180 units of allowable University work. (As described below, units above the allowable limits for activity courses and for courses taken on a satisfactory/no credit basis cannot be counted towards the 180 minimum.)
2. The Writing, General Education, and Language Requirements (see below).
3. Curricular requirements of at least one major department or program and the recommendation of the department(s). (Descriptions of curricular and special degree requirements are included in each department’s section of this bulletin.)
4. A minimum of 90 units (including the last 15) at Stanford. In special cases, students who have earned at least 135 units in resident work and who have completed the Writing, General Education, and Language Requirements, as well as all major requirements, may petition for a waiver of the last 15 units-in-residence requirement.

Stanford confers the Bachelor of Science degree on candidates who fulfill these requirements in the School of Earth Sciences, in the School of Engineering, or in the departments of Applied Physics, Biological Sciences, Chemistry, Mathematics, or Physics in the School of Humanities and Sciences. The University also awards B.S. degrees to candidates in the Program in Science, Technology, and Society; in the Program in Mathematical and Computational Science; in the Program in Symbolic Systems; and, when appropriate, in the Program for Individually Designed Majors. Candidates who fulfill these requirements in other schools or departments receive the Bachelor of Arts degree.

Students who complete the requirements for two or more majors which ordinarily would lead to the same degree (A.B. or B.S.) should review “The Major” section of this bulletin to ensure that they have an understanding of the requirements for multiple or secondary majors.

BACHELOR OF ARTS AND SCIENCE (B.A.S.)

The University confers the degree of Bachelor of Arts and Science (B.A.S.) on candidates who have completed, with no overlapping courses, the curricular requirements of two majors which ordinarily would lead to different bachelor’s degrees (that is, a Bachelor of Arts degree and a Bachelor of Science). These students must have applied in advance for graduation with the B.A.S. degree instead of the A.B. or B.S. degree, been recommended by the C-AAA, and have fulfilled requirements 1, 2, and 4 above in addition to the requirements for multiple majors.

Students who cannot meet the requirements for both majors without overlapping courses are not eligible for the B.A.S., but may apply to have a secondary major recorded on their transcripts. (See “The Major” section below.)

DUAL BACHELOR’S DEGREES (CONCURRENT A.B. AND B.S.)

A Stanford undergraduate may work concurrently toward both an A.B. and a B.S. degree. To qualify for both degrees, a student must complete:

1. A minimum of 225 units of University work. (As described below, units above the allowable limits for activity courses and for courses taken on a satisfactory/no credit basis cannot be counted towards the 225 minimum.)
3. The curricular requirements of two majors (one of which leads to a Bachelor of Arts degree and the other to a Bachelor of Science degree).
4. A minimum of 135 units (including the last 15) at Stanford. In special cases, as described above, students may petition for waiver of the last 15 units-in-residence requirement.

A student interested in dual bachelor’s degrees should file a statement of intention with the Registrar’s Office no later than two quarters in advance of completing the program. The statement should be submitted on a standard petition form along with recommendations of appropriate representatives from the two departments whose major requirements the student is expecting to fulfill.

Students who do not meet the higher unit and residence requirements of the dual degree option may be eligible instead for the B.A.S. degree as described above.

SECOND BACHELOR’S DEGREE

Stanford does not award a second Bachelor of Arts degree to an individual who already holds a Bachelor of Arts, nor a Bachelor of Science degree to an individual who already holds a Bachelor of Science degree. However, the holder of a Bachelor of Arts degree from Stanford may apply to the Subcommittee for Exceptions to Academic Policy for admission to candidacy for a Bachelor of Science degree, and the holder of a Bachelor of Science degree from Stanford may apply for candidacy for a Bachelor of Arts degree. A recommendation of the major department for the second bachelor’s degree must accompany the application.

Generally, a student may not apply for a second bachelor’s degree after having been a graduate student, although a student may submit a petition for exception. The Office of the Registrar’s Academic Standing section in the Old Union, room 141, reviews these petitions. A student approved for this program may register as an undergraduate and is subject to the usual rules and regulations affecting undergraduates. Requirements for a second Stanford bachelor’s degree are the same as those described above for dual bachelor’s degrees.

COTERMINAL BACHELOR’S AND MASTER’S DEGREES

The coterminal degree program allows undergraduates to study for a master’s degree while completing their bachelor’s degree(s) in the same or a different department. Undergraduates with strong academic records may apply for admission to a coterminal master’s program as early as the eighth quarter (or upon completion of 105 units) but no later than early in the 11th quarter of undergraduate study, and at least four quarters in advance of the anticipated date of conferral of the master’s degree. Units completed during summer quarters, as well as undergraduate transfer credit, are also counted towards quarters of undergraduate study. Students who wish to apply for a master’s program after these deadlines must apply through the regular graduate admissions process.

To apply for admission to a coterminal master’s program, students must submit to the prospective graduate department the following: coterminal application, statement of purpose, preliminary program proposal, two letters of recommendation from Stanford professors, and a current Stanford transcript. Graduate Record Examination (GRE) scores or other requirements may be specified by the prospective department.

For coterminal students, the quarter following completion of 180 units (or 225 units for dual undergraduate degree students) is identified as the first graduate quarter. Beginning with this quarter, coterminal students are subject to graduate student policies and procedures, as described in the “Graduate Degrees” section of this bulletin. These policies include continuous registration or leave of absence for quarters not enrolled (rather than the stopping out procedure for undergraduates) and minimal progress guidelines.

In the first graduate quarter, a coterminal student is assigned an advisor in the master’s department for assistance in planning a program of study to meet the requirements for the master’s degree. The plan is outlined on the Program Proposal for a Master’s Degree, which is approved by the master’s department by the end of the first graduate quarter. Authorizations for master’s programs expire three calendar years from the
first graduate quarter. An extension requires review of academic performance by the department.

The specific University residency, unit requirement, and additional policies for bachelor’s/master’s program are described under Residency and Unit Requirements in Coterminal Programs in the “Graduate Degrees” section of this bulletin.

Completion of each degree is applied for separately by the deadlines given in the University Time Schedule. The master’s degree must be conferred simultaneously with, or after, the bachelor’s degree.

DEGREE REQUIREMENTS

A LIBERAL EDUCATION

As do all major universities, Stanford provides the means for its undergraduates to acquire a liberal education—an education that broadens the student’s knowledge and awareness in each of the major areas of human knowledge, that significantly deepens understanding of one or two of these areas, and that prepares him or her for a lifetime of continual learning and application of knowledge to career and personal life.

The undergraduate curriculum at Stanford allows considerable flexibility. It permits each student to plan an individual program of study that takes into account personal educational goals consistent with particular interests, prior experience, and future aims. All programs of study should achieve some balance between depth of knowledge acquired in specialization and breadth of knowledge acquired through exploration. Guidance as to the limits within which that balance ought to be struck is provided by the University’s General Education Requirements and by the requirements set for major fields of study.

These educational goals are achieved through study in individual courses that bring together groups of students examining a topic or subject under the supervision of scholars. Courses are assigned credit units. To earn a bachelor’s degree, the student must complete at least 180 allowable units and, in so doing, also complete the Writing Requirement, to fulfill the General Education Requirements, and to meet the Language Requirement, and the requirements of a major.

The purpose of the Writing Requirement is to promote effective communication by ensuring that every undergraduate can write clear and effective English prose. Words are the vehicles for thought, and clear thinking requires facility in writing and speech.

The Language Requirement ensures that every student gains a basic familiarity with a foreign language. Foreign language study extends the student’s range of knowledge and expression in significant ways, providing access to materials and cultures that otherwise would be out of reach.

The General Education Requirements provide guidance toward the attainment of breadth and stipulate that a significant share of a student’s work must lie outside an area of specialization. These requirements ensure that every student is exposed to different ideas and different ways of thinking. They enable the student to approach and to understand the important “ways of knowing”—to assess their strengths and limitations, their uniqueness, and, no less important, what they have in common with others.

Depth, the intensive study of one subject or area, is provided through specialization in a major field. The major relates more specifically to a student’s personal goals and interests than do the general requirements outlined above. Stanford’s curriculum provides a wide range of standard disciplinary majors in addition to department offerings, and the opportunity for students to design their own major programs.

Elective courses, which are not taken to satisfy requirements, play a special role in tailoring the student’s program to individual needs. For most students, such courses form a large portion of the work offered for a degree. Within the limitations of requirements, students may freely choose any course for which previous studies have prepared them.

Following are more detailed descriptions of these various requirements and the rationales upon which they are based.

THE WRITING REQUIREMENT

All instructors expect that students will express themselves effectively in speech and writing. The Writing Requirement helps students meet that expectation.

All candidates for the bachelor’s degree, regardless of the date of matriculation, must satisfy the requirement. Transfer students are individually informed at matriculation of their status with regard to the requirement.

The Writing Requirement was revised for undergraduates who entered Stanford in Autumn 1996 and thereafter. In addition to the requirement detailed below for completion of the first-year courses, these students must complete a writing-intensive course in their major. Courses available to fulfill the Writing in the Major Requirement (WIM) are designated under individual department listings.

All undergraduates must satisfy the first-year course(s) requirement in one of four ways:

1. English 1-2, a two-quarter sequence of composition courses. (Note: a few students who demonstrate sufficient skill in the first quarter of the English 1-2 sequence will be exempted from English 2 upon certification by the instructor.)
2. English 3, an intensified one-quarter course open only to students with a score of 4 or 5 on the CEEB Advanced Placement Test in English.
3. Special writing instruction in connection with the Area One Requirement.
4. Approved transfer credit.

A complete list of courses is distributed to all entering undergraduates and is also available at the Writing and Critical Thinking office.

Courses available to fulfill the first-year Writing Requirement are designated (W) in this bulletin.

THE GENERAL EDUCATION REQUIREMENTS

PURPOSE

The General Education Requirements are an integral part of undergraduate education at Stanford. Their purpose is two-fold: to introduce students to a broad range of fields and areas of study within the humanities, social sciences, natural sciences, applied sciences, and technology, and to help students prepare to become responsible members of society. Whereas the concentration of courses in the major is expected to provide depth, the General Education Requirements have the complementary purpose of providing breadth to a student’s undergraduate program. The requirements are also intended to introduce students to the major social, historical, cultural, and intellectual forces that shape the contemporary world.

Fulfillment of the General Education Requirements in itself does not provide a student with an adequately broad education any more than acquiring the necessary number of units in the major qualifies the student as a specialist in the field. The major and the General Education Requirements are meant to serve as the nucleus around which the student is expected to build a coherent course of study by drawing on the options available among the required and elective courses.

Information regarding specific courses that have been certified to fulfill the General Education Requirements and regarding a student’s status in meeting these requirements is available at the Office of the Registrar. Course planning and advising questions related to the General Education Requirements should be directed to the Undergraduate Advising Center.

It is the responsibility of each student to ensure that he or she has fulfilled the requirements by checking in Axess within the Undergraduate Progress function or by checking with the Office of the Registrar. This should be done at least two quarters before graduation.

Students should be extremely careful to note which set of General Education Requirements apply to them. The date of matriculation at Stanford determines which requirements apply to an individual student.

CURRENT SYSTEM

To fulfill the General Education Requirements (GER), undergraduates who entered Stanford in Autumn Quarter 1996 and thereafter must

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complete a minimum of nine courses certified for this purpose in four areas as follows:

**Area 1 Program**—Introduction to the Humanities courses (one-quarter introductory courses followed by two-quarter thematic sequences)

Students are expected to satisfy the Area One Requirement during their freshman year.

**Area 2: Natural Sciences, Applied Science and Technology, and Mathematics**—Students can fulfill this requirement in two different ways:

1) by completing one of the integrated three-course Science, Mathematics, and Engineering Core sequences or
2) by completing three certified GER courses in this area, with no more than two of these courses from the same subarea.

**Area 3: Humanities and Social Sciences**—Students are required to complete three certified GER courses in this area with at least one course in the humanities subarea and one in the social sciences subarea.

**Area 4: World Cultures, American Cultures, and Gender Studies**—While satisfying requirements for areas 1 or 3, or by taking additional courses, students must complete at least one certified GER course in two of the three subareas.

Courses certified as meeting the General Education Requirements must be taken for a letter grade and a minimum of 3 units of credit. A single course may be certified as fulfilling only one subarea within the General Education Requirements; the one exception is that a course may be certified to fulfill an Area 4 subarea in addition to Area 1 or an Area 3 subarea.

Courses that have been certified as meeting the requirements are identified throughout this bulletin with the notational symbols listed below. A comprehensive list of certified courses also appears as an Appendix to this bulletin.

**Area 1 Program**

GER 1a: first-quarter course
GER 1b: second-quarter course
GER 1c: third-quarter course

**Area 2: Natural Sciences, Applied Science and Technology, and Mathematics**

GER 2: three-quarter Science, Mathematics, and Engineering Core sequence
   or
GER 2a: Natural Sciences subarea
GER 2b: Applied Science and Technology subarea
GER 2c: Mathematics subarea

**Area 3: Humanities and Social Sciences**

GER 3a: Humanities subarea
GER 3b: Social Sciences subarea

**Area 4: World Cultures, American Cultures, and Gender Studies**

GER 4a: World Cultures subarea
GER 4b: American Cultures subarea
GER 4c: Gender Studies subarea

Continuing undergraduates who entered Stanford prior to Autumn 1996 may elect to complete either the set of Distribution Requirements in effect when they entered or the set of General Education Requirements effective Autumn 1996 and described above. Note: students will not, however, be permitted to mix the requirements of the two systems or to change from one system to the other after they have elected the system under which they wish to be monitored for graduation. If the 1996 program of General Education Requirements is chosen, only certified courses passed with a letter grade and taken for 3 or more units can fulfill the requirements.

**CREDIT TRANSFER**

While courses taken in fulfillment of the General Education Requirements should be taught by Stanford faculty members who are Academic Council members or Senior Lecturers, students may propose that work taken at another college or university be accepted in fulfillment of a General Education Requirement. In such cases, the Office of the Registrar’s Credit Evaluation staff determines, after appropriate faculty consultation, whether the work is comparable to any of the specifically certified courses or course sequences.

**UNDERGRADUATES WHO ENTERED PRIOR TO AUTUMN 1996**

Stanford has a long tradition of ensuring curricular breadth through some system of requirements, variously described as “distribution requirements,” “general studies requirements,” or “general education requirements.” A student returning to Stanford to complete an interrupted degree program may satisfy either the distribution program in place at the time of matriculation or the current program of requirements. Such a student should consult the Stanford Bulletin or its predecessors appropriate to the original entrance year or seek the advice of the Undergraduate Degree Coordinator, room 132, Old Union. Students completing requirements in effect 1991 or later may find the Appendix to this bulletin helpful in providing them with a list of certified courses. This list indicates which courses fulfill the Distribution Requirements in effect in 1991, as well as the General Education Requirements in effect beginning Autumn 1996.

**THE LANGUAGE REQUIREMENT**

To fulfill the Language Requirement, undergraduates who entered Stanford in Autumn 1996 and thereafter are required to complete one year of college-level study in a foreign language. Students may fulfill the requirement in any one of the following ways:

1. Complete three quarters of a first-year language course at Stanford or the equivalent at another recognized post-secondary institution.
2. Score 4 or 5 on the Advanced Placement (AP) test in a language other than English.
3. Achieve a satisfactory score on the SAT II Subject Tests in the following languages:
   - Chinese 630 Italian 630
   - French 640 Japanese 620
   - German 630 Latin 630
   - Hebrew 540 Spanish 630
4. Take a diagnostic test in a particular language which either:
   a) Places them out of the requirement, or
   b) Diagnoses them as needing one, two, or three additional quarters of college-level study. In this case, the requirement can then be fulfilled either by passing the required number of quarters of college-level language study at Stanford or the equivalent elsewhere, or by retaking the diagnostic test at a later date and placing out of the requirement.

Written placements are offered on-line throughout the summer in Chinese, French, German, Japanese, Russian, Spanish, and Spanish for home background speakers.

**CREDIT**

**ADVANCED PLACEMENT**

Stanford University allows up to 45 units of credit toward graduation for work completed in high school as part of the College Entrance Examination Board (CEEB) Advanced Placement curriculum. The awarding of such credit is based on CEEB Advanced Placement test scores and is subject to University and department approval.

The faculty of a given department determine whether any credit toward the 180-unit requirement can be based on achievement in the CEEB Advanced Placement Program in their discipline. Stanford departments electing to accept the Advanced Placement (AP) credit are bound by these University policies:

1. Credit is usually granted for an AP score of 4 or 5. Usually, 10 quarter units are awarded (but occasionally fewer than 10). No more than 10 quarter units may be given for performance in a single examination. If the student has scores of 4 or 5 on two exams within the same language (for example, French Language and Literature), or within the same subject (for example, Music Theory and Music History), the student is given a maximum total of 10 quarter units based on only one of the scores—the higher of the two, if different. The Studio Art...
and Art History examinations are treated separately and yield 10 quarter units each for scores of 4 or 5.

2. Whether credit is to be given for an AP score of 3 is a matter of departmental discretion; up to 10 units may be awarded.

3. No credit may be authorized for an AP score lower than 3.

Performance on an AP exam can indicate the appropriate placement for continuing course work in that subject at Stanford. Students may not enroll in courses at Stanford for which they received equivalent credit through the AP program. The chart below shows the current AP credit and placement policies. Further information is available from the Office of the Registrar’s Transfer Credit Evaluator, room 141, Old Union.

ADVANCED PLACEMENT SCORES AND PLACEMENT

<table>
<thead>
<tr>
<th>Test Subject</th>
<th>Score</th>
<th>Placement of Credit</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Government and Politics</td>
<td>4, 5</td>
<td>Not applicable</td>
<td>5</td>
</tr>
<tr>
<td>U.S. History</td>
<td>4, 5</td>
<td>Not applicable</td>
<td>10</td>
</tr>
<tr>
<td>Art History</td>
<td>4, 5</td>
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<td>Take placement test</td>
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<td>Math. 51</td>
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<td>4</td>
<td>Math. 42</td>
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<td>Math. BC</td>
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<td>Math. 51</td>
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<td></td>
<td>4</td>
<td>Math. 42</td>
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<td></td>
<td>1, 2</td>
<td>Math. 19 or 41</td>
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<td>Physics B</td>
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<td>25, 45, 61 (with strong calculus background)</td>
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<td>23 or 43</td>
<td>5</td>
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<tr>
<td></td>
<td>3</td>
<td>21 or 43</td>
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<tr>
<td>Physics C (2 parts)</td>
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<td>23, 41, 61 (with strong calculus background)</td>
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<td>4</td>
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<td>E&amp;M only</td>
<td>4, 5</td>
<td>21, 41, 61 (with strong calculus background)</td>
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<tr>
<td>Statistics</td>
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<td>Stat. 61</td>
<td>5</td>
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</table>

* Students may skip Computer Science 106A, B and X and complete Computer Science 103, 107, or 109 to receive an additional 5 quarter units.
† A minimum score of 4 on both tests will receive 5 units.

ACTIVITY COURSES

For undergraduates who entered Autumn 1996 and thereafter, a maximum of 8 units of credit earned in activity courses, regardless of the offering department or if accepted as transfer units, count towards the 180 (225 if dual degrees are being pursued) units required for the bachelor’s degree. All activity courses are offered on a satisfactory/no credit basis.

Undergraduates who entered Stanford between Autumn 1986 and the end of the 1995-96 academic year may apply a maximum of 12 units in activity courses (Physical Education or Music Activity) to the 180/225 unit requirement for graduation.

COURSES TAKEN ON SATISFACTORY/NO CREDIT OR CREDIT/NO CREDIT BASIS

For undergraduates who entered Autumn 1996 and thereafter, a maximum of 36 units of credit taken at Stanford or its overseas campuses for a "CR" or "S" grade may be applied towards the 180 (225 if dual degrees are being pursued) units required for the bachelor’s degree. For those who entered Stanford as transfer students in Autumn 1996 and thereafter, the maximum is 27 units.

Departments may also limit the number of satisfactory or credit courses accepted towards the requirements for a major. Satisfactory/credit courses applied towards a minor may be similarly limited. Courses not letter-graded are not accepted in fulfillment of the General Education Requirements or Writing in the Major Requirement applicable to undergraduate students who entered Stanford in Autumn 1996 and thereafter.

INTERNSHIP GUIDELINES

Undergraduate internships should not by themselves carry any credit. However, an individual student may arrange with a faculty member for a research or other academic project to be based on the internship. Arrangements between students and faculty regarding credit are expected to be made well in advance of the internship. Credit should be arranged within departmental rules for directed reading or independent study and should meet the usual departmental standards.

TRANSFER WORK

Academic credit for work done elsewhere will be allowed toward a Stanford bachelor’s degree under the following rules and conditions:

1. Credit may be granted for work completed at institutions in the U.S. only if the institutions are accredited.

2. Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactorily completed work, may be credited toward a Stanford bachelor’s degree, subject to the approval of the credit evaluator and the appropriate departments.

3. Credit is officially allowed only after the student has been unconditionally admitted to Stanford.

4. Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned.

5. Credit from another institution will be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.

6. The credit allowed at Stanford for one quarter’s work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.

7. Credit is allowed at Stanford for work graded ‘A,’ ‘B,’ ‘C,’ or ‘Pass,’ but not for work graded ‘D’ or below.

8. No more than 90 quarter units of credit for work done elsewhere may be counted toward a bachelor’s degree at Stanford.

9. Credit earned in extension and correspondence courses is transferable only if the university offering the courses allows that credit toward its own bachelor’s degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence study, and a maximum of 45 quarter units for the combination of extension and correspondence courses.

10. Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and is evaluated as above by the credit evaluator.
THE MAJOR

The primary purpose of the major is to encourage each student to explore a subject area in considerable depth. This in-depth study complements the breadth of study promoted by the General Education Requirements and, in many cases, by a student’s choice of electives. Work in depth permits practice in critical analysis and the solving of problems. Because of its depth, such study also provides a sense of how knowledge grows and is shaped by time and circumstances.

The structure of a major should be a coherent reflection of the logic of the discipline it represents. Ideally, the student should be introduced to the subject area through a course providing a general overview, and upper-division courses should build upon lower-division courses. The course of study should, if feasible, give the student the opportunity and responsibility of doing original, creative work in the major subject. Benefits of the major program are greatest when it includes a culminating and synthesizing experience such as a senior seminar, an undergraduate thesis, or a senior project.

REQUIREMENTS

Undergraduates must select a major by the time they achieve junior status (85 units completed). All undergraduate major programs listed in this bulletin, except for certain honors degree programs that require application and admission in advance, are open to all students. Students may use Axcess to declare, drop or exchange a major at any time. In some departments or programs, though, a late change could easily result in extending the period of undergraduate study. Students who have applied to graduate, wish to declare an individually-designed major or pursue a dual AB/BS degree, and co-term students must use printed forms to select or change a major. Students requiring assistance should contact the Registrar’s Degree Progress Office, Old Union, room 132.

Check individual department or program listings in this bulletin for the undergraduate degrees offered and for specific major requirements. If an area of study has no baccalaureate degree, that discipline is not available as a regular undergraduate major.

Faculty set the minimum requirements for the major in each department. These requirements usually allow latitude for tailoring a major program to a student’s specific educational goals. The responsibility for developing a major program within department or program requirements lies ultimately with the individual student working in consultation with the major adviser.

MULTIPLE MAJORS

Although most students declare only one major, a student may formally declare more than one major within a single bachelor’s degree (A.B., B.S., or B.A.S.) program. The student may do that either at the time of initial major declaration or, as may be more advisable given the planning required to complete more than one major, by amending the original declaration. The student’s major departments or programs will have access routinely to all information pertinent to that student’s academic record (for example, course and grade information), and each is expected to provide advising and other assistance. Students may pick up appropriate information regarding major declarations from the Registrar’s Office. To be awarded a bachelor’s degree with multiple majors, the student must fulfill the following requirements:

1. Formally declare all majors to the Registrar’s Office.
2. Satisfy the requirements of each major without applying any course towards the requirements of more than one major or any minor unless:
   a) overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language)
   b) overlapping courses enable the student to meet school requirements (for example, for two majors within the School of Engineering). Currently, only the School of Engineering has school requirements for its undergraduate majors.

Students pursuing multiple majors must complete a multiple major program sheet indicating which courses they plan to apply toward each major and any minor(s). Departments must certify that the plan of study meets all requirements for the majors and any minor(s) without unallowable overlaps in course work. To facilitate advance planning, multiple majors program sheets are available at any time in the Degree Progress Office, room 132, Old Union.

When students cannot meet the requirements of multiple majors without overlaps, the secondary major, outlined below, may be relevant.

SECONDARY MAJOR

In some cases, students may complete course requirements for more than one major, but they may not meet the requirements outlined for the multiple major option. For example, the student may develop a course plan in which courses requisite for one major overlap with requirements for another. In these cases, the student may declare a secondary major which will result in the transcript bearing an annotation that the course requirements for that major have also been met.

LIMITS OF THE MAJOR

In order to achieve the values of study in depth, a well-structured major should constitute approximately one-third of a student’s program (55-65 units). To ensure the values of breadth, a major should comprise no more than two-thirds of a student’s program (115-125 units). And, to avoid intellectual parochialism, a major program should not require a student to take more than about one-third of his or her courses from within a single department.

Major requirements in cognate subjects essential to the structure of a given major should be counted as part of the major program in applying these guidelines. Department or school requirements designed to provide extra disciplinary breadth should not be counted.

For a limited number of qualified students, many departments and programs offer special programs leading to degrees with honors. A student may apply to the major department or program for acceptance into the honors program. Demands on the student may vary, but all honors programs encourage creative, independent work at an advanced level in addition to the major requirements.

The guidelines set forth here are deliberately general; implementation must take into account the specific needs of a student’s program and the nature of the discipline or disciplines involved. The exercise of responsibility in achieving the desired educational balance belongs first with the student, who, after all, has the strongest interest in the value of his or her education. It belongs secondarily to departments and major programs, which must set the requirements of competence in the many majors offered.
## UNDERGRADUATE MAJOR UNIT REQUIREMENTS

<table>
<thead>
<tr>
<th>Major Department</th>
<th>Units required outside the dept./program</th>
<th>Units required within the dept./program</th>
<th>Total # of units</th>
<th>Notes/Special Requirements</th>
<th>WIM Course</th>
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<tbody>
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<td>School of Earth Sciences</td>
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<tr>
<td>Earth Systems</td>
<td>84-100</td>
<td>24</td>
<td>108-124</td>
<td>Internship/Senior Seminar</td>
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<td>47-69</td>
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<td>62-77</td>
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<td>60-62</td>
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<td>41-46</td>
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<td>111-112</td>
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<td>110-116</td>
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<td>CSRE 200 X,Y,Z</td>
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<tr>
<td>w/ Interdisciplinary Emphasis</td>
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<td>dept. approval and interdisciplinary paper</td>
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<td>20 units in foreign lang. lit.; dept. approval</td>
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<td>IS 123N,126Q,127</td>
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<td>55-63 above #100</td>
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<td>Italian and French Literatures</td>
<td>max. 28</td>
<td>32 above #100</td>
<td>60 above #100</td>
<td>4 Fr. Lit. courses</td>
<td>Fr 123,261</td>
</tr>
<tr>
<td>German Studies</td>
<td>0-25</td>
<td>35-60</td>
<td>60</td>
<td>3 above #130</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>—</td>
<td>58-60</td>
<td>58-60</td>
<td>12 3-5 unit courses</td>
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</tr>
<tr>
<td>Human Biology</td>
<td>min. 13</td>
<td>min. 43</td>
<td>87</td>
<td>req. internship</td>
<td>HB 4B</td>
</tr>
<tr>
<td>Interdisciplinary Studies in Humanities</td>
<td>—</td>
<td>—</td>
<td>60</td>
<td>2 yr. foreign lang.; Overseas studies 1 qtr.</td>
<td></td>
</tr>
<tr>
<td>Option I</td>
<td>approx. 60</td>
<td>27 (honors)</td>
<td>approx. 87</td>
<td>Honors only major:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+ 5 qtrs. language</td>
<td></td>
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<tr>
<td>Option II</td>
<td>approx. 110</td>
<td>27 (honors)</td>
<td>approx. 137</td>
<td>Honors only major:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+ premed requirements</td>
<td></td>
</tr>
<tr>
<td>International Relations</td>
<td>55-65</td>
<td>0-10</td>
<td>65</td>
<td>IR 199T,206,210,215</td>
<td></td>
</tr>
<tr>
<td>Jewish Studies (Individually Designed)</td>
<td>60-62</td>
<td>—</td>
<td>60</td>
<td>Pol Sci 115B,134B</td>
<td></td>
</tr>
<tr>
<td>Latin American Studies</td>
<td>—</td>
<td>—</td>
<td>50</td>
<td>field exper., senior honors, demonstr. lang. proficiency</td>
<td></td>
</tr>
<tr>
<td>Linguistics</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>foreign lang. @ 6th quarter level</td>
<td></td>
</tr>
<tr>
<td>Mathematical &amp; Computational Science</td>
<td>—</td>
<td>—</td>
<td>60</td>
<td>CSRE Senior Sem.</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>up to 15 units</td>
<td>49</td>
<td>64</td>
<td>Math 109,110,120,121</td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td>—</td>
<td>62-72</td>
<td>62-72</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Music, Science, &amp; Technology</td>
<td>3</td>
<td>62-72</td>
<td>62-72</td>
<td>Music 140,141,142,143,144,145,154</td>
<td></td>
</tr>
<tr>
<td>Native American Studies</td>
<td>10-60</td>
<td>—</td>
<td>60</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Philosophy</td>
<td>—</td>
<td>55</td>
<td>55</td>
<td>3 seminars; 20 units in each dept. + 20 advanced units fr. both depts.</td>
<td></td>
</tr>
<tr>
<td>Philosophy and Religious Studies</td>
<td>—</td>
<td>60</td>
<td>60</td>
<td>Phl 80 or RS 290</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>21</td>
<td>72</td>
<td>93</td>
<td>Phy 107</td>
<td></td>
</tr>
<tr>
<td>Political Science</td>
<td>0-10</td>
<td>50-60</td>
<td>60</td>
<td>PS 29,104,115B,117K,134B,134B</td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td>—</td>
<td>55</td>
<td>55</td>
<td>Psych 50,60,70,110,131,161</td>
<td></td>
</tr>
<tr>
<td>Public Policy</td>
<td>60-65</td>
<td>28</td>
<td>88-93</td>
<td>15 in concentration, Senior Seminar</td>
<td>PubPol 104</td>
</tr>
</tbody>
</table>

**Notes/Special Requirements:**
- Senior essay; seminar
- Dept. approval
- Dept. approval and interdisciplinary paper
- 20 units in foreign lang. lit.; dept. approval
- Honors only major:
- + 5 qtrs. language
- Honors only major;
- + premed requirements
- 2 yr. foreign lang.; Overseas studies 1 qtr.
- Field exper., senior honors, demonstr. lang. proficiency
- Foreign lang. @ 6th quarter level
- CSRE Senior Sem.
- Math 109,110,120,121
- Music 140,141,142,143,144,145,154
- 3 seminars; 20 units in each dept. + 20 advanced units fr. both depts.
- Phl 80 or RS 290
- Phy 107
- PS 29,104,115B,117K,134B,134B
- Psych 50,60,70,110,131,161
- 15 in concentration, Senior Seminar
- PubPol 104

**Degree Requirements:**
- WIM Course
- Econ 101
- Eng 150
- Fr 123,261
- GS 123N,126Q,127
- Fr 123,261
- GS 123N,126Q,127
- IR 199T,206,210,215
- Pol Sci 115B,134B
- See CSRE
- Las 80
- See Mathematics
- Math 109,110,120,171
- Music 140,141,142,143,144,145,154
- CSRE Senior Sem.
- See CSRE
- Phil 80 or RS 290
- Phy 107
- PS 29,104,115B,117K,134B,134B
- Psych 50,60,70,110,131,161
- PubPol 104

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**Notes:**
- Math 109,110,120,171
- Music 140,141,142,143,144,145,154
- CSRE Senior Sem.
- See CSRE
- Phil 80 or RS 290
- Phy 107
- PS 29,104,115B,117K,134B,134B
- Psych 50,60,70,110,131,161
- PubPol 104

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**Department Unit Requirements:**
- Major Department Units required outside the dept/program
- Units required within the dept/program
- Total # of units
- Notes/Special Requirements
- WIM Course
MINORS, HONORS, ACADEMIC STANDING, AND ADVISING

THE UNDERGRADUATE MINOR

Students completing a bachelor’s degree may elect to complete one or more minors in addition to the major. Minors must be officially declared by students no later than the deadline for their applications to graduate, according to declaration procedures developed and monitored by the Registrar. Earlier deadlines for declaration of the minor may be set by the offering school or department. Satisfactory completion of declared minors is noted on the students’ transcripts after degree conferral.

A minor is a coherent program of study defined by the department or degree program. It may be a limited version of a major concentration or a specialized subset of a field. A minor consists of no fewer than six courses of 3 or more units to a maximum of 36 units of letter-graded work, except where letter grades are not offered. Departments and degree programs must adhere to the policy above and within specific guidelines developed by the deans of schools. Programs which do not offer undergraduate degrees may also establish the structure and requirements of each minor in accordance with the standards for its undergraduate majors.

Undergraduate students use Axcess to declare or drop a minor. Students with questions about declaring minors or double-counting courses towards combinations of majors and/or minors should consult with the departments or programs involved or the Registrar’s Degree Office, room 132, Old Union.

BACCALARUREATE HONORS

With Distinction—In recognition of high scholastic attainment, the University, upon recommendation of a major department or program, awards the Bachelor’s Degree with Distinction to approximately 15 percent of the graduating class.

Students are also urged to consider the departmental honors programs that may give depth to their major study and to consider, as well, how the interdisciplinary honors programs might contribute to the quality of their undergraduate education.

Departmental Honors Programs—In recognition of successful completion of special advanced work, departments in more than 30 fields of study may recommend their students for honors. Departmental honors programs demand independent creative work at an advanced level in addition to the major requirements.

Interdisciplinary Honors Programs—In recognition of successful completion of honors program requirements, the following interdisciplinary programs can recommend students majoring in any field for honors in their program:

- Education
- Environmental Science, Technology, and Policy
- Ethics in Society
- Feminist Studies
- Humanities
- Jewish Studies
- Latin American Studies
- Science, Technology, and Society

The interdisciplinary honors programs are designed to complement study in a department major. The requirements for these honors programs are described in the department sections of this bulletin.

Foreign Language Proficiency—The notation “proficiency in (language)” appears on the official transcripts of those students whose levels of achievement are found by procedures established by the language department to be roughly equivalent to knowledge an excellent student can be expected to demonstrate late in the third quarter of the third year of study in that language.

ACADEMIC STANDING

Undergraduates matriculating in Autumn Quarter 1999, and thereafter, are required to adhere to the academic standards described below. The standards include maintaining a minimum 2.0 cumulative GPA and a quantitative unit requirement for good academic standing. In addition, a minimum 2.0 cumulative GPA is required for a baccalaureate degree.

Undergraduates matriculating prior to Autumn 1999 are required to adhere to the academic standards described below but are exempt from the minimum 2.0 cumulative GPA requirement for academic standing pur-
poses. However, departments can elect to require a minimum GPA for course work applicable to the major and the minor. Refer to departmental literature for specific requirements.

Undergraduate students normally are expected to plan their academic programs so that they can complete 180 units in four years (twelve quarters), including the requirements for a major and the General Education, Writing, and Language Requirements. Satisfactory academic progress is, on average, 45 units per academic year for four years leading to at least 180 units, a cumulative grade point average of at least 2.0, and a baccalaureate degree.

While undergraduate students are expected to register for a minimum of 12 units, they are required to complete at least 9 units each quarter and at least 36 units in their most recent three quarters of Stanford enrollment. In addition, students are expected to maintain an overall grade point average of at least 2.0. Transfer work completed at other institutions is not considered in this calculation. A student earning fewer than 9 units per quarter or fewer than 36 units in three quarters, or earning less than a 2.0 cumulative grade point average, is placed on probation. Students on probation or provisional registration status (see definitions below) are required to earn a minimum of 12 units per quarter, by the end of the final quarter examination period for three consecutive quarters, and maintain a cumulative grade point average of at least 2.0 to attain good academic standing. A Stanford Summer Session Quarter counts toward the three consecutive quarter requirement if 11 or more units are completed. The faculty Subcommittee on Academic Standing may stipulate otherwise by acting upon a petition for fewer units.

Full-time enrollment is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Under extenuating circumstances, students may petition to the faculty Subcommittee on Academic Standing to take fewer units. Work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time enrollment in the current quarter. All students registering for less than 12 units should consider the effects of that registration on their degree progress, visas, deferments of student loans, residency requirements, and their eligibility for financial aid and awards.

All undergraduate students validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification and athletic participation.

Units are granted for courses completed with grades 'A', 'B', 'C', 'D', 'Satisfactory' ('CR' or 'S'), and 'L'. Courses graded 'N' are counted provisionally as units completed, provided the student enrolls in the continuing segment of that course the following quarter. When the course is completed, the student receives the units for which he or she enrolled. No units are granted for a course in which the student receives an 'I' or an 'IP' until the course is completed satisfactorily and the final grade reported. (See "Grading Systems" above.)

PROBATION

A student who fails to complete at least 36 units of work in his or her most recent three quarters of enrollment at the University, or who fails to complete by the end of the final examination period at least 9 unit of work in his or her most recent quarter of enrollment at the University, or who has a cumulative grade point average of less than 2.0, shall be placed on probation (warning status).

A student shall be removed from probation after three subsequent quarters of enrollment at the University if, in each quarter, he or she completes a minimum of 12 units of new course work by the end of the final examination period and maintains a cumulative grade point average of at least 2.0. A student may also be removed from probation at the discretion of the subcommittee as a result of a review of individual records.

PROVISIONAL REGISTRATION

A student who fails to complete a minimum of 12 units of new course work by the end of the final examination period in any quarter of registration, or who fails to achieve a cumulative grade point average of at least 2.0 while on probation, in general, shall be placed on provisional registration status. Also, a student may be suspended directly from probation.

Provisional registration requires that a student submit a properly endorsed request to return to Stanford. A student shall be removed from provisional registration after three subsequent quarters of enrollment at the University if, in each quarter, he or she completes a minimum of 12 units of new course work by the end of the final examination period and maintains a cumulative grade point average of at least 2.0. A student may also be removed from provisional registration at the discretion of the subcommittee as a result of a review of individual records.

SUSPENSION

A student who fails to complete a minimum of 12 units of new course work by the end of the final examination period in any quarter of provisional registration, or who fails to maintain a cumulative grade point average of at least 2.0 while on provisional registration (and in some cases probation), shall be suspended. In general, students suspended for the first time are suspended for one year. Students suspended a subsequent time are suspended for three years.

Students suspended for one year are not eligible to enroll for four quarters (including Summer Quarter) following the quarter in which the suspension was issued. Students suspended for three years are not eligible to enroll for twelve quarters (including Summer Quarter) following the quarter in which the suspension was issued. Students are required to submit a properly endorsed petition for provisional registration to request reenrollment after the suspension period has been completed.

Return from Suspension—Students who have been suspended are required to petition for provisional registration to return after their suspension has been completed. Students are strongly encouraged to submit their petition for provisional registration at least three months prior to the desired quarter of return, but no later than the first week of the desired quarter of return.

Appeal of Suspension—Students who have been suspended, and who believe they have a compelling reason to appeal their suspension, without a break in enrollment, are required to submit a petition for provisional registration. See “Petition Deadlines” for deadline dates to submit petitions for provisional registration to appeal a suspension.

Early Return from Suspension—Students who have been suspended and who believe they have a compelling reason to return early from their suspension are required to submit a petition for provisional registration. See “Petition Deadlines” for deadline dates to submit petitions for provisional registration to return early from suspension.

PETITIONING

Specific instructions for requesting provisional registration or an early return from suspension should be obtained from the Registrar’s Academic Standing Office, Old Union, room 141. The faculty Subcommittee on Academic Standing, or those designated by the subcommittee, shall act upon all requests concerning academic standing, including requests for provisional registration. Questions concerning academic standing or the petitioning process should be directed to the Academic Standing Office.

Late petitions to return from suspension, appeal a suspension, or return early from suspension will not be considered. Students are strongly encouraged to submit petitions as early as possible.

Students applying for financial aid and/or on-campus housing should be aware of the deadlines and procedures for those offices.

**PETITION DEADLINES**

<table>
<thead>
<tr>
<th>Requested Quarter of Return</th>
<th>Deadline to Submit a Petition to Appeal a Suspension</th>
<th>Deadline to Submit a Petition to Return Early from Suspension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter 2001</td>
<td>January 12, 2001</td>
<td>December 1, 2000</td>
</tr>
<tr>
<td>Spring 2001</td>
<td>April 6, 2001</td>
<td>March 2, 2001</td>
</tr>
</tbody>
</table>

Contact the Academic Standing Office for future deadline dates.
NOTIFICATION

Written notification that a student is on probation, provisional registration, or suspension is sent to the student and to the student's academic adviser as soon as possible after the close of the quarter. Students also receive written notification of the outcome of their provisional registration petition.

UNDERGRADUATE ACADEMIC ADVISING

The Undergraduate Advising Center (UAC) partners with faculty and staff to address students' intellectual and developmental goals. The staff coordinates a comprehensive array of programs and advising services designed to support and enhance the undergraduate curriculum. For example, the UAC coordinates the Freshman Advising, Resources, and Mentoring (FARM) program through which freshmen make connections with students, faculty, and staff who share their interests. The Partners for Academic Excellence (PAE) program is another example of a mentoring program designed to increase participants' connection to and involvement in the academic and social networks of the campus.

Freshmen are assigned to general academic advisers according to their residence and their preliminary academic interest. Freshman advisers work with advisees each quarter to plan their academic programs; advisers must provide an approval code for the on-line filing of study lists through Axess for each quarter of the students' freshman year.

Sophomores who are undecided about their majors continue to work with the advisers they had as freshmen, and to seek out their advisers' guidance and approval code. By the time they achieve junior status, undergraduates must declare a major, at which time they are assigned to an adviser from the faculty of the major department or program.

The UAC's staff of professional advisers, located on the first floor of Sweet Hall, provides advising to all students, freshmen through seniors. The UAC staff offers students help when the official adviser is unavailable or when additional advice is needed; assistance with curriculum planning, including four-year plans; help with choosing a major; information on designing an individually designed major; academic and personal counseling related to academic performance; advice regarding plans to attend graduate or preprofessional school; peer tutoring; and learning skills classes, counseling, and workshops. Reference guides to graduate and professional schools are available. For detailed information see the UAC web site at http://uac-server.stanford.edu/ or request a copy of the UAC brochure.
Graduate Degrees

GENERAL REQUIREMENTS

For each Stanford advanced degree, there is an approved course of study which meets University and department requirements. The University’s general requirements, applicable to all graduate degrees at Stanford, are described below. University requirements pertaining to only a subset of advanced degrees are described in the “Degree-Specific Requirements” section.

See the “Graduate Programs” section of each department’s listing for specific department degree requirements. Information on professional school programs is available in the bulletins of the Graduate School of Business, the School of Law, and the School of Medicine.

REGISTRATION REQUIREMENTS

Graduate students must register for all terms of each academic year (Autumn, Winter, and Spring Quarters or, for Law students, Autumn and Spring Semesters), from the admission term until conferment of the degree. The only exception to this requirement occurs when the student is granted an official leave of absence. Failure to register for a term during the academic year without taking a leave of absence results in denial of further registration until reinstatement to the degree program is granted and the reinstatement fee paid. Registration in Summer Quarter is not required and does not substitute for registration during the academic year.

In addition to the above requirement for continuous registration during the academic year, graduate students are required by the University to be registered:

1. In each term during which any official department or University requirement is fulfilled, including qualifying exams or the University oral exam.
2. In any term in which a University dissertation/thesis is submitted or at the end of which a graduate degree is conferred, unless the student was registered the prior term.
3. Normally, in any term in which the student receives financial support from the University.
4. In any term for which the student needs to use University facilities such as on-campus housing, libraries, Cowell Health Service, and so on.
5. For international students, in any term of the academic year for which they have non-immigrant status (for example, a J1 or F1 visa).

Individual students may also find themselves subject to the registration requirements of other agencies (for example, external funding sources such as Federal financial aid). Course work and research are expected to be done on campus unless the department gives prior approval for study in absentia and a petition for in absentia registration is approved by the Registrar’s Office.

LEAVES OF ABSENCE

Graduate students who do not meet the requirement for continuous registration during the academic year must obtain an approved leave of absence, in advance, for the term(s) they will not be registered. The leave of absence must be reviewed for approval by the chair or director of graduate studies of the student’s major department and, if the student is in the United States on a visa, by the Bechtel International Center.

New graduate students and approved coterminous students may not take a leave of absence during their first quarter. Coterminous students are required to register their first graduate quarter. However, new Stanford students may request a deferment.

Leaves of absence are granted for a maximum of one calendar year. Leaves requested for a longer period are approved only in exceptional circumstances (for example, mandatory military service). An extension of leave (a maximum of one year) for students in master’s programs or for doctoral students not yet admitted to candidacy, is approved only in unusual circumstances. Extension requests must be made before the expiration of the original leave of absence. Leaves of absence may not exceed a cumulative of two years.

Students on leave of absence are not registered at Stanford and, therefore, do not have the rights and privileges of registered students. They cannot fulfill any official department or University requirements during the leave period.

Students on leave may complete course work for which an Incomplete grade was awarded in a prior term and are expected to comply with the usual one-year time limit for resolving incompletes.

REINSTATEMENT

Students who fail to be either registered or approved for a leave of absence by the start of a term have to apply for reinstatement through the Graduate Admissions Office before they can return to the same degree program. The decision to approve or deny reinstatement is made by the student’s department or program. Departments are not obliged to approve reinstatements of students. Reinstatement decisions may be based on the applicant’s academic status when last enrolled, activities while away from campus, the length of the absence, the perceived potential for successful completion of the program, and the ability of the department to support the student both academically and financially, as well as any other factors or considerations regarded as relevant by the department.

Reinstatement information is available from the Graduate Admissions Office. A fee is required. Reinstatement applications must be submitted by the first day of the term for which reenrollment is requested if the student is registering for courses.

RESIDENCY

At Stanford, as at other research universities, each advanced degree program has a residency requirement of a minimum number of full-tuition quarters of registration or the equivalent in partial-tuition quarters. Where more than one advanced degree is pursued, the residency requirement may be unique to that particular combination of degrees.

The residency requirements for most degrees and degree combinations are listed in the chart below. Residency measures tuition assessments; the number of course units attempted or completed has no bearing on residency. It should also be noted that the residency requirement represents the minimum tuition requirement for a degree; an individual student, depending on his or her program, preparation, and choices, may need to accrue more residency than the requirement states to earn the degree.

The fundamental reason for this requirement is educational: the minimum residency fixed for each program is the shortest period that students generally need to attain the level of expertise that a particular Stanford advanced degree signifies, by completing specified course work and other degree requirements, and by immersing themselves in the intellectual life of the University.

The residency requirement also ensures that a reasonable proportion of the University’s expenses for providing the requisites of a high quality education are met from tuition income, particularly the expense of small classes and the need for state-of-the-art laboratory facilities and comprehensive library collections. These expenses remain constant even if, as sometimes happens, a student satisfies his or her other degree requirements before completing the residency requirement.

In such cases, the student can receive the degree early but must pay tuition for the full residency period. A tuition deficiency (a percent of residency less than the required number of quarters) for a degree may be paid to obtain the degree or to qualify for Terminal Graduate Registration (TGR) status.

Residency is stated in terms of full-tuition quarters. Registration at the full-tuition rate (11 or more units during the academic year and 15 units during Summer Quarter) earns one quarter of residency. Residency for partial tuition quarters during the academic year accrues as follows:

- 3 units = .24
- 4 units = .31
- 5 units = .37
- 6 units = .43
- 7 units = .50
- 8 units = .56
- 9 units = .62
- 10 units = .68

Residency is most commonly accrued through registration at Stanford as a matriculated graduate student. Within applicable policy, it may also
be earned through graduate work done elsewhere (see below), registra-
tion as a non-matriculated student at Stanford, or payment of a tuition
deficiency.

Further information about the residency requirement is available from
the Degree Progress Office in the Old Union.

RESIDENCY AND UNIT REQUIREMENTS IN COTERMINAL
PROGRAMS

Unit Requirement—The University minimum requirements for co-
terminal bachelor's/master's program are 180 units for the bachelor's
degree plus 36 (or higher departmental requirement, as determined by
each graduate department) unduplicated units for the master's degree.
The requirements for the coterminal program with dual undergraduate
degrees are 180 units for the first bachelor's degree, 45 units for the sec-
ond bachelor's degree, 36 to 45 units for the master's degree. Of the 36-
unit University minimum for the master's degree, all courses must be at
or above the 100 level and 50 percent must be courses designated prima-
arily for graduate students (typically at least at the 200 level). Department
requirements may be higher. Units for a given course may not be count-
ed to meet the requirements of more than one degree, that is, no units may
be double-counted. No courses taken more than two quarters prior to
admission to the coterminal master's program may be used to meet the
36-unit University minimum requirement for the master's degree.

Residency Requirement—All Stanford master's degree students are
required to complete a residency requirement.

The residency requirement for a student pursuing an A.B., B.S., or
B.A.S., and a coterminal master’s degree can be fulfilled by completing
three full-tuition quarters (or the equivalent in partial-tuition quarters),
after reaching 180 units (90 units completed at Stanford). For example,
the student who has 180 units at the end of a Autumn Quarter, will begin
to accrue graduate residency during the Winter Quarter. If the student has
179 units at the end of Autumn Quarter, graduate residency will not ac-
crue during the Winter Quarter as the 180 unit minimum had not been
reached during Autumn Quarter. Advanced Placement and undergradu-
ate transfer units on the student’s transcript assist the student in reach-
ing the 180-units milestone sooner, but cannot be counted towards the
three required quarters thereafter.

The residency requirement for a student pursuing dual degrees (an
A.B. and a B.S.) and a coterminal master’s degree can be fulfilled by
completing three full-tuition quarters (or the equivalent in partial-tuition quarters), after reaching 225 units (135 units completed at Stanford). This
higher requirement follows the same rules as described in the above para-
graph, except the student will begin to accrue graduate residency the
quarter after reaching the 225-units milestone.

A full-tuition quarter is registration at the full-tuition rate (11 or more
units during the regular academic year and 15 or more units during the
Summer Quarter). A partial tuition quarter is registration below the full-
tuition rate. For example, students who register for 9 units during an
academic quarter accrue 62 percent (0.62) of one full-tuition quarter (see
residency for partial tuition quarters as those described above).

Tuition Rate for Graduate Engineering—The tuition rate for gradu-
ate Engineering is higher than for undergraduate programs. Students
enrolled in a coterminal program in the School of Engineering need to
earn three quarters for graduate residency, as do other master’s degree
students. They begin to pay the higher graduate Engineering tuition rate
in the quarter after they have reached 180 units and after they have been
enrolled for twelve quarters as undergraduates, at the 11 or more unit rate
during the regular academic year (or the 15 or more unit rate during the
summer quarters). In effect, undergraduate students are allotted twelve
quarters of undergraduate tuition. For example, a student in a cotermi-
nal program in the School of Engineering who earned 180 units by the
end of the eleventh quarter of enrollment, would begin to accrue gradu-
ate residency during the twelfth quarter, but would only start to pay the
graduate Engineering tuition rate during the thirteenth quarter of enroll-
ment.

Coterminal students in the School of Engineering, with two under-
grade degrees, are assessed the graduate Engineering tuition rate in
the quarter after they have reached 225 units and after they have been
enrolled for fifteen quarters as undergraduates, at the 11 or more unit rate
during the regular academic year (or the 15 or more unit rate during the
summer quarters).

Engineering coterminal students would also start paying the gradu-
ate Engineering tuition rate if any undergraduate degree is conferred or
if they are granted any graduate aid. Once charged under the graduate
Engineering tuition schedule, the tuition will not revert thereafter to the
undergraduate rate.

For additional information on the coterminal bachelor's/master pro-
gram, see Coterminal Bachelor’s and Master’s Degrees in the “Under-
graduate Degrees” section of this bulletin.

RESIDENCY CREDIT FOR GRADUATE WORK DONE
ELSEWHERE

After at least one quarter of enrollment, students pursuing an Engi-
neer, Ed.S., D.M.A., Ed.D., or Ph.D. may apply for residency credit for
graduate work done at another institution. Engineer or Ed.S. candidates
who also earned their master’s at Stanford are not eligible for transfer
residency credit, nor are any master’s degree students. The chart below
shows the maximum number of transfer quarters that will be accepted
towards Stanford’s residency requirement for each degree or degree
combination. Regardless of whether transfer residency credit is approved,
transfer courses may be used to fulfill department course requirements
at the department’s discretion, but cannot be applied to Stanford’s min-
imum unit requirement for the degree.

Students enrolled at Stanford who are going to study elsewhere dur-
ing their degree program should obtain prior approval of any transfer
residency sought before their departure.

The following criteria are used for awarding transfer residency cred-
it for graduate-level work done at another institution:

1. Courses should have comparable Stanford counterparts that are
approved by the student’s department. A maximum of 12 units of courses
with no Stanford counterparts and/or research units may be granted
transfer residency credit.
2. The student must have been registered in a student category which
yields graduate credit. The maximum amount of credit given for ex-
tension and non-matriculated (non-degree) courses is one quarter. No
transfer credit is given for correspondence work.
3. Courses must have been taken after the conferral of the bachelor’s
degree. The only exception is for work taken through programs struc-
tured like the Stanford coterminal bachelor’s/master’s program.
4. Courses must have a grade point average (GPA) of ‘B’ or better. Pass
grades are accepted only for courses for which letter grades were not
an option and for which the standard of passing is ‘B’-quality work.
5. Courses must have been taken at a regionally accredited institution
in the U.S. or at an officially recognized institution in a foreign coun-
try. Courses taken at foreign universities must be at the level of study
comparable to a U.S. graduate program.

The Application for Residency Credit for Graduate Work Done Else-
where is reviewed by the department and the Degree Progress Office.
### RESIDENCY AND MINIMUM UNITS REQUIREMENTS

<table>
<thead>
<tr>
<th>Degree</th>
<th>Min. # of Units</th>
<th>Min. # of Full-Tuition Qtrs. (Residency) (in qtrs.)</th>
<th>Max. Allowable Transfer Residency Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.M.</td>
<td>36-45</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>M.S./M.A.T. (see note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.M./M.S.</td>
<td>36-45</td>
<td>see note</td>
<td>0</td>
</tr>
<tr>
<td>in Coterminal Program (see note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.M./M.S. plus M.A./M.S.</td>
<td>36-45 undisputed units beyond A.M./M.S.</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>M.F.A.</td>
<td>48-54</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Engineer</td>
<td>36-45 undisputed units beyond A.M./M.S.</td>
<td>6 (0 if A.M./M.S. completed at Stanford)</td>
<td></td>
</tr>
<tr>
<td>Ed.S.</td>
<td>45 undisputed units beyond A.M./M.S.</td>
<td>6 (0 if A.M./M.S. completed at Stanford)</td>
<td></td>
</tr>
<tr>
<td>plus Ph.D.</td>
<td>45 undisputed units beyond A.M./M.S. plus 36 unduplicated units for Ph.D.</td>
<td>9 (0 if A.M./M.S. completed at Stanford)</td>
<td></td>
</tr>
<tr>
<td>Ph.D.</td>
<td>3 years of resident course D.M.A./ work and research beyond A.M./M.S., including 72 units of course work and research done at Stanford</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Ed.D.</td>
<td>plus 72 units (36 undisputed for each degree)</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>plus two</td>
<td>108 units (36 undisputed for each degree)</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>plus Engineer</td>
<td>Engineer requirements plus 36 unduplicated units for the doctoral degree</td>
<td>9 (0 if A.M./M.S. completed at Stanford)</td>
<td></td>
</tr>
<tr>
<td>plus M.D.</td>
<td>Ph.D. requirement plus requirement for first M.D.</td>
<td>Min. 3 Ph.D. qtrs. plus 13 M.D. qtrs.</td>
<td>0</td>
</tr>
<tr>
<td>M.D.</td>
<td>221 units</td>
<td>13 Med. School qtrs. If transfer students, 3 qtrs. and 65 units (first yr. and 130 units) (second year)</td>
<td>0</td>
</tr>
</tbody>
</table>

### UNIVERSITY MINIMUM UNITS REQUIREMENT

Each Stanford graduate degree or combination of degrees is subject to a requirement specifying the minimum number of units that must be earned at Stanford. The minimum units requirement for most degrees and degree combinations is listed in the chart above. The minimum units requirement measures the units completed by the student, without regard for whether the units were earned in courses re-
required for the degree and/or in courses that are not part of the department's course requirements. Study at another institution never counts towards the minimum units requirement, unless the courses were taken through Stanford's Exchange Scholar Program or formal exchange program with U.C.-Berkeley or U.C. San Francisco.

When multiple degrees are being pursued, units must be "unduplicated." This means that units counted towards one degree may not be counted again towards another.

For all graduate degrees, the University's expectation is that the units counted towards the minimum unit requirement are primarily in graduate courses. The University has set specific requirements for units applied to the minimum unit requirement for the A.M., M.S., M.A.T. and M.F.A. degrees: all units must be in courses at or above the 100 level and at least 50 percent of those must be courses designated primarily for graduate students (typically at least the 200 level). Units earned in courses below the 100 level may never be counted towards the minimum unit requirement for the master's degree. Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications.

**SATISFACTORY PROGRESS REQUIREMENTS**

The academic requirements for graduate students include timely completion of department and program requirements, such as admission to candidacy, successful completion of qualifying exams, and so on. The standards for students in professional degree programs are described in the bulleted section. Students in other degree programs must also meet the following standards of satisfactory progress as indicated by registration and reporting of grades.

Graduate students registered at full tuition must enroll for at least 11 units and must pass, over the course of three quarters, a total of 24 units, and at least 8 units per term. Units earned in courses below the 100 level may never be counted towards the minimum unit requirement for the master's degree. Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications.

**GUIDELINES FOR DISMISSAL OF GRADUATE STUDENTS FOR ACADEMIC REASONS**

Admission to graduate programs at Stanford is highly selective. It is anticipated that every admitted student will be able to fulfill the requirements for the advanced degree. This policy provides guidelines for the unusual circumstance that a department must consider dismissal of a graduate student for academic reasons. These guidelines apply to all advanced degree programs except those in the schools of Law or Business or the M.D. program in the School of Medicine. Business, Law, and M.D. programs follow guidelines issued by the respective school.

The principal conditions for continued registration are a timely completion of the University, department, and program requirements for that program, and satisfactory progress (as discussed in the preceding section). The guidelines that follow specify procedures for dismissal of graduate students who are not meeting these conditions. In such cases, the department (through the chair, the Director of Graduate Studies, or the student's faculty adviser) will:

1. Where possible and as early as possible, warn students, in writing, of the situation and deficiency. A detailed explanation of the reason for the warning should be provided.
2. Consider extenuating circumstances.
3. Place a summary of department discussions, votes, and decisions about this matter in the students' files.
4. Provide students the opportunity to examine their department files, if requested.
5. Provide students with information on their rights to appeal under the statement on Student Academic Grievance Procedures. (This is included in this bulletin.)

Careful records of department decisions safeguard the rights of both students and faculty.

**ADDITIONAL SPECIFICS FOR DEGREES WITH CANDIDACY**

**Before Candidacy**—A department committee may vote to dismiss a student who is clearly not making satisfactory progress before review for admission to candidacy. Before considering dismissal, the committee should communicate with the student (which may include a meeting with the student) concerning his or her academic performance and how to correct deficiencies.

In a review for admission to candidacy, if the department votes not to recommend the student for admission to candidacy, the vote will result in the dismissal of the student from the program. The Director of Graduate Studies or the student's adviser shall communicate the department's decision to the student in writing and orally. The student may submit a written request for reconsideration. The committee shall respond in writing to the request for reconsideration; it may refuse to reconsider its decision.

**During Candidacy**—When a student admitted to candidacy is not making satisfactory progress or not completing University, department, or program requirements, the student's adviser, the Director of Graduate Studies, and other relevant faculty should meet with the student. A written summary of these discussions shall be sent to the student and the adviser and added to the student's department file. The summary should specify the student's academic deficiencies, the steps necessary to correct them, and the period of time that is allowed for their correction (normally a minimum of one academic quarter). At the end of the warning period, the department's Graduate Studies Committee shall review the student's progress and notify the student of its proposed actions. If the student has made satisfactory progress, he or she should be notified in writing that the warning has been lifted.

If at the end of the warning period the student has not in the view of the Graduate Studies Committee corrected the deficiencies, the committee may initiate proceedings for dismissal. The student shall be notified, in writing, that the case of dismissal will be considered at an impending department committee meeting. The student has the right to be invited to attend a portion of the scheduled meeting to present his or her own case; a student may also make this case to the committee in writing.

After full discussion at the department committee meeting, the committee, without the student present, reviews the case and votes on the issue of dismissal. A minimum of three faculty members must be present, and a decision is by majority vote. The student is sent a written summary of the discussion, including the committee's decision and the reasons for it. The student may submit a written request for reconsideration. The department committee may refuse to reconsider its decision. The committee's response to the request for reconsideration shall be made in writing.
CONFERRAL OF DEGREES

Upon recommendation to the Senate of the Academic Council by the faculty of the relevant departments or schools and the Committee on Graduate Studies, degrees are awarded four times each year, at the conclusion of Autumn, Winter, Spring, and Summer terms. All diplomas, however, are prepared and awarded in Spring Quarter. Stanford University awards no honorary degrees.

Students must apply for conferral of a graduate degree by filing an Application to Graduate before the deadline of each term. The application should be filed preferably in the second week, but no later than the last day of classes of the conferral quarter, as listed on the University calendar. A separate application must be filed for each degree program and for each conferral term. Applications are filed through Axess, the online service which allows students to update their administrative/academic records.

Requests for conferral are reviewed by the Degree Progress Office, and the student’s department, to verify completion of degree requirements. Registration is required in the conferral term or the term immediately preceding. Students with unmet financial obligations resulting in the placement of a hold on their registration will not receive a transcript, statement of completion, degree certificate, or diploma until the hold is released by the Bursar’s Office.

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should notify the Degree Progress Office in writing. Students who withdraw their graduation applications or fail to meet degree requirements must reapply to graduate for a subsequent term.

CHANGES OF DEGREE PROGRAMS

Graduate students are admitted to Stanford for a specific degree program. Students who have attended Stanford for at least one term and who are currently enrolled or on an approved leave of absence may submit a Graduate Program Authorization Petition to make one of the following changes: (1) change to a new degree program in the same department; (2) change to a new degree program in a different department; (3) add a new degree program in the same or a different department to be pursued with the existing program.

It is important that the attempt to add or change degree programs be made while enrolled. Otherwise, a new Application for Graduate Admission must be submitted and an application fee paid. The Graduate Program Authorization Petition is submitted directly to the department in which admission is requested. If applying for a higher degree program, students may also be required to submit other application materials such as GRE Subject Test scores, a statement of purpose, or new letters of recommendation.

International students changing departments or degree programs must also request the Foreign Student Adviser at the Bechtel International Center. If the requested change lengthens their stay, they also are required to submit verification of sufficient funding to complete the new degree program.

Students who wish to terminate study in a graduate program should submit to the department a letter indicating the program from which they wish to withdraw and the effective date. To return to graduate study thereafter, the student is required to apply for reinstatement (if returning to the same degree program) or admission (if applying to a different program). Both applications require payment of a fee.

DEGREE-SPECIFIC REQUIREMENTS

MASTER OF ARTS AND MASTER OF SCIENCE

In addition to completing the general requirements for advanced degrees and the requirements specified by their department, candidates for a Master of Arts (A.M.) or Master of Science (M.S.) degree must complete their degree requirements within the time limit specified below and must outline an acceptable program of study on the Master’s Degree Program Proposal.

MASTER’S PROGRAM PROPOSAL

Students pursuing an A.M., M.F.A., M.A.T., or M.S. are required to submit an acceptable program proposal to their department during the first quarter of enrollment. Coterminal students must submit the proposal during the first quarter after their completion of 180 units. The program proposal establishes a student’s individual program of study to meet University and department degree requirements. Students must amend the proposal formally if their plans for meeting degree requirements change.

In reviewing the program proposal or any subsequent amendment to it, the department confirms that the course of study proposed by the student fulfills all department course requirements (for example, requirements specifying total number of units, course levels, particular courses, sequences, or substitutes). The department confirms that all other department requirements (for example, required projects, foreign language proficiency, or qualifying exams) are listed on the form and that all general University requirements (minimum units, residency, and so on) for the master’s degree will be met through the proposed program of study.

TIME LIMIT FOR COMPLETION OF THE MASTER’S DEGREE

All requirements for a master’s degree must be completed within three years after the student’s first term of enrollment in the master’s program (five years for Honors Cooperative students). Students pursuing a coterminal master’s degree must complete their requirements within three years of their first quarter of graduate standing.

The time limit is not automatically extended by a student’s leave of absence. All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program’s time limit. Departments are not obliged to grant an extension. The maximum extension granted is one additional year. Extensions require review of academic progress and any other factors regarded as relevant by the department and approval by the department.

MASTER OF BUSINESS ADMINISTRATION

The degree of Master of Business Administration (M.B.A.) is conferred on candidates who have satisfied the requirements established by the faculty of the Graduate School of Business and the general requirements for advanced degrees. Full particulars concerning the school requirements are found in the Graduate School of Business Bulletin. The M.B.A. must be completed within the time limit for completion of the master’s degree.

MASTER OF ARTS IN TEACHING

The program leading to the Master of Arts in Teaching (M.A.T.) is designed for experienced teachers or for individuals who have previously completed programs of teacher preparation. In addition to completing the general requirements for advanced degrees and the program requirements specified by the School of Education and by one of the academic departments participating jointly in the program, M.A.T. candidates must fulfill the requirements for a master’s program proposal as specified above and complete their degrees within the time limit for completion of the master’s degree.

MASTER OF FINE ARTS

In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Art and Art History" section of this bulletin, candidates for the degree of Master of Fine Arts (M.F.A.) must fulfill the requirements for a master’s program proposal and complete their degrees within the time limit for completion of the master’s degree, as specified above.

ENGINEER

In addition to completing the general requirements for advanced degrees and the requirements specified by their department, candidates for
the degree of Engineer must be admitted to candidacy and must complete a thesis per the specifications below.

CANDIDACY

The Application for Candidacy for Degree of Engineer is an agreement between the student and the department on a specific program of study to fulfill degree requirements. Students must apply for candidacy by the end of the second quarter of the program. Honors Cooperative students must apply by the end of the fourth quarter of the program. Candidacy is valid for five calendar years.

THESIS

A University thesis is required for the Engineer degree. Standards for professional presentation of the thesis have been established by the Committee on Graduate Study and are detailed in Directions for Preparing Theses for Engineer Degrees, available from the Degree Progress Office in the Old Union.

The deadline for submission of theses for degree conferment in each term is specified by the University calendar. Three copies of the thesis, bearing the approval of the adviser under whose supervision it was prepared, must be submitted to the Degree Progress Office before the quarterly deadline listed on the University calendar. A fee is charged for binding copies of the thesis.

Registration is required for the term, or the immediately preceding term, in which the thesis is submitted. The period between the last day of final exams of one term and the first day of the subsequent term is considered an extension of the earlier term. Students submitting a thesis during this period would meet the registration requirement but would be eligible for degree conferment only in the subsequent term.

EDUCATIONAL SPECIALIST

In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Education" section of this bulletin, candidates for the degree of Educational Specialist (Ed.S.) must complete a field-based project.

MASTER OF LEGAL STUDIES

Admission to study for the Master of Legal Studies degree (M.L.S.), a nonprofessional degree, is granted to students who hold the Doctor of Philosophy (Ph.D.) or other nonlaw doctoral degree, or who have been admitted to a nonlaw doctoral program and have completed a program of study amounting to 45 quarter units or 30 term units of work toward the doctorate, and who meet an admission standard equivalent to that required of candidates for the Doctor of Jurisprudence degree.

The M.L.S. degree is conferred upon candidates who, in not fewer than two academic terms in residence and in not more than two consecutive academic years, successfully complete 30 term units of work in the School of Law, including three first-year courses in the first autumn term and at least one course or seminar requiring a research paper. All work shall conform to the rules and regulations of the University and the School of Law.

DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence (J.D.) is conferred on candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the School of Law over not less than three academic years and who otherwise have satisfied the requirements of the University and the School of Law.

DOCTOR OF PHILOSOPHY

The degree of Doctor of Philosophy (Ph.D.) is conferred on candidates who have satisfied the general requirements for advanced degrees, the program requirements specified in the "Music" section of this bulletin, and the candidacy requirement as described below in the "Doctor of Philosophy" section.

DOCTOR OF EDUCATION

In addition to completing the general requirements for advanced degrees and the requirements specified by the School of Education, candidates for the Doctor of Education (Ed.D.) must fulfill the following requirements as detailed in the "Doctor of Philosophy" section below: candidacy, University oral examination, and dissertation.

MASTER OF THE SCIENCE OF LAW

The degree of Master of the Science of Law (J.S.M.) is conferred upon candidates who have completed one academic year (26 term-units) with distinction in accordance with the rules of the University and the School of Law.

The degree is primarily designed for those qualified students who hold a J.D. or its equivalent and who are at the Stanford School of Law for independent reasons (for example, as teaching fellows) and who wish to combine work toward the degree with their primary academic activities. Specially qualified lawyers, public officials, academics, and other professionals who have worked outside the United States may apply for the degree through the Stanford Program in International Legal Studies (SPILS). Full particulars concerning requirements may be found in the Stanford University bulletin School of Law.

DOCTOR OF THE SCIENCE OF LAW

The degree of the Doctor of Science of Law (J.S.D.) is conferred upon candidates who hold a J.D. or its equivalent, who complete one academic year in residence, and who, as a result of independent legal research, present a dissertation that is, in the opinion of the faculty of the School of Law, a contribution to knowledge. Such work and dissertation shall conform to the rules of the School of Law and the University, as described below in the "Doctor of Philosophy" section.

Candidacy is limited to students of exceptional distinction and promise. Full particulars concerning requirements may be found in the Stanford University bulletin School of Law.

DOCTOR OF MEDICINE

Candidates for the degree of Doctor of Medicine (M.D.) must satisfactorily complete the required curriculum in medicine. All requirements for the M.D. degree are detailed in the Stanford University School of Medicine Catalog.

DOCTOR OF PHILOSOPHY

The degree of Doctor of Philosophy (Ph.D.) is conferred on candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and ability to do independent investigation and present the results of such research. They must satisfy the general requirements for advanced degrees, the program requirements specified by their departments, and the doctoral requirements described below. The option for a Ph.D. minor is also described below, though it is not a Ph.D. requirement.

CANDIDACY

Admission to a doctoral degree program is preliminary to, and distinct from, admission to candidacy. Admission to candidacy for the doctoral degree is a judgment by the faculty of the student’s potential to complete successfully the requirements of the degree program. Students are expected to complete department qualifying procedures and apply for candidacy by the end of their second year in the Ph.D. program. Honors Cooperative students must apply by the end of their fourth year.

The Application for Candidacy specifies a departmentally approved program of study to fulfill degree requirements, including required course work, language requirements, teaching requirements, dissertation (final project public lecture-demonstration for D.M.A.), and University oral examination (for Ph.D. and Ed.D.). At least 3 units of work must be taken with each of four Stanford faculty members.

If the Ph.D. student is pursuing a minor, approval by the department awarding the minor is also required on the Application for Candidacy.
TIME LIMIT FOR COMPLETION OF A DEGREE WITH CANDIDACY

All requirements for the degree must be completed before candidacy expires. Candidacy is valid for five years unless terminated by the department for unsatisfactory progress. The time limit is not automatically extended by a student’s leave of absence. All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program’s time limit. Departments are not obliged to grant an extension. The maximum extension granted is one additional year. Extensions require review by the department of a dissertation progress report, a timetable for completion of the dissertation, any other factors regarded as relevant by the department, and approval by the department.

TEACHING REQUIREMENTS

A number of departments require their students to teach for one or more quarters during their doctoral programs. Detailed information is included in the department sections of this bulletin.

FOREIGN LANGUAGE REQUIREMENT

Some departments require a reading knowledge of one or more foreign languages as indicated in department sections of this bulletin. Fulfillment of language requirements must be endorsed by the chair of the major department on the Foreign Language Report form.

UNIVERSITY ORAL EXAMINATION

Passing a University oral examination is a requirement of the Ph.D. and Ed.D. degrees. The purpose of the examination is to test the candidate’s command of the field of study and to confirm fitness for scholarly pursuits. Departments determine when, after admission to candidacy, the oral examination is taken and whether the exam will be a test of knowledge of the field, a review of a dissertation proposal, or a defense of the dissertation.

Students must be registered in the term in which the University oral examination is taken. The period between the last day of final exams of one term and the first day of the following term is considered an extension of the earlier term. Candidacy must also be valid.

The University Oral Examination Committee consists of at least five Stanford faculty members: four examiners and the committee chair from another department. All members are normally on the Stanford Academic Council, and the chair must be a member. Emeritus faculty are also eligible to serve as examiners or chair of the committee. (A petition for appointment of an examining committee member who is not on the Academic Council may be approved if that person contributes an area of expertise that is not readily available from the faculty.) The chair of the examining committee may not have a full or joint appointment in the adviser’s or student’s department, but may have a courtesy appointment in the department. The chair can be from the same department as any other member(s) of the examination committee and can be from the student’s minor department provided that the student’s adviser does not have a full or joint appointment in the minor department.

The University Oral Examination form must be submitted to the department graduate studies administrator at least two weeks prior to the proposed examination date. The examination is conducted according to the major department’s adopted practice, but it should not exceed three hours in length, and it must include a period of private questioning by the examining committee.

Responsibility for monitoring appointment of the oral examination chair rests with the candidate’s major department. Although the department cannot require the candidate to approach faculty members to serve as chair, many departments invite students and their advisers to participate in the process of selecting and contacting potential chairs.

The candidate passes the examination if the examining committee casts four favorable votes out of five or six, five favorable votes out of seven, or six favorable votes out of eight. Five members present and voting constitute a quorum. If the committee votes to fail a student, the committee chair sends within five days a written evaluation of the candidate’s performance to the major department and the student. Within 30 days and after review of the examining committee’s evaluation and recommendation, the chair of the student’s major department must send the student a written statement indicating the final action of the department.

DISSERTATION

An approved doctoral dissertation is required for the Ph.D., Ed.D., and J.S.D. degrees. The doctoral dissertation must be an original contribution to scholarship or scientific knowledge and must exemplify the highest standards of the discipline. The dissertation is approved for the school or department by the doctoral dissertation reading committee. Each member of the reading committee signs the signature page of the dissertation to certify that the work is of acceptable scope and quality. One reading committee member reads the dissertation in its final form and certifies on the Certificate of Final Reading that department and University specifications have been met.

Dissertations must be in English. Approval for writing the dissertation in another language is normally granted only in cases where the other language or literature in that language is also the subject of the discipline. Such approval is routinely granted for dissertations in the Division of Literatures, Cultures, and Languages, in accordance with the policy of the individual department. Dissertations written in another language must include an extended summary in English.

Directions for preparation of the dissertation are available from the Degree Progress Office in the Old Union. The signed dissertation copies and accompanying documents must be submitted to the Degrees Progress Office on or before the quarterly deadline indicated in the University’s academic calendar. A fee is charged for the microfilming and binding of the dissertation copies.

Registration is required for the term, or the immediately preceding term, in which the dissertation is submitted. The period between the last day of final exams of one term and the first day of the subsequent term is considered an extension of the earlier term. Students submitting a dissertation during this period would meet the registration requirement but would be eligible for degree conferral only in the subsequent term. At the time the dissertation is submitted, an Application to Graduate must be on file. All of the department requirements must be complete, and candidacy must be valid through the term of degree conferral.

DOCTORAL DISSERTATION READING COMMITTEE

The Doctoral Dissertation Reading Committee consists of the principal dissertation adviser and two other readers. At least one member must be from the student’s major department. Normally, all members are on the Stanford Academic Council. The student’s department chair may, in some cases, approve the appointment of a reader who is not on the Academic Council, if that person is particularly well-qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree.

Former Stanford Academic Council members, emeritus professors, and non-Academic Council members may serve on a reading committee. If they are to serve as the principle dissertation adviser, however, the appointment of a co-adviser who is currently on the Academic Council is required.

The reading committee, as proposed by the student and agreed to by the prospective members, is endorsed by the chair of the major department on the Doctoral Dissertation Reading Committee form. This form must be submitted before approval of Terminal Graduate Registration (TGR) status or before scheduling a University oral examination that is a defense of the dissertation. The reading committee may be appointed earlier, according to the department timetable for doctoral programs. All subsequent changes to the reading committee must be approved by the chair of the major department.

Ph.D. MINOR

Students pursuing a Ph.D. may pursue a minor in another department or program to complement their Ph.D. program. This option is not available to students pursuing other graduate degrees. Ph.D. candidates cannot pursue a minor in their own major department or program.
Except for a Ph.D. minor in Applied Linguistics and Social Science History, only departments that offer a Ph.D. may offer a minor, and those departments are not required to do so. The minor should represent a program of graduate quality and depth, including core requirements and electives or examinations. The department offering the minor establishes the core and examination requirements. Elective courses are planned by the students in conjunction with their minor and Ph.D. departments.

The minimum University requirement for a Ph.D. minor is 20 units of course work at the graduate level (courses numbered 200 and above). If a minor department chooses to require those pursuing the minor to pass the Ph.D. qualifying or field examinations, the 20-unit minimum can be reduced. All of the course work for a minor must be done at Stanford.

Units taken for the minor can be counted as part of the overall requirement for the Ph.D. of 72 units of graduate course work done at Stanford, but cannot be counted as part of the 36 unduplicated units for the Ph.D. itself. Courses used for a minor may not be used also to meet the requirements for a master’s degree.

A Ph.D. minor form outlining a program of study must be approved by the major and minor departments. This form is submitted at the time of admission to candidacy and specifies whether representation from the minor department on the University oral examination committee is required.

ADVISING AND CREDENTIALS

ADVISING

By the start of their first term, students should be paired by the department with faculty advisers who assist them in planning a program of study to meet degree requirements. The department should also ensure that doctoral students are informed in a timely fashion about procedures for selecting a dissertation adviser, reading committee members, and orals committee members. Departments should make every effort to assist doctoral students who are not admitted to candidacy in finding an appropriate adviser.

Students are obliged to follow department procedures for identifying advisers and committee members for their dissertation reading and orals examinations.

Occasionally, a student’s research may diverge from the area of competence of the adviser, or irreconcilable differences may occur between the student and the faculty adviser. In such cases, the student or the faculty adviser may request a change in assignment. If the department decides to grant the request, every effort must be made to ensure that the student is paired with another suitable adviser. This may entail some modification of the student’s research project.

In the rare case where a student’s dissertation research on an approved project is in an advanced stage and the dissertation adviser is no longer available, a new adviser must be appointed, usually from the student’s reading committee. This may also require that a new member be added to the reading committee before the draft dissertation is evaluated, to keep the reconstituted committee in compliance with the University requirements for its composition.

PUBLIC SCHOOL CREDENTIALS

Stanford University acts as agent for the California Commission on Teacher Credentialing in recommending students for credentials for service in California public schools upon completion of a Stanford approved program. The University offers complete training programs for the Single Subject Teaching Credential and the Preliminary Administrative Services Credential.

The student expecting to complete the fifth-year requirement for a teaching credential must submit a proposed course of study to the Credential Office in the School of Education at the beginning of the first quarter of study.
Academic Policies and Statements

COMPLIANCE WITH UNIVERSITY REGULATIONS

Registration as a student constitutes an agreement to abide by University regulations, including those concerning admissions, registration, academic performance, student conduct, public health, use of the libraries, operation of vehicles on campus, University facilities, and the payment of fees and assessments. Many of these regulations are set forth in this bulletin while others are available in relevant University offices.

Graduate students should also take responsibility for informing themselves in particular of University policy on intellectual property, environmental health and safety, and scientific misconduct. These policies are described in the Research Policy Handbook and the Graduate Student Handbook.

The University reserves the right to withhold registration privileges or to require the withdrawal of any student who is not in compliance with its regulations.

ACADEMIC INSTRUCTIONAL USE OF VERTEBRATE ANIMALS

It is the policy of Stanford University that the use of either live or deceased vertebrate animals for solely instructional purposes is permitted (1) when the cognizant instructor(s) judges that the educational goals of the program or course are best achieved by such usage, and (2) when the Administrative Panel on Laboratory Animal Care determines that such usage is humane, proper, and appropriate and that it is consistent with government principles and regulations for the utilization and care of vertebrate animals used in teaching and research. Only the minimum number of animals essential to instructional objectives should be used. Instructors should be encouraged to use alternatives to animals whenever feasible.

INFORMATION TO STUDENTS

Academic departments and programs should alert prospective students if any courses required for a major or degree involve the use of animals. This requirement may be met by a statement to the effect that some required courses for certain degrees may involve the use of animals or animal tissue and that interested students should seek further information about such requirements from the department.

Instructors must inform their students during the first week of class if animals or animal tissue will or may be used as part of that course. Students who have concerns about the use of animals may then choose whether or not to take the class. Students should feel free to discuss their concerns with the instructor, but they should be aware that instructors and departments are not obligated to alter course requirements that are consistent with University policies.

PROCEDURES FOR USE OF ANIMALS

Any faculty member who intends to use vertebrate animals for teaching purposes must submit an Animal Use Protocol, signed by the department chair, to the Administrative Panel on Laboratory Animal Care. Reuse of previously preserved material requires no approval. Courses taught each year with no significant changes in animal usage must submit a Renewal Animal Use Protocol every year.

The protocol must include information about the sources from which animals are procured. In addition, the protocol must explain why animals are needed to achieve the goals of the course and must justify the species and the number of animals to be used. Questions from the Administrative Panel on Laboratory Animal Care regarding the species of animal chosen, the procurement process, the number of animals to be used, or other related matters must be resolved before the animals may be ordered.

Live vertebrate animals must be cared for according to the Division of Laboratory Animal Medicine policies and procedures governing the use of laboratory animals. Disposal of animal tissue must be in compliance with relevant health and safety regulations.

REGISTRATION AND RECORDS

REGISTRATION AND STUDY LISTS

Students register for each term by submitting a Registration Commitment form through the mail, in person, or through the computerized registration system, Axess. No student may attend any classes without a valid student identification card.

As early as possible, but no later than the second Sunday of the quarter, students (including those with TGR status) must submit to the Registrar’s Office, via Axess, a study list to enroll officially in classes for the quarter. Students may not enroll in more units than their tuition charge covers, nor enroll in courses for zero units unless those courses, like TGR, are defined as zero-unit courses. Undergraduate students are subject to academic load limits described in the “Amount of Work” section below.

The University reserves the right to withhold registration from, and to cancel the advance registration or registration of, any student having unmet obligations to the University.

For full registration procedures, see the quarterly Time Schedule.

STUDY LIST CHANGES

Students may add courses or units to their study lists through the end of the third week of classes. (Individual faculty may choose to close their classes to new enrollments at an earlier date.) Courses or units may be dropped only if the revised program remains within the normal load limits.

Courses may be dropped by students through the end of the fourth week of classes, without any record of the course remaining on the student’s transcript. No drops are permitted after this point, regardless of the grade or notation recorded in the course.

A student may withdraw from a course after the drop deadline through the end of the eighth week of each quarter. In this case, a grade notation of “W” (for “Withdrew”) is automatically recorded on the student’s transcript for that course. Students who do not officially withdraw from a class by the end of the eighth week are assigned the appropriate grade or notation by the instructor to reflect the work completed.

Through the end of the sixth week of classes, students may elect the grading option of their choice in courses where the option of letter or Credit/No Credit grading is offered.

If the instructor allows a student to take an ‘I’ (incomplete) in the course, the student must make the appropriate arrangements for that with the instructor by the last day of classes.

These policies reflect changes adopted by the Faculty Senate on June 2, 1994 which were effective Autumn Quarter 1995-96. The deadlines described above follow the same pattern each quarter but, due to the varying lengths of Stanford’s quarters, they may not always fall in exactly the week specified. Students should consult the Time Schedule for the deadline dates each term.

REPEATED COURSES

Students may not enroll in courses for credit for which they received either Advanced Placement or transfer credit.

Some Stanford courses may be repeated for credit; they are specially noted in this bulletin. Most courses may not be repeated for credit. Under the general University grading system, when a course which may not be repeated for credit is retaken by a student, the following special rules apply:

1. A student may retake once any course on his or her transcript (regardless of grade or notation earned), or from which she or he withdrew, and have the original grade or notation replaced by the notation ‘RP’
(repeated course). When retaking a course, the student must enroll in it for the same number of units originally taken. Upon completion of the retake, units for the first occurrence are automatically lowered to zero, the grade is changed to an ‘RP,’ and the second occurrence is flagged on the student’s transcript to indicate that it is a repeated course.

2. The student may not retake the same course again (for a third time), unless he or she received a ‘NC’ (No Credit), ‘NP’ (Not Passed), or ‘W’ (Withdraw) when it was taken the second time. Upon completion of the third attempt, the units for the first and second time are automatically lowered to zero. The third attempt appears on the transcript with its units, grade, and the special flag to indicate that it is a repeated course.

These policies reflect changes adopted by the Faculty Senate on June 2, 1994.

AMOUNT OF WORK

The usual amount of work for undergraduate students is 15 units per quarter; 180 units are required for graduation. Registration for fewer than 12 units is rarely permitted and may cause the undergraduate to be ineligible for certification as a full-time student. The maximum is 20 units (21 if the program includes a 1-unit activity course). The maximum may be exceeded only for compelling reasons. A past superior academic performance is not considered to be sufficient justification for exceeding the maximum. Petitions for programs of fewer than 12 or more than 20 units must be signed by the student’s adviser and submitted to the Office of Academic Standing, Old Union, room 141. For additional information regarding satisfactory academic progress, refer to the “Academic Standing” section of this bulletin.

Graduate students are normally expected to enroll in no more than 24 units; registration for more than 24 units must be approved by the department. Under certain circumstances, graduate students may register on a part-time basis. See the “Tuition, Fees, and Housing” section of this bulletin.

During the eight-week Summer Quarter, 16 units is the maximum for all students. For details, see the Stanford University bulletin, Summer Session Catalogue, 2000.

UNIT OF CREDIT

Every unit for which credit is given is understood to represent approximately three hours of actual work per week for the average student. Thus, in lecture or discussion work, for 1 unit of credit, one hour per week may be allotted to the lecture or discussion and two hours for preparation or subsequent reading and study. Where the time is wholly occupied with drawing, field, or laboratory work, or in the classroom work of conversation classes, three full hours per week through one quarter are expected of the student for each unit of credit; but, where such work is supplemented by systematic outside reading or experiment under the direction of the instructor, a reduction may be made in the actual drawing, field, laboratory, or classroom time as seems just to the department.

AUDITING

No person shall attend any class unless he or she is a fully registered student enrolled in the course or meets the criteria for auditors. Auditors are not permitted in courses that involve direct participation such as language or laboratory science courses, fieldwork, art courses with studio work, or other types of individualized instruction. Auditors are expected to be observers rather than active participants in the courses they attend, unless the instructors request attendance on a different basis. Stanford does not confer credit for auditing, nor is a permanent record kept of courses audited.

In all cases of auditing, the instructor’s consent and the Registrar’s approval are required. Further information is available from the Registrar’s Office.

WITHDRAWAL FOLLOWING REGISTRATION

Students who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a leave of absence petition with the Registrar’s Office. More information is available in the “Refunds” section of this bulletin and, for graduate students, in General Requirements in the “Graduate Degrees” section of this bulletin.

RECORDS

TRANSCRIPTS

Transcripts of Stanford records are issued by the Registrar’s Office upon the student’s request when submitted in writing or via the online Axess system. There is no charge for official transcripts. The courses taken and grades given in one quarter will not appear on any student’s transcript until all grades received by the grade deadline have been recorded; generally, this is two weeks after final exams. The University reserves the right to withhold transcripts or records of students with unmet obligations to the University.

CERTIFICATION OF ENROLLMENT OR DEGREES

Requests for official certification of enrollment or degrees should be addressed to the Registrar’s Office. Oral confirmation of registration or degrees earned can often be made at the time of the phone inquiry. Requests for written certification of enrollment should be submitted by the student to the Registrar’s Office.

Degrees are conferred quarterly, but diplomas are issued at the Commencement exercises which are held only in June. After conferral, the degree awarded to a student can be verified by contacting the Registrar’s Office for an official transcript, a certification form, or an oral confirmation via telephone. Requests for transcripts must be made by the student in writing or through Axess.

Full-time enrollment for undergraduates is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Work necessary to complete units from previous quarters will not count toward the 12 units necessary for full-time status in the current quarter. Enrollment in 8 to 11 units is considered half-time enrollment. Enrollment in 1 to 7 units is considered less-than-half-time, or part-time enrollment.

All undergraduate students validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification. Stanford uses the following definitions to certify the enrollment status of graduate students each quarter:

- Full-time: 9 or more units
- Half-time: 6, 7 or 8 units
- Part-time: 5 or fewer units
- Registered TGR students are certified as full-time.

Only information classified by the University as directory information (see below) can be confirmed to inquirers other than the student.

PRIVACY OF STUDENT RECORDS

NOTIFICATION OF RIGHTS UNDER FERPA

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. These are:

1. The right to inspect and review the student’s education records within 45 days of the date the University receives a request for access.

The student should submit to the Registrar, Dean, chair of the department, or other appropriate University official, a written request that identifies the record(s) the student wishes to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student’s educational records that the student believes are inaccurate or misleading.
A student may ask the University to amend the record that he or she believes is inaccurate or misleading. The student should write the University official responsible for the record, clearly identify the part of the records he or she wants changed, and specify why it is inaccurate or misleading.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment.

Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student’s education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

Another exception is that the University discloses education records without consent to officials of another school, in which a student seeks or intends to enroll, upon request of officials at that other school.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA.

The name and address of the office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW., Washington, DC, 20202-4605.

DIRECTORY INFORMATION

The University regards the following items of information as “directory information,” that is, information that the University may make available to any person upon specific request (and without student consent):

Name
Date of birth
Place of birth
Directory address and phone number
Electronic mail address
Mailing address
Campus office address (for graduate students)
Secondary mailing or permanent address
Residence assignment and room or apartment number
Specific quarters or semesters of registration at Stanford
Stanford degree(s) awarded and date(s)
Major(s), minor(s), and field(s)
University degree honors
Institution attended immediately prior to Stanford
Photographs for University purposes (such as classroom use) only

Students may prohibit the release of any of these items listed above by designating which items should not be released on the Privacy function of Axess.

Students, faculty, and others with questions regarding student records should contact the Registrar’s Office.

CONSENT TO USE OF PHOTOGRAPHIC IMAGES

Registration as a student and attendance at or participation in classes and other campus and University activities constitutes an agreement by the student to the University’s use and distribution (both now and in the future) of the student’s image or voice in photographs, videotapes, electronic reproductions, or audiotapes of such classes and other campus and University activities.

If any student in a class where such photographing or recording is to take place does not wish to have his or her image or voice so used, the student should raise the matter in advance with the instructor.

STANFORD UNIVERSITY ID NUMBER

The Stanford University ID is a number assigned to each student’s academic record for unique identification. It is printed on the Stanford University ID card and on documents distributed by the Registrar’s Office and other administrative offices.

SUNET ID

The SUNet ID provides access to the Stanford University Network (SUNet) and its services, and identifies authorized users of these services. Each member of the Stanford electronic community creates a unique SUNet ID and password for him/herself.

SUNET IDs provide:

Axess services
Email service
Storage space within Stanford’s distributed file system
Usenet newsgroups
World Wide Web services, including serving of personal web pages on the Leland system and access to Stanford Web Resources

IDENTIFICATION CARDS

ID cards are available to registered students, faculty, and regular staff through the Office of the Registrar, Old Union.

Married students or students with a domestic partner (same or opposite sex) may obtain a courtesy identification card for their spouse/partner through the Registrar’s Office, Old Union. The spouse/partner card enables use of some campus services during terms for which the student is registered.

Similar courtesy cards are also available to the spouses and same-sex partners of faculty and regular staff.

PERSONAL IDENTIFICATION NUMBERS

Students eligible to use on-line services such as Axess obtain a PIN through the Registrar’s Office. The PIN, coupled with the assigned University identification number, uniquely identifies the student and serves in a place of a signature on electronic forms. The PIN and SUNet ID password must remain confidential. It is a violation of University policy to use another’s PIN or identification number to misrepresent yourself in any way. Use of another student’s PIN or SUNet ID password can result in loss of student privileges or other disciplinary action.

EXAMINATIONS

MIDTERMS

Classes that give midterm examinations outside of regular class hours must: (1) announce the date and time during the first week of the academic quarter, and (2) provide reasonable alternative times to those students for whom these announced times are not convenient. According to Honor Code interpretations and applications, different examinations may be given at these alternative times.

END-QUARTER POLICY STATEMENT

The End-Quarter Period is a time of reduced social and extracurricular activity preceding final examinations. Its purpose is to permit students to concentrate on academic work and to prepare for final examinations.

In Autumn, Winter, and Spring Quarters, End-Quarter starts seven full days (to begin at 12:01 a.m.) prior to the first day of final exams. In Spring Quarter, final examinations begin on Friday; no classes are held on Thursday, the day before. In Summer Quarter, this consists of the weekend and the four class days preceding the final examinations, which take place
on Friday and Saturday of the eighth week. (See the Time Schedule for dates.)

During the End-Quarter Period, classes are regularly scheduled and assignments made; this regular class time is used by instructors in whatever way seems best suited to the completion and summation of course material. Instructors should neither make extraordinary assignments nor announce additional course meetings in order to "catch up" in course presentations that have fallen behind. They are free, however, and even encouraged to conduct optional review sessions and to suggest other activities that might seem appropriate for students preparing for final examinations.

No graded homework assignments, mandatory quizzes, or examinations should be given during the End-Quarter Period except:

1. In classes where graded homework assignments or quizzes are routine parts of the instruction process.
2. In classes with laboratories where the final examination will not test the laboratory component. In such a case, the laboratory session(s) during the End-Quarter Period may be used to examine students on that aspect of the course.

Major papers or projects about which the student has had reasonable notice may be called due in the End-Quarter Period.

Take-home final examinations, given in place of the officially scheduled in-class examination, may be distributed in the End-Quarter Period. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course. Such a policy respects the principle that students' final examinations are to be scheduled over a period of several days.

End-quarter examinations may not be held during this period. This policy preserves the instruction time for courses and protects the students' opportunities for extensive review and synthesis of their courses.

During the End-Quarter Period, no musical, dramatic, or athletic events involving compulsory student participation may be scheduled, unless approved as exceptions by the Committee on Academic Appraisal and Achievement, or may routine committee meetings be scheduled (such as those of the ASSU, the Senate of the Academic Council, or the committees of the President of the University) when such meetings normally would involve student participation.

Note—Students who believe that there are faculty who are violating End-Quarter policy should contact the Registrar's Office.

END-QUARTER EXAMINATIONS

Examinations are part of the process of education at the same time that they are a means to measure the student's performance in course work. Their structure, content, frequency, and length are to be determined in accordance with the nature of the course and the material presented in it, subject only to the limitations contained herein.

Great flexibility is available regarding the types of examinations that an instructor may choose to employ. Examinations, including final examinations, may be, for example, in-class essay examinations, take-home essay examinations, objective examinations, oral examinations, or appropriate substitutes such as papers or projects. Instructors may use any type of examination, paper, or project, or any combination thereof, guided only by the appropriateness of the types of examinations, papers, or projects for the material upon which the student is being examined.

When the final examination is an in-class examination, the following regulations apply:

1. A three-hour period is reserved during examination week for the final examination in each course of more than 2 units. This examination period must be available for students, but not necessarily in its entirety, if an in-class examination is given. In courses with extraordinary meeting times, such that ambiguity might exist as regards the period reserved for the final examination, the schedule should be clarified and students informed no later than the end of the second week of the quarter.
2. Examinations in 1- or 2-unit courses must be completed by the end of the last class meeting before the End-Quarter Period, except in Summer Quarter when examinations must be completed during the last regularly scheduled class session.

When the final examination or its appropriate substitute is not an in-class examination (for example, when an instructor chooses to employ a take-home examination, paper, or project in lieu of an in-class examination), the following regulations apply:

1. The schedule and format of the final examination or its appropriate substitute shall be made known not later that the end of the second week of the quarter and, if changed subsequently, may be only an option of the plan originally announced by the instructor.
2. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course.

In submitting official Study Lists, students commit to all course requirements, including the examination procedures chosen and announced by the course instructor. In selecting courses, students should take cognizance of the official schedule of final examinations announced in the quarterly Time Schedule. Students anticipating conflicts in final examination schedules should seek to resolve these with the instructors involved before submitting Study Lists at the end of the second week of the quarter. If accommodation cannot be made at that time, the student should revise his or her Study List in order to be able to meet the required final examination.

If unforeseen circumstances prevent the student from sitting for the regularly scheduled examination, instructors should make alternative arrangements on an individual basis. Such unforeseen circumstances include illness, personal emergency, or the student's required participation in special events approved as exceptions by the Committee on Academic Appraisal and Achievement (for example, athletic championships).

STATEMENT CONCERNING EARLY EXAMINATIONS

Students are reminded that taking final examinations earlier than the scheduled time is a privilege, not a right. They should request this privilege only in the event of extraordinary circumstances.

Since the final examination schedule is published quarterly in the Time Schedule at the time of course selection and enrollment, students are expected to make their academic plans in light of known personal circumstances that may make certain examination times difficult for them.

In general, faculty members are discouraged from giving final examinations earlier than the published and announced times. If faculty nevertheless decide to administer early examinations, either the questions should be completely different from those on the regularly scheduled examination or the early examination should be administered in a highly controlled setting. An example of such a setting would be a campus seminar room where the examination questions would be collected along with students' work and students would be reminded of their Honor Code obligations not to share information about the examination contents. Giving students easy opportunities to abuse the integrity of an examination is unfair to honest students and inconsistent with the spirit of the Honor Code.

Academic fields differ in the degree to which early examination requests present dilemmas for faculty. If, for example, an examination format consists of a small number of essay questions, where students would be greatly advantaged by knowing the question topics, faculty should be especially reluctant to allow early examinations unless they are willing to offer totally different examinations or a different kind of academic task, for example, a final paper in lieu of an examination.

GRADING SYSTEMS

GENERAL UNIVERSITY

The general University grading system is applicable to all schools of Stanford University except the Graduate School of Business, the School of Law, and M.D. students in the School of Medicine. Note that the GPA
(grade point average) and rank in class are not computed under the general University grading system. Stanford does use an internal-only GPA system, which is based on units completed up to the time of conferment of the first bachelor's degree. This information is used for the internal purposes only and is not displayed on the official transcript which is sent outside the University. Note also that, as to graduate students, there may be departmental requirements as to grades that must be maintained for purposes of satisfactory progress.

**DEFINITION AND EXPLANATION**

The following reflects changes adopted by the Faculty Senate on June 2, 1994 and effective Autumn Quarter 1995-96. All grades/notations for courses taken in 1995-96 or later are to be visible on student transcripts.

- **A** Excellent
- **B** Good
- **C** Satisfactory
- **D** Minimal pass

(Plus (+) and minus (-) may be used as modifiers with the above letter grades)

- **NP** Not Passed
- **NC** No Credit (unsatisfactory performance, 'D+' or below equivalent, in a class taken on a satisfactory/no credit basis)
- **CR** Credit (student-elected satisfactory; A, B, or C equivalent)
- **S** No-option Satisfactory; A, B, or C equivalent
- **L** Pass, letter grade to be reported
- **W** Withdrew
- **N** Continuing course
- **I** Incomplete
- **RP** Repeated Course
* No grade reported

**NC** The notation 'NC' represents unsatisfactory performance in courses taken on a satisfactory/no credit basis. Performance is equivalent to letter grade 'D+' or below.

**NP** The notation 'NP' is used by instructors in courses taken for a satisfactory/no credit basis. Performance is equivalent to letter grade 'D+' or below.

**CR** In a course for which some students will receive letter grades, the 'CR' represents performance that is satisfactory or better when the student has elected the 'CR' grading option. This option is available in any course, subject to the consent of the instructor and department and to the student's observance of the time limit for electing or dropping the option (the end of the sixth week of the quarter).

**S** For an activity course or a course in which the instructor elects to grade students only on a satisfactory/no credit basis, the 'S' represents performance that is satisfactory or better. For such a course, no letter grades may be assigned for satisfactorily completed work.

It should be noted that the Registrar is unable to record course grades submitted when the instructor has not observed the required distinction between 'S' and 'CR'.

The "satisfactory" options are intended to relieve the pressure on students for achievement in grades. The "satisfactory" options in no way imply fewer or different course work requirements than those required of students who elect evaluation with a letter grade. A department may limit the number of "satisfactory" courses to count for a major program. For those students admitted as freshmen for Autumn Quarter 1996-97 or later, no more than 36 units of Stanford course work in which a 'CR' or 'S' was awarded can be applied toward the 180 (225 if dual degrees are being pursued) units required for a bachelor's degree. Students who enter Stanford as transfer students in 1996-97 or later are limited to 27 'CR' or 'S' units applied toward the 180/225 minimum.

**L** The 'L' is a temporary notation that represents creditable completion of a course for which the student will receive a permanent letter grade before the start of the next quarter. The 'L' is given when the instructor needs additional time to determine the specific grade to be recorded, but it is not appropriate if additional work is expected to be submitted by the student. A student receives unit credit for work graded 'L' at the same number of units, but the grade for all quarters of such a course must be the same.

**N** The 'N' indicates satisfactory progress in a course that has not yet reached completion. Continuation courses need not continue at the same number of units, but the grade for all quarters of such a course must be the same.

- The 'N-' grade indicates unsatisfactory progress in a continuing course. The first 'N-' grade constitutes a warning. The adviser, department chair, and students should discuss the deficiencies and agree on the steps necessary to correct them. A second 'N-' should cause the student to be denied further registration until a written plan for the completion of the degree requirements has been submitted by the student and accepted by the department. Any 'N-' grades received after that point are grounds for dismissal from the program.

- The 'I' is restricted to cases in which the student has satisfactorily completed a substantial part of the course work. No credit will be given until the course is completed and a passing grade received. When a final grade is received, all reference to the initial 'I' is removed.

In courses taken before 1994-95, satisfactory completion of the course work when an 'I' has been given is expected within a year from the date of the course's final examination, but an alternate time limit may be set by the instructor. Students may petition that these courses with an 'I' grade be removed from their records.

In a course taken 1994-95 or later, 'I' grades must be changed to a permanent notation or grade within one year (that is, prior to the first day of the fifth quarter which follows the course, including Summer Quarter). An alternate time limit may be set by the instructor. If the 'I' remains uncleared at that time, it is changed automatically by the Registrar's Office to an 'NP' or 'NC' as appropriate for the grading option selected. Courses from 1994-95 or later with an 'I' grade may not be dropped.

**RP** The notation 'RP' (meaning Repeated Course) replaces the original grade recorded for a course when a student retakes a course. (See repeated courses above.)

**W** The notation 'W' (meaning Withdrew) is recorded when a student withdraws from a course.

- When the Registrar receives an End-Quarter Report (EQR) from an instructor with a grade omitted, or receives an End-Quarter Report too late for processing with other End-Quarter Reports, a '*' (no grade reported) shows as the grade for the course on a student's transcript. The asterisk may also be reported by the instructor when he or she is unable to record any other grade or symbol. The '*' symbol remains in the record until changed.

**GENERAL**

The back of the End-Quarter Report (EQR) sheet shall carry only information explaining the significance of the various forms of entries described therein and a calendar for required submission of grades. No description of a "curve" system shall appear on EQR sheets, and instructors are discouraged from awarding grades according to any predetermined distribution system.

A student who takes a course in a school or program of the University other than the one in which he or she is matriculated is subject to the grading system of the school or program in which the course is given.

**REPORTING OF GRADES**

All grades must be reported within 96 hours after the time and day reserved for the final examination, and in no case later than noon of the fourth day (including weekends) after the last day of the final examination period.

In the case of degree candidates in Spring Quarter, final grades must be reported within 24 hours of the end of the final examination period.

**REVISION OF END-QUARTER GRADES**

When duly filed in the Registrar's Office, end-quarter grades are final and not subject to change by reason of a revision of judgment on the instructor's part; nor are passing grades to be revised on the basis of a second trial (for example, a new examination or additional work undertaken or completed after the date of the End-Quarter Report). Changes may be made at any time to correct an actual error in computation or in transcribing, or where some part of the student's work has been intentionally overlooked; that is, if the new grade is the one that would have
been entered on the original report had there been no mistake in comput-
ing and had all the pertinent data been before the instructor, the change is a proper one.

If a student questions an end-quarter grade based on the grading of part of a specific piece of work (for example, part of a test) on the basis of one of the allowable factors mentioned in the preceding paragraph (for example, an error in computation or in transcribing, or work unintentionally overlooked, but not matters of judgment as mentioned below), the instructor may review the entire piece of work in question (for example, the entire test) for the purpose of determining whether the end-quarter grade was a proper one. In general, changing an end-quarter grade is permitted on the basis of the allowable factors already mentioned whether an error is discovered by the student or the instructor; however, chang-
ing a grade is not permitted by reason of revision of judgment on the part of the instructor.

In the event that a student disputes an end-quarter grade, the estab-
lished grievance procedure should be followed (see the "Statement on Student Academic Grievance Procedures" section of this bulletin).

GRADUATE SCHOOL OF BUSINESS

Effective September 1971, the following grade scale applies only to
courses offered by the Graduate School of Business:

H Distinction. Work that is of markedly superior quality.
P+ Work that is of high quality and exceeds in a significant way all of the basic requirements of the course.
P Pass. Work that is of good quality and clearly satisfies all the basic requirements of the course.
P- Work that satisfies most of the basic requirements of the course, but is deficient in some minor ways.
U Unsatisfactory. Work that does not satisfy the basic requirements of the course and is deficient in significant ways.
EX Course exempted. (Does not affect grade point calculations.)
+ Pass (P-or better).

SCHOOL OF LAW

The two grading systems previously employed at the School of Law were revised effective September 1983. Under the letter grade systems (with numerical equivalents), the range of satisfactory grades runs from 4.3 to 2.3 as outlined in the following distribution. Below the grade of 2.3 is one level of restricted credit (R=2.2) and one level of failure (F=2.1). The letter grades and numerical equivalents are as follows:

- A+ 4.3
- A 4.0
- B+ 3.3
- B 3.0
- C+ 2.3
- C 2.0
- D+ 1.3
- D 1.0

'A' is a temporary notation used in a continuing course; it is replaced with a final grade upon completion of the course series.

Students may elect to take a limited number of courses on a credit/
restricted credit/no credit system (K/RK/NK). 'K' shall be awarded for work that is comparable to numerical grades 4.3 to 2.3, 'RK' for R-level work (2.2), and 'NK' for F-level work (2.1). A limited number of courses are offered on a mandatory credit (KM)/no credit basis.

SCHOOL OF MEDICINE

The following grades are used in reporting on the performance of
students in the M.D. program:

Pass Indicates that the student has demonstrated to the satisfaction of the department or teaching group responsible for the course that he or she has mastered the material taught in the course.

Fail Indicates that the student has not demonstrated to the satisfaction of the department or teaching group responsible for the course that he or she has mastered the material taught in the course.

Incomplete Indicates that extenuating medical or personal circumstances have prevented the student from completing the course requirements. This grade shall be given when requested by the student with the prior approval of the Dean for Student Affairs in the School of Medicine.

EXempt Indicates a course that is exempted by examination. No units are awarded for courses completed.

A "Fail" grade can be cleared by repeating and passing the particular course or by other arrangement prescribed by the department or teaching group. An "Incomplete" grade can be made up in a manner specified by the department or teaching group within a reasonable time; if the deficiency is not made up within the agreed-upon time, the "Incomplete" grade becomes a "Fail" grade. The opportunity to clear a "Fail" grade or an "Incomplete" grade cannot be extended to individuals who are not registered or eligible to register as students in the M.D. program.

STATEMENT ON STUDENT ACADEMIC GRIEVANCE PROCEDURES

The following policy was effective beginning in the 1999-2000 academic year and is subject to periodic review.

1. Coverage

a) Any Stanford undergraduate or graduate student or postdoctoral fellow who believes that he or she has been subjected to an improper decision on an academic matter is entitled to file a grievance to obtain an independent review of the allegedly improper decision, followed by corrective action if appropriate. A grievance is a complaint in writing made to an administrative officer of the University concerning an academic decision, made by a person or group of persons acting in an official University capacity, that directly and adversely affects the student or postdoctoral fellow as an individual in his or her academic capacity.

b) Grievance procedures apply only in those cases involving a perceived academic impropriety arising from decision taken by: (1) an individual instructor or researcher; (2) a school, department, or program; (3) a committee charged to administer academic policies of a particular school, department, or program; (4) the University Registrar or a Senate committee or subcommittee charged to administer academic policies of the Senate of the Academic Council. They do not pertain to complaints expressing dissatisfaction with a University policy of general application challenged on the grounds that the policy is unfair or inadvisable, nor do they pertain to individual school, department, or program academic policies, as long as those policies are not inconsistent with general University policy.

c) Individuals should be aware that the University Ombudsperson's Office is available to all Stanford students, postdoctoral fellows, faculty, and staff to discuss and advise on any matter of University concern and frequently helps expedite resolution of such matters. Although it has no decision-making authority, the Ombudsperson's Office has wide powers of inquiry, including into student complaints against instructors.

2. Grievance and Appeal Procedures

a) Informal Attempts at Resolution: the student or postdoctoral fellow first should discuss the matter, orally or in writing, with the individual(s) most directly responsible. If no resolution results, the student or postdoctoral fellow should then consult with the individual at the next administrative level, for example, the chair or director of the relevant department or program, or, for those cases in which there is none, with the school dean. At this stage, the department chair or program director, if any, may inform the dean that the consultation is taking place and may solicit his or her advice on how to ensure that adequate steps are taken to achieve a fair result. Efforts should be made to resolve the issues at an informal level without the complaint escalating to the status of a formal grievance.
b) The Filing of the Grievance:
1. If informal means of resolution prove unsatisfactory, the student or postdoctoral should set forth in writing a statement of the decision that constitutes the subject matter of the dispute, the grounds on which it is being challenged, and the reasons why the grievant believes that the decision was improperly taken. The statement should also include a description of the remedy sought and the informal efforts taken to date to resolve the matter. It is at this point that the complaint becomes a formal grievance. The written grievance should specifically address the matters set forth in the Standards for Review, as stated in Section 4 below. The grievance should include an allegation of any adverse effects on the grievant, known to the grievant at the time of filing.
2. The grievance document should be submitted to the dean of the school in which the grievance arose; for a grievance concerning a decision of the University Registrar or of a Senate committee or subcommittee, the procedures set forth herein for grievances and appeals shall be modified as stated in Section 3 below. A grievance must be filed in a timely fashion, that is, normally within 30 days of the end of the academic quarter in which the adverse decision occurred or should reasonably have been discovered. A delay in filing a grievance may, taking all circumstances into account, constitute grounds for rejection of the grievance.

c) The Response to the Grievance:
1. The relevant dean shall consider the grievance. The dean may attempt to resolve the matter informally or make whatever disposition of the grievance that he or she deems appropriate. The dean may, in appropriate cases, remand the grievance to a lower administrative level (including to the level at which the grievance arose) for further consideration.
2. The dean may also refer the grievance, or any issue therein, to any person (the "grievance officer") who shall consider the matter and report to the dean as the latter directs. The dean shall inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and shall specify the matters referred, the directions to the person to whom the referral is made (including the time frame within which the person is to report back to the dean), and the name of that person.
3. In undertaking the review, the dean or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information considered relevant, including faculty, staff, and students.
4. Should attempts be made to resolve the matter informally not be successful, the dean shall decide the grievance, and shall notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the matter and the grounds for the disposition at the earliest practicable date after his or her receipt of the grievance.
5. Normally, no more than 60 days should elapse between the filing of a grievance and the disposition by the dean. If, because of absence of key persons from the campus or other exigencies, the dean decides that prompt disposition is not possible, he or she shall inform the grievant (and the party against whose decision the grievance has been filed) of that in writing, giving the grounds therefor and an estimate of when a disposition can be expected.

d) The Filing of an Appeal:
1. If the grievant is dissatisfied with the disposition of the grievance at the dean level, either on substantive or on procedural grounds, he or she may appeal in writing to the Provost.
2. The appeal must specify the particular substantive or procedural bases of the appeal (that is, the appeal must be made on grounds other than general dissatisfaction with the disposition) and must be directed only to issues raised in the grievance as filed or to procedural errors in the grievance process itself, and not to new issues. The appeal shall contain the following:
   a. A copy of the original grievance and any other documents submitted by the grievant in connection therewith.
   b. A copy of the determination made by the dean on that grievance.
   c. A statement of why the reasons for the determination of the dean are not satisfactory to the grievant. This statement should specifically address the matters set forth in the Standards for Review in Section 4 below.
3. The grievant shall file his or her appeal at the earliest practicable date after the grievant’s receipt of the determination by the dean. Normally, no more than 30 days should elapse between the transmittal of the dean’s decision on the grievance and the filing of the appeal. A delay in filing an appeal may, taking all circumstances into account, constitute grounds for rejection of the appeal.

e) The Response to the Appeal:
1. The Provost may attempt to resolve the matter informally, or refer the appeal, or any issue thereof, to any person (the "grievance appeal officer") who shall consider the matter and report to the Provost as the latter directs. The Provost may also, in appropriate cases, remand the matter to a lower administrative level (including to the level at which the grievance arose) for further consideration.
2. The Provost shall inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and shall specify the matters referred, the directions to the person to whom the referral is made (including the time frame within which the person is to report back to the Provost), and the name of that person.
3. Should attempts be made to resolve the matter informally not be successful, the Provost shall decide the appeal, and shall notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the appeal. The decision of the Provost shall be final, unless the grievant requests a further appeal to the President pursuant to Section 2f below, and the President agrees to entertain this further appeal.
4. Normally no more than 45 days should elapse between the filing of the appeal and the disposition by the Provost. If, because of absence of key persons from the campus or other exigencies, the Provost judges that prompt disposition is not possible, he or she shall inform the grievant (and the party against whose decision the grievance has been filed) of the fact in writing, giving the grounds therefor and an estimate of when a disposition can be expected.

f) The Request to the President: if the student or postdoctoral fellow is dissatisfied with the disposition of the appeal by the Provost, he or she may write to the President of the University, giving reasons why he or she believes the grievance result to be wrong (following the general format set forth in Section 2d above). No more than 30 days should elapse between the transmittal of the Provost’s disposition and the written statement to the President urging further appeal. In any case, the President may agree or decline to entertain this further appeal. If the President declines to entertain the further appeal, the decision of the Provost shall be final. If the President decides to entertain the further appeal, he or she shall follow the general procedures set forth in Section 2e above, and the decision of the President shall be final.

3. Grievances Concerning Decisions of the University Registrar or of a Senate Committee or Subcommittee
a) For a grievance concerning a decision of the University Registrar or of a Senate committee or subcommittee, the grievant shall file his or her grievance with the Provost, rather than with the dean, and the Provost shall handle that grievance in accordance with the procedures set forth in Section 2c above.
b) There shall be no appeal of the Provost's disposition of that grievance, except as may be available under Section 2f above.

4. Standards for Review and Procedural Matters

a) The review of grievances or appeals shall usually be limited to the following considerations:

1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?

2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?

b) The time frames set forth herein are guidelines. They may be extended by the relevant administrative officer in his or her discretion for good cause.

c) Questions concerning the filing and appeal of grievances should be directed to the Office of the Provost.

3. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

b) The time frames set forth herein are guidelines. They may be extended by the relevant administrative officer in his or her discretion for good cause.

c) Questions concerning the filing and appeal of grievances should be directed to the Office of the Provost.
COURSES OF INSTRUCTION
1999-2000

Unless otherwise specified, courses numbered from 1 through 99 are primarily for first- and second-year undergraduates; courses numbered from 100 through 199 are for third- and fourth-year undergraduates; and those from 200 through 699 are for graduate students.

Amendments to course offerings announced in the Stanford Bulletin are found in the Time Schedule, issued quarterly.

Starting Autumn Quarter 1996, a new set of undergraduate degree requirements went into effect. In this edition of the Stanford Bulletin, a special notation follows each course description if the course can fulfill a requirement under the 1996 set of General Education Requirements or under the set of Distribution Requirements in effect Autumn 1991 through the end of the 1995 academic year. The 1991 set of requirements are designated within parentheses. Thus a course marked GER:2a may be used only towards the Natural Sciences sub-area within Area 2 of the new General Education Requirements. A course marked (DR:5) may be used only towards the Area 5 Natural Sciences requirement under the older 1991 set of Distribution Requirements. A course marked GER:2a (DR:5) has been approved to fulfill either requirement.

The Appendix of this bulletin presents a comprehensive list of courses certified as fulfilling a requirement under the 1996 system of General Education Requirements or the 1991 Distribution Requirements system.

Undergraduates fulfilling requirement sets in effect prior to 1991 should consult the Registrar's Undergraduate Degree Coordinator for information about whether a course may be applied to the requirement set applicable to them. Graduate students should ignore the various markings since such requirements do not apply to them.

SUMMER SESSION

Summer session courses are eight weeks in length, except in certain departments that offer ten-week courses.

This bulletin includes, for the Summer Session, only those courses that can be tentatively scheduled at publication time by each department. For the complete list of courses and faculty, refer to the Stanford University bulletin, Summer Session Catalogue, 2000, issued in January.
The Graduate School of Business provides graduate education for careers in management, research, and teaching. The two-year Master of Business Administration (M.B.A.) degree program is designed for the student preparing for a general management career. No specific undergraduate major or courses are required for admission, although prospective applicants are encouraged to have two or more years of managerial experience and to include some mathematics and economics in their undergraduate programs. Curricular options within the M.B.A. program include a certificate in Public Management or Global Management, the joint J.D.-M.B.A. degree, and dual master’s degrees in business and engineering.

The Stanford Sloan Program is an intensive one-year course of study for middle management executives leading to the degree of Master of Science in Management. Participants must be sponsored by their company and have demonstrated superior achievement.

Those interested in college teaching and research are served by the Doctor of Philosophy program.

For detailed information on programs, curricula, and faculty, write to the Graduate School of Business, Stanford University, Stanford, California 94305-5015 for the current School of Business bulletin.
School of Earth Sciences

Dean: Franklin M. Orr, Jr.

The School of Earth Sciences includes the departments of Geological and Environmental Sciences, Geophysics, and Petroleum Engineering. The interschool Earth Systems Program offers study of the geological and biological processes that operate on global scales and how they interact with international environmental issues and policies. An honors program in Environmental Science, Technology, and Policy is also available through the Institute for International Studies.

The aims of the school are (1) to prepare students for careers in the fields of environmental studies, engineering, geology, geochemistry, geomechanics, geophysics, geostatistics, hydrogeology, petroleum engineering, and petroleum geology; (2) to conduct research in the Earth sciences; and (3) to provide opportunities for Stanford undergraduates to learn about our planet’s history, to understand the natural energy and resource base that underlies our economy, and to appreciate the geological and geophysical hazards that affect human societies, as well as those factors that contribute to the quality of our environment.

To accomplish these objectives, the school offers a variety of programs adaptable to the needs of the individual student: a four-year undergraduate program leading to the degree of Bachelor of Science (B.S.); a five-year program leading to the coterminal Bachelor of Science and Master of Science (M.S.), combining degrees in Earth sciences, social sciences, physical sciences, or engineering; and a graduate program offering the degrees of Master of Science, Engineer, and Doctor of Philosophy as described below. Details of individual departmental degree programs are found in the section for each department. In addition, it is possible for an undergraduate to develop an individually designed major in the Earth Sciences.

UNDERGRADUATE PROGRAM

Any undergraduate student admitted to the University may declare a major in one of the Earth Science departments or the interschool Earth Systems Program by contacting the appropriate department or program office. Students interested in creating an individually designed major should visit the dean’s office.

Specific requirements for the B.S. degree are listed in each department or program section. Departmental academic advisers work with students to define a career or academic goal and assure that the student’s curricular choices are appropriate to the pursuit of that goal. Advisers can help devise a sensible (and enjoyable) course of study that meets degree requirements and provides the student with opportunities to experience advanced courses, seminars, and research projects. To maximize such opportunities, students are encouraged to complete basic science and mathematics courses in high school or during their freshman year.

Each department (as well as Earth Systems) offers an honors program that involves research during the senior year. Each department also offers an academic minor for those undergraduates majoring in compatible fields.

COTERMINAL BACHELOR’S AND MASTER’S DEGREES

The Stanford coterminal degree plan enables an undergraduate to embark on an integrated program of study leading to the master’s degree before requirements for the bachelor’s degree have been completed. This may result in more expeditious progress towards the advanced degree than would otherwise be possible, making the program especially important to Earth scientists because the master’s degree provides an excellent basis for entry into the profession. The coterminal plan permits students to be admitted to a graduate program as early as their eighth quarter at Stanford, or after earning 105 units, and no later than the eleventh quarter.

Under the plan, the student may meet the degree requirements in the more advantageous of the following two ways: by first completing the 180 units required for the B.S. degree and then completing the three quarters required for the M.S. degree; or by completing a total of 15 quarters during which the requirements for the two degrees are completed concurrently. In either case, the student has the option of receiving the B.S. degree upon meeting all the B.S. requirements or of receiving both degrees at the end of the coterminal program. Students earn degrees in the same department (including Earth Systems), in two different departments, or even in different schools; for example, a B.S. in Physics and an M.S. in Geological and Environmental Sciences. Students are encouraged to discuss the coterminal program with their advisers during their junior year. Additional information is available in the individual department offices.

GRADUATE PROGRAM

Admission to the Graduate Program—A student who wishes to enroll for graduate work in the school must be qualified for graduate standing in the University and in addition must be accepted by one of the school’s three departments. One requirement for admission is submission of scores on the verbal and quantitative sections of the Graduate Record Exam. Admission to one department of the school does not guarantee admission to other departments.

Faculty Adviser—Upon entering a graduate program, the student should report to the head of the department who will arrange with a member of the faculty to act as the student’s adviser. The student, in consultation with the adviser, then arranges a course of study for the first quarter and ultimately develops a complete plan of study for the degree sought.

Financial Aid—Detailed information on scholarships, fellowships, and research grants is available from the school’s individual departments. Applications should be filed by the various dates listed in the application packet for awards that become effective in Autumn Quarter of the following academic year.

EARTH SYSTEMS PROGRAM

Director: Joan Roughgarden

Steering Committee: David Ackerly (Biological Sciences), Carol Boggs (Biological Sciences), Robert Dunbar (Geological and Environmental Sciences), Gary Ernst (Geological and Environmental Sciences), Walter Falcon (Institute for International Studies, Food Research Institute), Deborah Gordon (Biological Sciences), Lawrence Gould (Economics, Institute for International Studies), Donald Kennedy (Biological Sciences, Institute for International Studies), Jeffrey Koseff (Civil and Environmental Engineering), Gilbert Masters (Civil and Environmental Engineering), Pamela Matson (Geological and Environmental Sciences, Institute for International Studies), Michael McWilliams (Geological and Environmental Sciences), Harold Mooney (Biological Sciences), Franklin Orr, Jr. (Dean, School of Earth Sciences), Stephen Schneider (Biological Sciences, Institute for International Studies), Jonathan Stebbins (Geological and Environmental Sciences), James Sweeney (Engineering-Economic Systems and Operations Research), Barton Thompson (Law), Peter Vitousek (Biological Sciences), Virginia Walbot (Biological Sciences), Mark Zoback (Geophysics)

Senior Lecturer and Academic Coordinator: Julie Kennedy

The Earth Systems Program (ESys) was conceived to meet new teaching and research needs at Stanford, and is approved as an undergraduate major. It was created to bind the expertise around Stanford into a unified, coherent, and demanding curriculum on environmental subjects. The concept of the Earth as a system views Earth as a dynamic integrated system with physical and biological processes linking the ocean, atmosphere, and solid earth together with Earth’s biological components, including people, and especially their economic and political institutions. The Earth Systems Program emphasizes the interaction between the Earth sciences, ecology and evolution, economics, and environmental technology. The program serves as a model for a number of institutions around the world.
Earth Systems has coalesced as a discipline from activities in more than six departments spread across three schools in the University. The Earth Systems Program coordinates an undergraduate major with courses from traditional departments together with courses it has originated. Its course offerings are aided by the Goldman Honors Program in the Institute of International Studies. Earth Systems also hosts faculty from traditional subjects such as climatology, meteorology, oceanography, and remote sensing that in a larger university might be found in separate departments, but that are perhaps best carried out in a more integrated academic context.

The central principle of the undergraduate major is that a career in Earth Systems springs from a perspective that synthesizes the many components involved in how the earth functions, followed by a coherent focus in one of five Earth Systems specialties. Education in these specialties is accomplished with defined tracks of intermediate courses, followed by advanced electives. Each track concludes with an internship that provides an opportunity for research and work experience, or an internship with a government, conservation, or other appropriate agency. The electives and internship must be approved by an Earth Systems adviser.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

The B.S. in Earth Systems (ESys) requires the completion of at least 108 units that can be divided into three levels of courses. The student must complete a series of courses comprising a broad base specialized study and must complete five required and three elective courses in that track. Finally, the student must carry out a senior-level research or internship project and participate in the senior seminar.

REQUERED CORE COURSES

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESys 10. Introduction to Earth Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESys 110. Geosphere</td>
<td>3</td>
</tr>
<tr>
<td>ESys 111. Biosphere</td>
<td>5</td>
</tr>
<tr>
<td>ESys 210. Internship</td>
<td>3</td>
</tr>
<tr>
<td>or ESys 250. Directed Research</td>
<td>9</td>
</tr>
</tbody>
</table>

REQUERED COGNATE COURSES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology (any one course below):</td>
<td></td>
</tr>
<tr>
<td>Biol. Sci. 51. Evolution, Genetics, and Ecology</td>
<td>5</td>
</tr>
<tr>
<td>Biol. Sci. 52. Biochemistry, Molecular, and Cell Biology</td>
<td>5</td>
</tr>
<tr>
<td>Chemistry:</td>
<td></td>
</tr>
<tr>
<td>Chem. 31. Chemical Principles</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 33. Organic Chemistry*</td>
<td>4</td>
</tr>
<tr>
<td>Computer Programming:</td>
<td></td>
</tr>
<tr>
<td>Comp. Sci. 106. Programming Methodology</td>
<td>5</td>
</tr>
<tr>
<td>or Comp. Sci. 138. Matlab and Maple for Science and Engineering Applications</td>
<td>5</td>
</tr>
<tr>
<td>Economics:</td>
<td></td>
</tr>
<tr>
<td>Econ. 1. Elementary Economics</td>
<td>5</td>
</tr>
<tr>
<td>Econ. 50. Economic Analysis I</td>
<td>5</td>
</tr>
<tr>
<td>Geological and Environmental Sciences:</td>
<td></td>
</tr>
<tr>
<td>Geol. &amp; Envir. Sci. 1. Planet Earth</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics:</td>
<td></td>
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<tr>
<td>Math. 19. Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Math. 20. Calculus and Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Math. 21. Calculus and Analytic Geometry</td>
<td>4</td>
</tr>
<tr>
<td>or Math. 41. Calculus and Analytic Geometry</td>
<td>5</td>
</tr>
<tr>
<td>Math. 42. Calculus and Analytic Geometry</td>
<td>5</td>
</tr>
<tr>
<td>and Math. 51. Linear Equations and Differential Calculus</td>
<td>5</td>
</tr>
<tr>
<td>Probability and Statistics (any one course below):</td>
<td></td>
</tr>
<tr>
<td>Biol. Sci. 141. Biostatistics</td>
<td>4</td>
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<tr>
<td>Geol. &amp; Envir. Sci. 160. Introduction to Statistical Methods for Earth and Environmental Sciences</td>
<td>4</td>
</tr>
<tr>
<td>Stat. 190. Statistics for Social Scientists</td>
<td>3</td>
</tr>
<tr>
<td>Physics:</td>
<td></td>
</tr>
<tr>
<td>Physics 41. Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Physics 47 Light and Heat</td>
<td>4</td>
</tr>
<tr>
<td>Additional physics cognate for Energy Track only</td>
<td></td>
</tr>
<tr>
<td>Physics 43. Electricity</td>
<td>3</td>
</tr>
</tbody>
</table>

* Students may take either Physics 47 or Chem. 33; Biosphere students must take Chem. 33.

More extensive work in mathematics and physics may be expected for those planning graduate study. Graduate study in ecology and evolutionary biology and in economics requires familiarity with differential equations, linear algebra, and stochastic processes. Graduate study in geology and geophysics may require more physics and chemistry. Check with your adviser about recommendations beyond the requirements specified above.

TRACKS

GEOSPHERE

Geochemistry (choose one): Geol. & Envir. Sci. 90. Introduction to Geochemistry 3
Geol. & Envir. Sci. 170. Environmental Geochemistry 3
Geol. & Envir. Sci. 171. Geochemical Thermodynamics 3

Oceans/Atmosphere (choose one): Geol. & Envir. Sci. 8. The Oceans: Introduction to the Marine Environment 3
Civ. & Envir. Engr. 163. Meteorology and Water Resources 3

Geol. & Envir. Sci. 196. Introduction to GIS 2

Rocks/Minerals: Geol. & Envir. Sci. 80. Earth Materials 5

Surface Processes (choose one): Geol. & Envir. Sci. 140. Geomorphology 3
Geol. & Envir. Sci. 151. Sedimentary Geology and Petrography 4-5

BIOSPHERE

Biol. Sci. 51. Evolution, Genetics, and Ecology 5
Biol. Sci. 52. Biochemistry, Molecular Biology, and Cell Biology 5
Biol. Sci. 53. Development and Physiology of the Organism 5

Biogeochecmy (choose one): Biol. Sci. 124. Ecosystem Physiology 4
Biol. Sci. 216. Biogeochecmy/Ecosystem Ecology (same as Geol. & Envir. Sci. 220) 4

or Biol. Sci. 173H. Marine Conservation Biology 3

Biol. Sci. 142. Principles of Ecology (same as Geophys. 176) 4

ANTHROSPHERE

Environmental and Economic Policy (choose 3): Econ. 51. Economic Analysis II 5
Econ. 102. Introduction to Econometrics 5
Econ. 106. The World Food Economy 5
Econ. 118. Economics of Development 5
Econ. 150. Economics and Public Policy 5
Econ. 160. Game Theory and Economic Application 5

Legal and Political Institutions and the Environment (choose one): Econ. 154. Economics of Legal Rules and Policy 5

LAND SYSTEMS MANAGEMENT


Surface Processes/Soils (choose one): Geol. & Envir. Sci. 140. Geomorphology 3

Urban and Environmental Planning (choose one): Geol. & Envir. Sci. 130. Environmental Earth Sciences I 5
Geol. & Envir. Sci. 131. Environmental Earth Sciences II 5
Geol. & Envir. Sci. 132. Environmental Earth Sciences III 5
ENERGY SCIENCE AND TECHNOLOGY
Civ. & Envir. Engr. 176A. Energy Efficient Buildings       4
Civ. & Envir. Engr. 176B. Electric Power: Generation and Conservation 4
Engr. 30. Engineering Thermodynamics          3
Pet. Engr. 103. Energy Resources     3

UPPER-DIVISION ELECTIVES

Three intermediate to advanced courses consistent with the primary track are required of all majors and are to be selected with the advice and consent of the adviser. Eligible upper-division electives are listed below. Additional courses may be selected; see the program office for the most current list.

GEOSPHERE TRACK
Geol. & Envir. Sci. 110. Structural Geology               5-6
Geol. & Envir. Sci. 111. Structural Geology and Rock Mechanics 4
Geol. & Envir. Sci. 112. Structural and Engineering Geology II 3
Geol. & Envir. Sci. 164. Stable Isotopes                    3
Geol. & Envir. Sci. 185. Volcanology                        4
Geol. & Envir. Sci. 162. Cosmochemistry                     3
Geol. & Envir. Sci. 220. Biogeochemistry                   3
Geol. & Envir. Sci. 221. The Origins of the Solar System    3
Geol. & Envir. Sci. 223. Seminar in Environmental Problem Solving 3
Geol. & Envir. Sci. 254. Paleoceanography                  3
Geol. & Envir. Sci. 255. Introduction to Micropaleontology 5
Geol. & Envir. Sci. 257. Climate Variability                3
Pet. Engr. 103. Energy Resources                            3

BIOSPHERE TRACK
Biol. Sci. 120. General Botany                            5
Biol. Sci. 125. Ecosystems of California                  3-4
Biol. Sci. 139. Biology of Birds                          3
Biol. Sci. 184. Principles of Biosystematics              4
Biol. Sci. 161H. Invertebrate Zoology                      5
Biol. Sci. 163H. Principles of Oceanic Biology            4
Biol. Sci. 164H. Marine Botany                            4
Biol. Sci. 170H. Seminar: Topics in Marine Biology         1
Biol. Sci. 217. Climate Theory, Modeling, Applications, and Implications 3
Biol. Sci. 283. Theoretical Populations Genetics           3
Geol. & Envir. Sci. 255. Introduction to Micropaleontology 5

ANTHROSPHERE TRACK
Anthro. Sci. 161. Conservation and Community Development in the Amazon 3-5
Civ. & Envir. Engr. 171. Environmental Planning Methods   4
Civ. & Envir. Engr. 266. Environmental Policy Design and Implementation 4
Econ. 158. Antitrust and Regulation                        5
Econ. 165. International Economics                       4
Econ. 243. Economics of the Environment                  5
Econ. 386. Seminar on Conflict Resolution                 2
Geol. & Envir. Sci. 133. Introduction to Assessment of Environmental Risk 3
Pol. Sci. 216M. Environmental Politics in the Asia/Pacific Region 5
Pub. Pol. 103. Introduction to Political Philosophy        3
Urban Studies 133. The Politics of Development            4
Urban Studies 182. Urban Environmental Policy             4
Urban Studies 183. Land Use Control                       4

LAND SYSTEMS MANAGEMENT TRACK
Civ. & Envir. Engr. 163. Introduction to Meteorology       3
Civ. & Envir. Engr. 171. Environmental Planning Methods   4
Geol. & Envir. Sci. 133. Introduction to Assessment of Environmental Risk 3

Geol. & Envir. Sci. 230. Hydrogeology                    5
Urban Studies 110. Introduction to Urban Studies          4
Urban Studies 182. Urban Environmental Policy             4
Urban Studies 183. Land Use Control                       4

ENERGY SCIENCE AND TECHNOLOGY TRACK
Esys 179. Energy Systems                                 5
Econ. 158. Antitrust and Regulation                       5
Mech. Engr. 130. Internal Combustion Engines              3
Mech. Engr. 131A. Heat Transfer                           3
Pet. Engr. 120. Fundamentals of Petroleum Engineering     3
Pet. Engr. 260. Groundwater Pollution and Oil Spills       3
Pet. Engr. 269. Geothermal Reservoir Engineering          3

SUMMARY OF COURSE REQUIREMENTS AND UNITS
Earth Systems Introduction and Core                        16
Required allied courses                                      47-50
Tracks: Geosphere                                           20
       Biosphere                                             20
       Anthroposphere                                         20
Land Systems Management                                    23
Energy Science and Technology                              23
Upper-division electives                                    9-15
Senior project or internship                               9
Senior seminar                                             3
Total units (depending on track, electives)                108-124

COTERMINAL B.S. AND M.S. DEGREES

The Stanford coterminal degree enables an undergraduate to embark on an integrated program of study leading to the master’s degree before requirements for the bachelor’s degree have been completed. An undergraduate majoring in Earth Systems may apply to work simultaneously toward B.S. and M.S. degrees. The M.S. degree in Earth Systems provides the student with enhanced tools to evaluate the primary literature of the discipline most closely associated with the student’s track and allows an increased specialization through additional course work that may include 9 units of thesis research. Integration of earth systems concepts is furthered by participation in the master’s seminar.

To apply, complete and return to the Earth Systems office an application that includes a statement of purpose; a Stanford transcript; two letters of recommendation, one of which must be from a faculty member of the program; and a list of courses that fulfill degree requirements signed by the master’s adviser. Students may be admitted as early as their eighth quarter at Stanford, or after earning 105 units, but no later than their eleventh quarter. Students may either (1) complete 180 units required for the B.S. degree and then complete the three quarters required for the M.S. degree, or (2) complete a total of 15 quarters during which the requirements of the degrees are fulfilled concurrently. The student has the option of receiving the B.S. degree after completing that degree’s requirements or receiving two degrees concurrently at the end of the master’s program.

Three levels of requirements must be fulfilled to receive an M.S. degree:

1. All requirements for the B.S. degree.
2. Further course work (and/or thesis research), all of which should be at the 100-level or above, including 18 units at the 200-level or above, leading to further focus within the student’s track.
3. Participation in the master’s seminar.

The program consists of a minimum of 36 units of course work and/or thesis research, at least 18 of which must be at the 200-level or above. The student must devise a program of study that shows a level of specialization appropriate to the master’s level, as determined in consultation with the adviser. At least 18 units must be at the 200-level or above. The program should demonstrate further specialization and focus within the student’s undergraduate track.

With the adviser’s approval, 9 units may be in the form of research. This may culminate in the preparation of a master’s thesis; however, a
thesis is not required for the degree. Master’s students must take part in the Winter Quarter master’s seminar (ESys 290) and have additional responsibilities appropriate to the master’s level (thesis presentation, modeling problems, and so on), 2 units.

A more detailed description of the coterminous master’s degree program may be obtained from the program office.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

UNDERGRADUATE

10. Introduction to Earth Systems—For non-majors and prospective Earth Systems majors. Multi-disciplinary approach to how the Earth works as a system, utilizing the tools of geology, biology, and economics to understand global change on all time scales. Topics: origin of the solar system and earth, paleoclimatic and climate modeling, ocean-atmosphere circulation, extinction and speciation, energy and mineral resources, economic attitudes and the environment. Case studies: acid rain, hunger and food, policy and the environment. GER:2a (DR:5)

3-5 units, Win (Ernst)

110. Geosphere—(Same as Geological and Environmental Sciences 120.) Geoloigcal processes, from local to global, affect people and civilization. The reverse is also true; civilization is beginning to influence the geosphere. Processes experienced at the earth’s surface (catastrophic earthquakes, volcanic eruptions, and longer term atmospheric and climate changes) are linked to what goes on in the earth’s deep interior. How geochemical, geophysical, and biological processes interact over time scales from 4.5 billion years to the nearly instantaneous. Topics: the origin and evolution of the atmosphere and oceans, heat flow and global tectonics and how they have changed over time, geochemical cycles, climate change, catastrophic impacts, and the roles played by organisms. Prerequisite: Geological and Environmental Sciences 1 or 2.

3 units, Win (Ernst)

111. Biosphere—(Same as Biological Sciences 117.) The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisites: Biology or Human Biology core or graduate standing in any department.

3 units, Win (Matson, Vitousek, Mooney)

112. Anthrosphere: Human Interactions with the Earth and Environment—(Same as Economics 155.) The economic sources of environmental problems and the alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). An evaluation of the policies addressing regional air pollution, global climate change, water allocation in the Western U.S., and the use of renewable resources. The connections between population growth, economic output, environmental quality, and human welfare. Prerequisite: Economics 50.

5 units, Spr (Staff)

150/240. Seminar in Sustainable Agriculture—Exploration of the interactions of agriculture and environment and the range of meanings and approaches to sustainable agriculture. Topics: ecological, economic, institutional, and political aspects of sustainability as they pertain to a range of cropping systems. For 2 units: participation in team research evaluating current and potential sustainable agriculture approaches in specific global cropping systems. Group presentation on research findings.

1-2 units (Matson, Naylor, Kennedy) alternate years, given 2000-01

169/269. The Scientific, Economic, and Political Issues of Radioactive Waste—(Graduate students register for 269.) Seminar on the scientific, economic, and political issues associated with the production and disposal of high- and low-level radioactive waste, focusing on scientific and economic issues. Class formulates answers to important questions which enter the political arena (the balance between risks and rewards to society). Enrollment limited to 15.

2 units, Spr (McWilliams)


2-3 units (Thompson) not given 1999-2000

179. Energy Systems: Achieving Energy Efficiency in the Real World—How are energy conservation and efficiency decisions made in the “real world?” Many opportunities for energy efficiency are not exploited, even when cost effective. Topics: fundamentals of energy and economic efficiency; energy efficient and alternative energy technologies and applications; incentives and obstacles to implementation. Students study and design an energy efficiency or alternate energy systems project. Prerequisites: Earth Systems 10, Economics 50, or consent of instructor.

3 units (Schneider) not given 1999-2000

210. Senior Seminar in Earth Systems—Focuses on communication skills, oral and written. Each student presents results of the Earth Systems internship in an oral presentation and leads a follow-up round table discussion subsequent to talk. Group project analyzing local environmental problems requiring an Earth Systems approach. Peer-reviews of internship papers as required. (WIM)

3 units, Aut, Spr (J. Kennedy)

223. Seminar in Environmental Problem Solving—(Same as Geological and Environmental Sciences 223.) For upper-division undergraduates and graduate students in the earth and biological sciences. Using case studies, evaluates and contrasts the approaches that different natural and social science disciplines bring to environmental problem solving. 2-3 units, Spr (Matson, Naylor) alternate years, not given 2000-01

250. Directed Research—Independent research into an aspect of earth systems related to the student’s primary track, carried out after the junior year, during the summer, and/or during the senior year. Student develops own project with faculty supervision, or can see adviser for research ideas. 10-15 page thesis required.

9 units, quarter by arrangement (Staff)

260. Internship—Supervised field, lab, private sector, or advocacy project, normally through an internship sponsored by government agencies, research institutions or other organizations, or independently developed by the student with the prior written approval of the academic coordinator. Provides hands-on experience within the student’s primary track. 10-15 page report required.

9 units, quarter by arrangement (J. Kennedy)

290. Master’s Seminar—Open to Earth Systems master’s students only. Focus is on critical examination and discussion of advanced topics in Earth Systems. Requires independent research, oral presentation of results, and preparation of an original proposal for innovative Earth Systems science/policy research.

2 units, Win (J. Kennedy)

298. Advanced Topics in Earth Systems—Open to Earth Systems master’s students only. Continuation of Winter Quarter master’s seminar.

2 units, Spr (J. Kennedy)
The Writing in the Major (WIM) requirement may be fulfilled by taking one of the following courses designated (WIM) for the larger unit total indicated: GES 51, 110, 112, 130, 151, 152, 185, 198 along with the one-unit WIM Project course, GES 190. Students choosing to take a course for WIM credit should consult with the instructor early in the quarter; additional writing-intensive work is assigned.

### GEOLOGICAL SCIENCES

The Geological Sciences curriculum leading to the B.S. degree in Geological and Environmental Sciences prepares students for professional careers and graduate studies in the earth sciences and other fields requiring an earth sciences background. The field of geological sciences is broad and involves the study of the physical and chemical processes that build continents, shape the earth’s landscape, and determine the distribution of elements in minerals, rocks, soils, and natural waters; the oceans and atmosphere; Earth’s history and the evolution of life; and materials that constitute the earth, including those of economic importance. Geological sciences are also concerned with the ways in which society is affected by natural hazards (for example, volcanic eruptions, landslides, and earthquakes) and the ways in which society affects the planet (for example, the pollution of groundwater and depletion of resources).

An important emphasis of the B.S. program in the Geological Sciences curriculum is the study of earth processes and history in the natural laboratory of the field. Stanford University’s location near the Pacific continental margin, the Sierra Nevada mountain range, and the San Andreas fault system provides a nearly unparalleled setting for field studies. The field of geological sciences has evolved over the last two centuries from mostly observational and descriptive into a quantitative science dealing with the chemistry and physics of the earth and other planets and with interactions between the biological and physical systems of the earth. Thus, the Geological Sciences curriculum includes significant course work in chemistry, physics, and mathematics. The diversity of these requirements and experience results in graduates with versatility and a broad range of skills. Our program is designed to recognize the diversity of this field and to provide a great deal of flexibility. A significant proportion of the required courses can be selected by the student in consultation with his or her faculty advisor, allowing the B.S. program to be tailored to individual goals and interests while providing a solid background in basic earth sciences, the supporting sciences, and mathematics.

GES majors who select the Geological Sciences curriculum are expected to complete a set of courses in supporting sciences and mathematics, a core course sequence that defines the curriculum, and a set of electives chosen from the prescribed list below. Students who elect this major must also enroll in the joint San Jose State University/Stanford summer field camp (see Professor Miller). Substitutions for core courses must be approved by the adviser and the department chair. Letter grades are required, if available, in all courses.

**CORE COURSE SEQUENCE**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GES 1. Fundamentals of Geology</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>or GES 2.3. Earth History and Lab</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 80. Earth Materials</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 90. Introduction to Geochemistry</td>
<td>W 3</td>
</tr>
<tr>
<td>GES 100. Introduction to Field Geology</td>
<td>Sun 3</td>
</tr>
<tr>
<td>GES 110. Structural Geology</td>
<td>S 5</td>
</tr>
<tr>
<td>or GES 111. Structural Geology and Rock Mechanics</td>
<td>A 4</td>
</tr>
<tr>
<td>GES 112. Mapping the Geologic Environment</td>
<td>S 3</td>
</tr>
<tr>
<td>GES 151. Sedimentary Geology</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 152. Stratigraphy and Applied Paleontology</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 160. Introduction to Statistical Methods for Earth and Environmental Science</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 181. Igneous and Metamorphic Processes</td>
<td>S 3-5</td>
</tr>
<tr>
<td>GES 190. WIM Project</td>
<td>A,W,S 1</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>49-51</strong></td>
</tr>
</tbody>
</table>

**REQUIRED SUPPORTING SCIENCES AND MATHEMATICS**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 31. Chemical Principles</td>
<td>A,W,S 4</td>
</tr>
<tr>
<td>Chem. 135. Physical Chemical Principles</td>
<td>W 3</td>
</tr>
<tr>
<td>or Chem. 171. Physical Chemistry</td>
<td>A 3</td>
</tr>
<tr>
<td>or GES 171. Geochemical Thermodynamics</td>
<td>A 3</td>
</tr>
</tbody>
</table>
Choose one of the following groups of mathematics courses:

Math. 20. Calculus W 3
Math. 21. Calculus S 4

or

Math. 41. Calculus* A 5
Math. 42. Calculus* A, W 5

Choose one of the following groups of physics courses:

Physics 22. Mechanics and Heat Lab A 1
Physics 23. Electricity and Optics W 3
Physics 24. Electricity and Optics Lab W 1

or

Physics 41. Mechanics† A 3
Physics 43. Electricity† W 3
Physics 45. Magnetism† S 3
Physics 46. Electricity and Magnetism Lab† S 1

Physics 47. Light and Heat† A 4

Subtotal 65

* Math. 41, 42, 51 are recommended for students planning graduate study in the sciences or engineering.
† Physics 41, 43, 45, 47 are recommended for students planning graduate study in the sciences or engineering.

ELECTIVES

Choose four courses from the following list or, with faculty approval, four related, but more advanced courses:

Biol. Sci. 117. Biology and Global Change W 3
Chem. 33. Structure and Reactivity W, S, Sum 4
Comp. Sci. 106A. Programming Methodology A, W, S 5
GES 2.3. Earth History and Lab (if not used above) A 3
GES 8. Oceans S 3
GES 132. Environmental Earth Sciences III S 5
GES 140. Geomorphology W 3
GES 162. Cosmochemistry S 3
GES 165. Radiogenic Isotopes and Geochronology S 3
GES 170. Environmental Geochemistry W 4
GES 185. Volcanology S 4-5
GES 187. Introduction to Ore Deposits A 4
GES 230. Physical Hydrogeology A 5
Geophys. 150. Plate Tectonics S 2-3
Geophys. 183. Interpretation of Seismic Reflection Profiles W 2-3
Geophys. 190. General Geophysics A 3-4

Subtotal 49-68

Total 79-102

ENVIRONMENTAL SCIENCES

Environmental Sciences in the School of Earth Sciences is concerned with the combined chemical, physical, and mathematical study of the outer crust of the earth and the hydrosphere as they are found today, and of the processes and stages through which our planet’s surface has evolved. The program also deals with the impact of the use of land and natural resources, processes through which the earth may respond to this use, and the hazards these processes present to people on local and regional scales. In comparison, earth systems science focuses on some of the same topics on a global scale, and environmental engineering focuses on prevention, control, or mitigation of the negative aspects of human impact on the environment.

The Environmental Sciences curriculum provides a background in selected fundamental geological and physical sciences, basic quantitative analytical and problem-solving tools, and an introduction to the use of this background in anticipating, recognizing, and defining or diagnosing environmental problems. The primary focus is on earth sciences, the natural environment, and anthropogenic changes. Graduates should be equipped for positions in environmental consulting and remediation firms or government agencies or, with appropriate selection of electives, for graduate study in related fields including the geological sciences, environmental sciences or engineering, business or law, and others.

GES majors who elect the Environmental Sciences curriculum are expected to complete a core course sequence in supporting sciences and mathematics and a set of electives chosen from the prescribed list below.

Substitutions for core and elective courses must be approved by the advisor and the department chair. Letter grades are required, if available, in all courses.

CORE COURSE SEQUENCE

Course No. and Subject Qtr. and Units

Civ. & Envr. Engr. 170. Environmental Science and Technology A 3
GES 1. Fundamentals of Geology A, W, S 5
GES 80. Earth Materials A 5
GES 90. Introduction to Geochemistry W 3
GES 102. Introduction to Field Geology Sum 3
GES 110. Structural Geology S 5
GES 111. Structural Geology and Rock Mechanics A 4
GES 112. Mapping the Geologic Environment S 4
GES 130. Environmental Earth Sciences I A 5
GES 131. Environmental Earth Sciences II W 5
GES 151. Sedimentary Geology S 4
GES 160. Introduction to Statistical Methods for Earth and Environmental Sciences S 4
GES 170. Environmental Geochemistry W 4
GES 190. WIM Project A, W, S 1
GES 230. Physical Hydrogeology A 5

Total 99-119

REQUIRED SCIENCES AND MATHEMATICS

Chem. 31. Chemical Principles A, W, S, Sum 4
Chem. 33. Structure and Reactivity W, S, Sum 4
Chem. 135. Physical Chemical Principles W 3
or Chem. 171. Physical Chemistry A 3
or GES 171. Geochmical Thermodynamics A 3

Choose one of the following groups of mathematics courses:

Math. 20. Calculus W, S 3
Math. 21. Calculus S 4

or

Math. 41. Calculus† A 3
Math. 43. Calculus† W 3
Math. 45. Calculus† S 3
Math. 46. Calculus† A, W, S 5

or

Math. 41. Calculus‡ A 4
Math. 42. Calculus A, W, S 5

Choose one of the following groups of physics courses:

Physics 22. Mechanics and Heat Lab A 1
Physics 23. Electricity and Optics W 3
Physics 24. Electricity and Optics Lab W 1

or

Physics 41. Mechanics‡ A 3
Physics 43. Electric† W 3
Physics 45. Magnetism‡ S 3
Physics 46. Electricity and Magnetism Lab‡ S 1

Physics 47. Light and Heat‡ A 4

Subtotal 76

* Math. 41, 42, 51 are recommended for students planning graduate study in the sciences or engineering.
† Physics 41, 43, 45, 47 are recommended for students planning graduate study in the sciences or engineering.
‡ Physics 41, 43, 45, 47 are recommended for students planning graduate study in the sciences or engineering.

ELECTIVES

Choose four courses from the following list or, with faculty approval, four related, but more advanced courses:

Biol. Sci. 117. Biology and Global Change W 3
Civ. & Envr. Engr. 266. Environmental Policy Design and Implementation S 4
Comp. Sci. 106A. Programming Methodology A, W, S 5
Engr. 60. Engineering Economy A, W, Sum 3
GES 2.3. Earth History and Lab A 5
GES 8. Oceans S 3
GES 115. Engineering Geology Practice S 3
GES 132. Environmental Earth Sciences III S 5
GES 140. Geomorphology W 3
GES 171. Geochmical Thermodynamics (if not used above) A 3
GES 185. Volcanology S 4
Geophys. 170. Environmental and Geotechnical Geophysics S 3
Hum. Bio. 143. Environmental Policy S 3
Pet. Engr. 103. Energy Resources S 3

Subtotal 50

Total 99-119
The Engineering Geology and Hydrogeology curriculum is intended for undergraduate students interested in the application of geological and engineering data and principles to the study of rock, soil, and water to recognize and interpret geological and environmental factors affecting engineering structures and groundwater resources. Students learn to characterize and assess the risks associated with natural geological hazards such as landslides and earthquakes and with groundwater flow and contamination. The curriculum prepares students for graduate programs and professional careers in engineering and environmental geology, hydrogeology, geotechnical engineering, and geology. Students interested in this major track should contact faculty advisers Professors Pollard, Loague, or Gorelick.

GES majors who elect the Engineering Geology and Hydrogeology curriculum are expected to complete a core course sequence and a set of courses in supporting sciences and mathematics. The core courses come from two areas: Earth Sciences and Engineering. Any substitutions for core courses must be approved by the faculty adviser and the department chair. In addition, four elective courses, consistent with the core curriculum and required of all majors are to be selected with the advice and consent of the adviser. Typically, electives are selected from the list below. Letter grades are required, if available, in all courses.

### CORE COURSE SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GES 1. Fundamentals of Geology</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>GES 80. Earth Materials</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 102. Introduction to Field Geology</td>
<td>Sum 3</td>
</tr>
<tr>
<td>GES 111. Structural Geology and Rock Mechanics</td>
<td>A 4</td>
</tr>
<tr>
<td>GES 112. Mapping the Geologic Environment</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 113. Engineering Geology Practice</td>
<td>S 3</td>
</tr>
<tr>
<td>GES 160. Introduction to Statistical Methods for Earth and Environmental Sciences</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 195. Integrating Remote Sensing and GIS</td>
<td>A 3</td>
</tr>
<tr>
<td>GES 190. WIM Project</td>
<td>A,W,S 1</td>
</tr>
<tr>
<td>GES 230. Physical Hydrogeology</td>
<td>A 5</td>
</tr>
<tr>
<td>Geophys. 190. Environmental and Applied Geophysics</td>
<td>S 3</td>
</tr>
</tbody>
</table>

**Earth Science Subtotal** 40

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civ. &amp; Envir. Engr. 101A. Structural Systems</td>
<td>W 4</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 101B. Mechanics of Fluids</td>
<td>S 4</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 101C. Geotechnical Engineering</td>
<td>A 4</td>
</tr>
<tr>
<td>Comp. Sci. 106A. Programming Methodology</td>
<td>A,W,S 5</td>
</tr>
</tbody>
</table>

**Engineering Subtotal** 22

#### REQUIRED SUPPORTING SCIENCES AND MATHEMATICS

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 31. Chemistry Principles</td>
<td>A,W,Sum 4</td>
</tr>
<tr>
<td>Math. 52. Calculus</td>
<td>W,S 5</td>
</tr>
<tr>
<td>Math. 53. Calculus</td>
<td>W,S 5</td>
</tr>
<tr>
<td>Physics 41. Mechanics A</td>
<td>W 5</td>
</tr>
</tbody>
</table>

**Subtotal** 23

#### SUGGESTED ELECTIVES

Choose four courses from the following list or, with faculty approval, four related courses:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civ. &amp; Envir. Engr. 170. Environmental Science and Technology</td>
<td>A 3</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 180A. Introduction to Structural Analysis</td>
<td>S 3</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 180B. Structural Analysis A</td>
<td>A 4</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 291. Foundation Engineering</td>
<td>W 3</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 293. Experimental Soil Mechanics</td>
<td>W 2</td>
</tr>
<tr>
<td>Engr. 30. Engineering Thermodynamics</td>
<td>A,W 3</td>
</tr>
<tr>
<td>Engr. 50. Introductory Science of Materials</td>
<td>A,W 3</td>
</tr>
<tr>
<td>GES 130. Environmental Earth Sciences I</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 131. Environmental Earth Sciences II</td>
<td>W 5</td>
</tr>
<tr>
<td>GES 132. Environmental Earth Sciences III</td>
<td>S 5</td>
</tr>
<tr>
<td>GES 133. Introduction to Assessment of Environmental Risk</td>
<td>W 3</td>
</tr>
<tr>
<td>GES 140. Geomorphology</td>
<td>W 3</td>
</tr>
<tr>
<td>GES 217. Characterization and Hydraulics of Rock Fracture</td>
<td>W 3</td>
</tr>
<tr>
<td>GES 231. Contaminant Hydrogeology</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 235. Role of Fluids in Geologic Processes</td>
<td>S 3</td>
</tr>
<tr>
<td>GES 236. Surface and Near-Surface Hydrologic Response</td>
<td>W 4</td>
</tr>
<tr>
<td>Geophys. 190. General Geophysics</td>
<td>A 4</td>
</tr>
</tbody>
</table>

### MECH. ENGR.

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mech. Engr. 100. Differential Equations in Engineering</td>
<td>S 3</td>
</tr>
<tr>
<td>Mech. Engr. 111. Stress, Strain, and Strength</td>
<td>A 3</td>
</tr>
</tbody>
</table>

**Subtotal** 72

**Total** 101-111

#### LAND RESOURCES PLANNING

The Land Resources curriculum is intended for students who anticipate graduate study and careers in city or regional planning, conservation, landscape architecture, environmental law, land resource management, and allied fields. The program is flexible and provides ample opportunity for expansion in scope or depth to accommodate the demands of an anticipated career or an individual’s interests. Students planning graduate study in the sciences or engineering should select one of the other GES programs.

GES majors in the Land Resources Planning curriculum are expected to complete a set of courses in supporting sciences and mathematics, a core course sequence, and several electives chosen from prescribed groups listed below. Course substitutions must be approved by the adviser and the department chair. Letter grades are required, if available, in all courses.

### CORE COURSE SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civ. &amp; Envir. Engr. 170. Environmental Science and Technology</td>
<td>A 3</td>
</tr>
<tr>
<td>Comp. Sci. 105A. Introduction to Computers</td>
<td>A,S 5</td>
</tr>
<tr>
<td>or Comp. Sci. 106A. Programming Methodology</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>Econ. 1. Elementary Economics</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>GES 1. Fundamentals of Geology</td>
<td>A 5</td>
</tr>
<tr>
<td>or GES 2.3. Earth History and Lab</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 8. Oceans</td>
<td>S 3</td>
</tr>
<tr>
<td>GES 80. Earth Materials</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 102. Introduction to Field Geology</td>
<td>Sum 3</td>
</tr>
<tr>
<td>GES 112. Mapping the Geologic Environment S 4</td>
<td></td>
</tr>
<tr>
<td>GES 130. Environmental Earth Sciences I</td>
<td>A 5</td>
</tr>
<tr>
<td>GES 131. Environmental Earth Sciences II</td>
<td>W 5</td>
</tr>
<tr>
<td>GES 132. Environmental Earth Sciences III</td>
<td>S 5</td>
</tr>
<tr>
<td>GES 160. Introduction to Statistical Methods for Earth and Environmental Sciences</td>
<td>S 4</td>
</tr>
<tr>
<td>GES 190. WIM Project</td>
<td>A,W,S 1</td>
</tr>
<tr>
<td>Urban Studies 110. Introduction to Urban Studies</td>
<td>W 5</td>
</tr>
<tr>
<td>Urban Studies 170. Introduction to Urban Design</td>
<td>W 5</td>
</tr>
</tbody>
</table>

**Subtotal** 72

#### REQUIRED ENGINEERING, SUPPORTING SCIENCES, AND MATHEMATICS

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 31. Chemical Principles</td>
<td>A,W,Sum 4</td>
</tr>
<tr>
<td>Math. 19. Calculus</td>
<td>A,W,S 4</td>
</tr>
<tr>
<td>Math. 20. Calculus</td>
<td>W,S 3</td>
</tr>
<tr>
<td>or Math. 41. Calculus</td>
<td>A 5</td>
</tr>
</tbody>
</table>

**Subtotal** 18

#### ELECTIVES

Choose one course from each of the following groups:

**Group A**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civ. &amp; Envir. Engr. 171. Environmental Planning Methods</td>
<td>W 3</td>
</tr>
<tr>
<td>Civ. &amp; Envir. Engr. 175. Environmental and Natural Resource Economics</td>
<td>S 5</td>
</tr>
<tr>
<td>Engr. 60. Engineering Economy</td>
<td>A,W,Sum 3</td>
</tr>
<tr>
<td>GES 133. Introduction to Assessment of Environmental Risk</td>
<td>W 3</td>
</tr>
</tbody>
</table>

**Group B**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geophys. 4. Natural Hazards and Human Survival</td>
<td>A 3</td>
</tr>
<tr>
<td>GES 140. Geomorphology</td>
<td>W 3</td>
</tr>
<tr>
<td>Pet. Engr. 103. Energy Resources</td>
<td>A,S 3</td>
</tr>
</tbody>
</table>

**Group C**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol. Sci. 117. Biology and Global Change</td>
<td>W 3</td>
</tr>
<tr>
<td>Econ. 106. The World Food Economy</td>
<td>W 4</td>
</tr>
<tr>
<td>Econ. 113. Technology and Economic Change</td>
<td>S 5</td>
</tr>
</tbody>
</table>

**Group D**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art &amp; Art Hist. 3. Introduction to the History of Architecture</td>
<td>W 5</td>
</tr>
<tr>
<td>Art &amp; Art Hist. 175A. Modern Architecture I</td>
<td>S 4</td>
</tr>
<tr>
<td>Art &amp; Art Hist. 175B. Modern Architecture II</td>
<td>A 4</td>
</tr>
<tr>
<td>Art &amp; Art Hist. 176. American Architecture and Urbanism</td>
<td>A 4</td>
</tr>
</tbody>
</table>

**Group E**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Studies 133. The Politics of Development</td>
<td>S 4</td>
</tr>
<tr>
<td>Urban Studies 138. Managing Local Government</td>
<td>S 4</td>
</tr>
</tbody>
</table>
MINORS
A minor in Geological and Environmental Sciences consists of a small set of required courses plus 12 elective units.

Required courses are:

GES 1. Fundamentals of Geology
or GES 2. Earth History and GES 3. Earth History Lab
or GES 130. Environmental Earth Sciences I
GES 80. Earth Materials
GES 102. Introduction to Field Geology
or GES 112. Mapping the Geologic Environment

A minimum of 12 additional units in GES courses, including three courses from the list below:
GES 8. The Oceans
GES 90. Introduction to Geochemistry
or GES 120. Geosphere
GES 102. Introduction to Field Geology
or GES 112. Mapping the Geologic Environment (if not used above)
GES 110. Structural Geology
or GES 111. Structural Geology and Rock Mechanics
GES 131. Environmental Earth Sciences II
GES 140. Geomorphology
GES 151. Sedimentary Geology and Petrography
GES 152. Stratigraphy and Applied Paleontology
GES 170. Environmental Geochemistry
GES 181. Igneous and Metamorphic Processes
GES 185. Volcanology
GES 195. Integrating Remote Sensing and GIS

All students pursuing a minor in GES are encouraged to take one of the freshman or sophomore seminars (courses with numbers 40–49) and to participate in the undergraduate seminar (GES 4). Up to 3 units of Stanford Introductory Seminar courses may be used in fulfilling the 12-unit requirement above.

Contact the GES department for further information. The variety of courses that may be used to satisfy the requirements should make it possible for students with a wide range of interests and backgrounds to complete a minor in GES.

HONORS PROGRAM
The Department of Geological and Environmental Sciences offers a program leading to the Bachelor of Science in Geological and Environmental Sciences with honors. The program provides an opportunity for independent study and research on a topic of special interest culminating in a written report. The honors program is open to all seniors with a grade point average (GPA) of at least 3.5 in earth and environmental science courses and a minimum of 3.0 in all University course work. Modest financial support is available to help defray laboratory and field expenses incurred in conjunction with honors research. Students intending to pursue the honors program must submit an application to the department before the beginning of their senior year.

A student selects a research topic and prepares a research proposal in consultation with a faculty adviser of his or her choosing. Research undertaken for the honors program can be of a theoretical, field, or experimental nature, or a combination of these approaches.

Upon approval of the research proposal and formal entrance to the program, course credit for the honors research project and report preparation is assigned by the student’s faculty adviser within the framework of GES 199; 3 units each quarter are assigned to the project for three quarters of the student’s senior year for a total of 9 units. Research undertaken for the honors program cannot be used as a substitute for regularly required courses.

Both a written and an oral presentation of research results are required of honors students. A formal written report must be submitted to the student’s research adviser no later than the fourth week of the student’s final senior quarter. To graduate with honors, the report must be read, approved, and signed by the student’s faculty adviser and a second member of the faculty. Before the end of the senior year, each honors candidate gives a public seminar on his or her research results.

COTERMINAL B.S./M.S. PROGRAM

The coterminal B.S./M.S. program offers a special opportunity for students to pursue a graduate research experience and a M.S. degree concurrently with or subsequent to their B.S. studies. The master’s degree is viewed as an entrance professional degree in a number of subdisciplines within the earth sciences (for example, engineering geology, environmental geology). Alternatively, graduate course work and the master’s research experience can provide an intermediate step prior to pursuit of the Ph.D. Regardless of their professional goal, coterminal B.S./M.S. students are treated as members of the graduate community and are expected to meet all of the standards set for regular M.S. students. Students should apply to the program after their seventh quarter (or after earning 105 units) but no later than their eleventh quarter. They are required to submit an application for entrance to the GES coterminal program including a statement of purpose, a copy of their current Stanford transcript, official Graduate Record Examination scores, letters of recommendation from two members of the Stanford faculty (at least one of whom must be in this department), and a list of courses in which they intend to enroll to fulfill degree requirements. Each student must complete a thesis or master’s report describing the results of his or her research. Specific research interests should be noted in the statement of purpose and discussed with a member of the GES faculty prior to submission of an application to the coterminal program.

Students must meet all requirements for both the B.S. and M.S. degrees. Students may either (1) complete 180 units required for the B.S. degree and then complete three full-time quarters for the M.S. degree, or (2) complete a total of fifteen quarters during which the requirements of the two degrees are fulfilled concurrently. The student has the option of receiving the B.S. degree upon completion of that degree’s requirements, or receiving the B.S. and M.S. degrees concurrently at the completion of the master’s program. Unit requirements for the coterminal program are a minimum of 180 units for the B.S. degree and a minimum of 36 units of course work at the 100 level or above for the M.S. degree. At least half of the courses used to satisfy the 36-unit requirement must be designated as being primarily for graduate students, normally at the 200 level or above. No more than 15 units of thesis research may be used to satisfy the 36-unit requirement. Further information about this program may be obtained from the GES office.

GRADUATE PROGRAMS

Graduate studies in the Department of Geological and Environmental Sciences (GES) involve academic course work and independent research. Students are prepared for careers as professional scientists in research or the application of the earth sciences to mineral, energy, and water resources. Programs lead to the M.S., Engineer, and Ph.D. degrees. Course programs in the areas of faculty interest are tailored to the student’s needs and interests with the aid of his or her research adviser. Students are encouraged to include in their program courses offered in other departments in the School of Earth Sciences as well as in other departments in the University. Diplomas designate degrees in Geological and Environmental Sciences and may also indicate the following specialized fields of study: Geomathematics, Geostatistics in the Earth Sciences, and Hydrogeology.

The broad areas of faculty teaching and research are divided into three fields that have diploma designation and an additional six areas of specialization.

Admission—For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Previously admitted students who wish to change their degree objective from M.S. to Ph.D. must petition the GES Admissions Committee.
FIELDS WITH DIPLOMA DESIGNATION

Hydrogeology—The Hydrogeology program, which leads to an M.S., Engineer, or Ph.D. degree in GES, balances research in the purely scientific and applied aspects of groundwater resources and near-surface processes. Key department faculty in hydrogeology are Professors Gorelick and Loague, but there are strong interactions with faculty in the departments of Civil and Environmental Engineering, Geophysics, and Petroleum Engineering and with scientists at the USGS. Investigations typically involve field sites and focus on topics ranging from understanding groundwater flow through large basins to optimal design of aquifer remediation strategies. The scales of interest extend from the domain of pores and fractures to vast regional flow systems. One important aim is to develop conceptual and quantitative predictive models. Such models enhance our understanding of the role of groundwater flow as a geological process and provide means for evaluating and managing resources.

The program requires students to obtain a broad background in earth sciences and engineering. Students in the program must have a strong general scientific background in basic physics, chemistry, computer science, and mathematics, and a demonstrated aptitude for solving quantitative problems. They must complete a core curriculum involving courses in fluid mechanics, hydrogeology, hydrology, and water quality. A list of required and recommended courses is supplied upon request.

Geostatistics—The Geostatistics program, which leads to a M.S. or Ph.D. degree in GES, is under the direction of Professor Journel. It focuses on the probabilistic modeling of earth sciences phenomena such as oil reservoirs, ore deposits, and pollution sites in view of their development and management. As opposed to traditional mapping algorithms, stochastic imaging provides alternative, equiprobable, very high resolution numerical models of the phenomenon under study. These models integrate data from various sources such as well data, geophysical logs, and geological interpretation. Strong interactions have been developed with faculty and students in the departments of Geophysics and Petroleum Engineering.

The program requires a geological background and a fair level of calculus and programming (Fortran and/or C). Recent graduates have found jobs in the extractive (mining, oil) and environmental (EPA) fields.

Geomathematics—The Geomathematics program, under the direction of Professor Harbaugh, leads either to a M.S. or Ph.D. degree in GES. It focuses on the use of mathematics in simulating geologic processes in petroleum-bearing sedimentary basins. Geological processes are represented in terms of their underlying physical principles by differential equations that have been placed in finite-difference form for numerical solution by computer. The numerical solutions are linked with graphics workstations to create dynamic three-dimensional displays, which are then used in simulating actual sedimentary basins.

Students in the program should have demonstrated aptitude for mathematics and computer programming. A list of required and recommended courses is supplied upon request.

AREAS OF SPECIALIZATION

Geochemistry, Petrology, and Mineralogy—The research and teaching interests of a number of the faculty in the Department of Geological and Environmental Sciences involve biogeochemistry, cosmochemistry, environmental geochemistry, geochemistry and its applications in the atomic-level structure and properties of earth materials, hydrothermal systems, igneous and metamorphic petrology, mineralogy and mineral physics, mineral surface and colloid reactions, and ore deposits. Techniques include Ar-Ar, U-Pb, Sm-Nd, Rb-Sr, and U series geochronology, computer prediction and modeling, electron microprobe and sensitive high-resolution ion microprobe analysis, field-oriented studies, laboratory experiments at high temperatures and pressures on phase equilibria and mineral-fluid interactions, and x-ray scattering and spectroscopic studies of organic and inorganic earth materials. The scale of problems studied ranges from global to atomic. Students with strong backgrounds in chemistry are especially urged to contact faculty in these fields, including Professors Bird, Brown, Einseidler, Ernst, Fendorf, Ireland, Liou, Mahood, Matson, McWilliams, Moldowan, and Stebbins.

Structural Geology and Geomechanics (http://pangea.stanford.edu/geomech/index.html)—Research opportunities in this specialization include: structural geology, geomechanics; rock fracture and fault mechanics; hydraulics of faults and fractures; reservoir description, and characterization, and engineering geology. Program advisers are Professors Aydin and Pollard. Correspondence with the advisers before application is suggested to clarify the nature and requirements of the program. Other faculty members with related research interests are: Professor Bird, Gorelick, Graham, Journel, Loague, Miller, and Moldovan (from GES); Professors Beroza, Klempner, Markov, Nur, Segall, and Zoback (from Geophysics); Professor Aziz, Durlofsky, Hewett, and Orr (from Petroleum Engineering); and Professor Borja (from Civil and Environmental Engineering).

One focus of the program is on characterizing and modeling physical processes responsible for geological structures. Topics include the evolution of crustal structures such as faults, folds, and fractures, and natural hazards related to earthquakes and volcanoes. Another focus is on the role of geologic structures (faults, folds, and fractures) in fluid flow in groundwater aquifers and petroleum reservoirs. This research is under the umbrella of the Rock Fracture Project, an industrial affiliates program.

The methodologies used in this program include field mapping of ancient or active structures, laboratory investigations using physical models; seismic mapping and interpretation of crustal subsurface structures; and theoretical analyses based on solid, fluid, and fracture mechanics. Research goals include delineating stress, strain, and displacement fields associated with geologic structures at scales ranging from laboratory samples to plate boundaries, and understanding the geologic and hydraulic properties of fractures and faults.

Sedimentary Geology Paleoclimatology, Marine Geology and Paleontology—Research in sedimentary geology at Stanford spans a wide range of specialized studies in modern and ancient settings. Sedimentary processes are studied at scales ranging from single sediment-gravity flows to the mechanisms by which continental margin basins subside. Time-dependent phenomena are investigated at levels that range from the deposition and organic geochemical and paleoecological signatures of annually varved sediments to that of the fill of long-lived foreland basins. Venues span the globe from Asia, around the Pacific Rim to South America, and across to Africa in stratigraphic units that range from Archean to Recent; these are investigated with special focus on the tectonics, sedimentation, and paleoclimate of continental margins and sedimentary basins in the western U.S. These investigations employ the tools of many subdisciplines, including computer modeling/simulation, geochemistry, geochronology, micropaleontology, paleoecology, paleomagnetism, sedimentology, and seismic interpretation, with emphasis on interdisciplinary integration. Current projects include application of sedimentology to interpreting surface conditions and crustal evolution on the Archean earth, computer simulation of sediment flows and deposits, evolution of modern shallow carbonate depositional systems in the Gulf of California, organic geochemistry of paleoclimatic events such as El Niño, paleoclimatology and sedimentation of modern western Pacific marginal seas, research on the origins and evolution of sedimentary basins in Asia, sequence and seismic stratigraphic architecture of active margin basins, and sediment-gravity flow mechanisms and the structure of associated deposits. Core faculty are Dunbar, Graham, Ingle, Lowe, and Paytan; faculty with related or overlapping interests include Fendorf, Gorelick, Harbaugh, McWilliams, Miller, and Moldovan.

Structural Geology, Regional Geology, and Tectonics—Research is a structural geology, regional geology, and tectonics. Research opportunities in this specialization include: structural geology, geomechanics; rock fracture and fault mechanics; and field-oriented studies. Laboratory experiments at high temperatures and pressures on phase equilibria and mineral-fluid interactions, and x-ray scattering and spectroscopic studies of organic and inorganic earth materials. The scale of problems studied ranges from global to atomic. Students with strong backgrounds in chemistry are especially urged to contact faculty in these fields, including Professors Bird, Brown, Einseidler, Ernst, Fendorf, Ireland, Liou, Mahood, Matson, McWilliams, Moldowan, and Stebbins.
scales. Geophysical studies include seismic imaging of the crust and mantle, stress and strain measurement in regions of active deformation, and paleomagnetic measurement of crustal deformation and continental accretion. Faculty with general interests in these topics include Professors Aydin, Ernst, Graham, McWilliams, Miller, and Pollard in Geological and Environmental Sciences, and Klemperer, Nur, Segall, Sleep, Thompson and Zoback in Geophysics.

Surface and Aqueous Geochemistry—Professors Brown and Parks (emeritus) lead the Surface and Aqueous Geochemistry Group (SAAG) in the alteration and partitioning reactions that determine the mobility, bioavailability, and ultimate fate of solutes and contaminants in natural waters. Research focuses on the fundamental physical and surface/interfacial chemistry underlying reactions among water, aqueous solutes, and minerals under earth-surface conditions, and how the composition and structure of the solutions and mineral surfaces influence them. Students study speciation or complexation, dissolution, precipitation, and especially sorption reactions using a variety of classical surface chemistry and surface-sensitive spectroscopic methods, as well as computer simulations of the macroscopic and molecular-scale behavior of solutes and properties of solute-surface complexes. Results can be used to understand mechanisms of element partitioning and cycling in geochemical systems; they have applications in a wide variety of contexts including hazardous waste management, remediation of contaminated sites, petroleum migration and recovery, and weathering under the influence of acid rain.

SAAG students are expected to accumulate a sound background in physical and inorganic chemistry as well as geochemistry, and at least one field of application such as environmental engineering, environmental geosciences, or hydrogeology. Preference is given to applicants who have a strong quantitative background in chemistry and physical chemistry and experience with computers and laboratory methods.

Volcanology—Professors Aydin, Mahood, and Pollard have overlapping interests with Professors Segall and Zebker in Geophysics in deformation of volcanic edifices; eruption triggers; explosive volcanism and emplacement of pyroclastic flows; formation of dikes, geologic evolution of caldera systems; magma degassing and impact of volcanic gases on the atmosphere; the physics of magma transport in the crust; magma reservoirs, and sills; planetary volcanology; and seismic signatures of volcanic activity.

MASTER OF SCIENCE

Objectives—The purpose of the master's program in Geological and Environmental Sciences is to continue a student's training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

Procedures—The graduate coordinator of the department appoints an academic adviser during registration with appropriate consideration of the student's background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The student should select a thesis adviser within the first year of residence and submit to the thesis adviser a proposal for thesis research as soon as possible. The academic adviser supervises completion of the department requirements for the M.S. program (as outlined below) until the research proposal has been accepted; responsibility then passes to the thesis adviser. The student may change either thesis or academic advisers by mutual agreement and after approval of the graduate coordinator.

Requirements—The University's requirements for M.S. degrees are outlined in the "Graduate Degrees" section of this bulletin. Practical training (GES 385) may be required by some programs, with adviser approval, depending on the background of the student. A summary of additional department requirements is presented below:

1. A minimum of 36 units of course work at the 100 level or above.
   a. Half of the courses used to satisfy the 36-unit requirement must be intended as being primarily for graduate students, usually at the 200 level or above.
   b. No more than 15 units of thesis research may be used to satisfy the 36-unit requirement.

2. Each student must have a research adviser who is a faculty member in the department and is within the student's thesis topic area or specialized area of study.

3. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence.

4. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis, who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

ENGINEER DEGREE

The Engineer degree is offered as an option for students in applied disciplines who wish to obtain a graduate education extending beyond that of an M.S., yet do not have the desire to conduct the research needed to obtain a Ph.D. A minimum of two years (six quarters) of graduate study is required. The candidate must complete 72 units of course work, no more than 10 of which may be applied to overcoming deficiencies in undergraduate training. The student must prepare a substantial thesis that meets the approval of the thesis adviser and the graduate coordinator.

DOCTOR OF PHILOSOPHY

Objectives—The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct independent research. To this end, the objectives of the doctoral program are to enable students to develop skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

Requirements—The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees" section of this bulletin. Practical training (GES 385) may be required by some programs, with adviser approval, depending on the background of the student. A summary of additional department requirements is presented below:

1. Ph.D. students must complete the required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 'B' or higher, or demonstrate that they have completed the equivalents elsewhere. Ph.D. students must complete a minimum of four letter-grade courses of at least 3 units each from four different faculty members on the Academic Council in the University. At least two of three courses must be from two different GES faculty members.

2. Each student must qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal, examination on the research proposal, and examination on subject matter relevant to the proposed research. The exam should be scheduled for prior to May 1, so that the outcome of the exam is known at the time of the annual spring evaluation of graduate students.

3. Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, in the month of March or April, the candidate must organize a meeting of the research committee to present a brief progress report covering the past year.

4. Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research. The format of the dissertation must meet University guidelines. The student is
strongly urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.

5. The doctoral dissertation is defended in the University oral examination. The department appoints the research adviser and two other members of the research committee to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

Ph.D. MINOR

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in Geological and Environmental Sciences must complete, with a GPA of 'B' or better, 20 units in the geosciences in lecture courses intended for graduate students. The selection of courses must be approved by the student’s GES adviser and the department chair.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

UNDERGRADUATE

1. Fundamentals of Geology—For non-majors or prospective majors in Earth Systems or Geological and Environmental Sciences. Introduction to and survey of the processes, past and present, that shape the earth’s landforms, produce the minerals and rocks that comprise the earth, create soils, deform the earth’s crust, and move continents. The ways in which man interacts with the earth, constructively and destructively. Surficial processes involving water, water’s role in erosion, and in the production of sediment. Processes acting within the earth’s interior, emphasizing global tectonics. Geologic hazards: earthquakes, volcanic eruptions, flooding, landslides, and their mitigation. Nonrenewable resources, energy, environmental problems. Lectures, one all-day field trip, and weekly lab. Recommended: high school chemistry and physics. GER:2a (DR:5)

   5 units, Aut (Mahood)
   Win (Bird)
   Spr (Staff)

2. Earth History—For non-majors or prospective Earth Systems or geology majors. The earth is a dynamic planet, its surface continuously remolded by changing patterns of plate movements, climatic variation, the rise and fall of sea level, mountain building, volcanism, erosion, and sedimentation. It has hosted an evolutionary parade of organisms, from self-replicating molecules to man, that have interacted with and strongly modified surrounding environments. The evolution of the earth and its biosphere, hydrosphere, and atmosphere represent active areas of current research and discussion. Topics: the formation of the earth, origin of life, evolution of the continents, oxygenation of the atmosphere, development of metazoans, history of glaciations and climate, the role of extraterrestrial events in geological and biological evolution. Non-required lab in GES 3 examines the materials and organisms discussed. Majors in geology must take 3 concurrently or in a subsequent year. $10 field trip fee required. GER:2a (DR:5)

   3 units (Lowe) alternate years, given 2000-01

3. Earth History Laboratory—Introduction to the methods and materials of historical geology. Lab sessions on stratigraphic interpretation, geologic maps and cross sections, sedimentary environments, and metazoan evolution and fossils. Recommended for students taking GES 2; required for geology majors who took Geology 2 in 1985-86 or later. Corequisite: 2.

   2 units (Lowe) alternate years, given 2000-01

4. Undergraduate Seminar—For prospective majors in the School of Earth Sciences and non-majors. Informal lectures introduce students to the earth sciences: the scope of research and teaching in the School of Earth Sciences at Stanford, career possibilities, and the importance of studying the Earth. (AU)

   1 unit, Aut, Win, Spr (Dunbar)

7A.B. An Introduction to Wilderness Skills—Introduction to living, traveling, and working in the wilderness for those planning fieldwork in the backcountry. In-class topics: geological processes, land management, environmental ethics, first aid, animal tracking, and plant ecology. Four weekend outings focus on minimum impact backcountry skills including backcountry ski technique, backpacking, caving, food preparation, orienteering, rock climbing, snow shelter building, and telemarking. Students research the geological history of trip locations and make short presentations on their findings. 7A emphasizes navigation on foot and rock climbing, and 7B emphasizes winter camping skills and backcountry skiing. Food, group, and major personal gear provided. Students provide own clothing. Fee for food and transportation. (AU)

   7A. 1 unit, Aut (Bird)
   7B. 1 unit, Win (Bird)

7C. Advanced Wilderness Skills: An Introduction to Mountaineering—Introduction to mountaineering techniques and issues. AWS addresses topics and skills of interest to those more experienced with outdoor travel, focusing on the techniques and skills applicable to mountaineering. Fee for food and transportation. (AU)

   1 unit, Spr (Bird)

8. The Oceans: An Introduction to the Marine Environment—For non-majors and prospective geology, earth science, and environmental majors. Topics: topography and geology of the sea floor; evolution of ocean basins, the circulation of the ocean and atmosphere, the nature of sea water, waves, tides, and the history of the major ocean basins. The interface between continents and ocean basins, emphasizing estuaries, beaches, and continental shelves with California margin examples. The relationships between the distribution of inorganic constituents, ocean circulation, biologic productivity, and marine environments from deep sea to the coast. Lectures and required one-day field trip to measure and analyze waves and currents. GER:2a (DR:5)

   3 units, Spr (Ingle)


   3 units, Spr (Dunbar) alternate years, not given 2000-01

42N. Stanford Introductory Seminar: Early Life on Earth—Preference to freshmen. An exploration of the first billion years of Earth history, with emphasis on the environments, conditions, and processes that led to the origin of life on Earth; the likelihood that life has evolved elsewhere in the solar system; examination and discussion of the geological record of the oldest preserved life forms, and the environments in which they lived. Term paper. Use of Stanford’s rock collection containing the oldest evidence for life on earth. GER:2a (DR:5)

   3 units (Lowe) alternate years, given 2000-01

44N. Stanford Introductory Seminar: Emerging Issues in Global Environmental Change—Preference to freshmen. Surveys the current understanding of environmental issues that are global in extent or effect, developing skills in researching primary literature and presenting the
results of research in writing and orally. Topics: atmospheric change, climate change, land use change, change in biotic resources, change in biogeochemistry. Structure: six weeks of lectures/discussions focused on the identification of global changes, and their causes and consequences; four weeks of oral presentations and discussions of student research. Five-page paper term project, written individually, exploring the social or natural science research in specific changes; students critique draft papers and give an oral presentation on their own research. Discussions on the integration of the social and biophysical aspects of various global changes.

3 units, Spr (Matson) alternate years, not given 2000-01

45N. Stanford Introductory Seminar: Detecting Changes in Climate and the Environment—Preference to freshmen. What is the evidence for global warming? How can we distinguish anthropogenic warming from Earth’s natural warming and cooling; what changes have actually occurred in regional and global climate, including surface temperature, precipitation and extreme weather events. How can we detect environmental change and discriminate between trends and natural variability. Students assemble historical data, apply statistical techniques to describe and interpret their data, and present oral reports and critiques of other student papers.

3 units (Switzer) alternate years, given 2000-01

46N. Stanford Introductory Seminar: The Beach—Preference to freshmen. Open coast beaches represent one of the most complex and dynamic natural environments of Earth: a triple point where the ocean, atmosphere, and continent meet and interact on time scales of seconds to millennia. The beach environment through lectures/discussion and reading, and by study in the field. Field work involves repeated measurement of waves, currents, and beach character and sample collection at sites from Point Reyes south to Monterey Bay, California, with the goals of assembling and analyzing a quantitative record of environmental change. Research paper on a specific aspect of the beach environment.

3 units, Win (Ingle)

49N. Stanford Introductory Seminar: Field Trip to Death Valley—Preference to freshmen. California’s Death Valley and Owens Valley are natural laboratories for exploring a billion years of earth history: the sediments of ancient ocean/s, large-scale crustal deformation and mountain building, recent earthquake faulting, and volcanic eruptions. Their desert environments reveal prehistoric climate changes and historic human impacts. Six-day field trip to these areas during Spring Break. Introduction to the basics of geology during the quarter. Individual projects on specific topics are presented during the trip. Camping and moderate hiking required.

3 units, Win (Stebbins, Miller)

50Q. Stanford Introductory Seminar: The Coastal Zone Environment—Preference to sophomores. The oceanographic, geological, and biological character of coastal zone environments, including continental shelves, estuaries, and coastal wetlands, with emphasis on San Francisco Bay. Five required field trips examine the estuarine and coastal environments of the Bay region, and agencies and facilities concerned with monitoring and management of these resources. Original research on a selected aspect of the coastal zone results in a written and oral report. Prerequisite: introductory course in the earth or biological sciences. GER:2a (DR:5)

3 units, Aut (Ingle)

51Q. Stanford Introductory Seminar: Volcanoes of the Eastern Sierra Nevada—Preference to sophomores, and to students who have completed introductory geology. Develop skills in researching primary sources in scientific literature and presenting the results of that research orally and in writing. Topics: young volcanoes, hot springs, earthquake faults, glacial features, and saline lakes of the eastern Sierra Nevada. Four-day field trip over the Memorial Day weekend. Term project is a 5-page paper written as a chapter for a class-produced field trip guidebook. Students give an oral presentation on the outcrop at the field trip stop described in the guidebook chapter. Camping and light hiking. (WIM)

3-4 units (Mahood) alternate years, given 2000-01

52Q. Stanford Introductory Seminar: Geologic Development of California—Preference to sophomores, and to students who have completed introductory geology. Field-based on the crustal evolution of California in post-Paleozoic time and covering the geotectonic development of most of the state. Weekend field trips to the Diablo Range (two days); the central Klamath Mountains (three days); Point Lobos (one day); the White-Inyo Range, Owens Valley, and the eastern Sierra (three days). Camping and hiking.

4 units, Spr (Ernst)

53Q. Stanford Introductory Seminar: In the Beginning—Theories of the Origin of the Earth, Solar System, and Universe—Preference to sophomores. What happened in the first few seconds following the Big Bang? Where did all the elements in the periodic table come from? When and how did the Earth, Moon, and solar system form? When and where did life begin on Earth? Answers to these questions have been sought for centuries, and continues today. The history and evolution of theories of the origin of the Earth, Moon, solar system, and the Universe.

3 units, Win (McWilliams)

54Q. Stanford Introductory Seminar: California Landforms and Plate Tectonics—Preference to sophomores. The forces of plate tectonics at work on the landscape of California. The principles of rock deformation are introduced in hands-on experiments. Landforms resulting from deformation of the earth are analyzed with digital and photographic images. Field trips relate these large-scale structures to what one sees from the human perspective on the ground. Literature research on the tectonics of a region of the student’s choice. GER:2a (DR:5)

3 units, Aut (Miller)

55Q. Stanford Introductory Dialogue: The California Gold Rush—Geologic Background and Environmental Impact—Preference to sophomores, and to students who have completed introductory geology. The geologic processes that led to the concentration of gold in the river gravels and rocks of the Mother Lode region of California. The environmental impact of the Gold Rush population increase and of mining operations, including the effects of placer mining on the landscape, rivers, and fisheries, and the concentration of arsenic and mercury in surface sediments and soils due to hard rock mining and milling operations. Field trip to the Mother Lode region; term paper and oral presentation required.

2 units, Spr (Bird)

56Q. Stanford Introductory Dialogue: Change in the Coastal Ocean—The View from Monterey Bay—Preference to sophomores. The issue of recent changes in the California Current, using Monterey Bay as an example. Current literature is an introduction to several principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay.

1 unit, Spr (Dunbar)

80. Earth Materials—Identification, classification, and interpretation of rock-forming minerals and the igneous, sedimentary, and metamorphic rocks they comprise. Rock cycles are related to earth systems. Lab work emphasizes use of the hand lens in making observations; overnight field trip demonstrates mineral and rock identification in the field, a variety of different pressure and temperature environments where minerals and rocks have formed, and genetic associations. Prerequisite: 1. Recommended: introductory chemistry.

5 units, Aut (Brown, Liou)

81. Petrography Tutorial—Practice and instruction in identifying minerals and rocks using a petrographic microscope. One three-hour lab per week. Prerequisite: 80 or equivalent.

2 units, Spr (Miller, Staff)
Introduction to Geochemistry—Introduction to the chemistry of the solid earth and its atmosphere and oceans, emphasizing the processes that control the distribution of the elements in the earth over geological time and at present, and on the conceptual and analytical tools needed to explore these questions. The basics of geochemical thermodynamics and isotopic geochemistry. The formation of the elements, crust, atmosphere and oceans, global geochemical cycles, and the interaction of geochro-

mistry, biological evolution, and climate. Recommended: introductory chemistry.

3 units, Win (Stebbins)

Introduction to Field Geology—Instruction and practice in the basic methods of geologic investigation in the field. Emphasis is on techniques of systematic observations and the construction of geologic maps and sections from the data obtained with a written geologic report on one of the study areas. Field area sites display a variety of rock types and landforms related to clearly defined geologic structures and events. Conducted from White Mountains Research Station in Bishop, CA for the two weeks preceding the beginning of Autumn Quarter. Contact GES, or see Summer Session Catalogue, 2000 for schedule. Prerequisites: 1, 80.

3 units, Sum (Ruetz)

Geologic and Environmental Problems—Supervised reading, field and/or laboratory work, written paper. Recommended: one quarter (Staff).

1-10 units, any quarter (Staff)

Structural Geology: Introduction to Deformation in the Earth's Crust—The basic theory, principles, and techniques used to interpret and measure structures in naturally deformed rocks. Topics: the properties, rheology, and mechanisms of deformation of rocks and minerals; techniques of data collection in the field; lab and computer analysis of structural data; geometry and development of faults and folds; interpretation of geologic maps and construction of geologic cross-sections; strain measurement and structural analysis of metamorphic tectonites; the evolution of mountain belts, formation of rift-related sedimentary basins and development of strike-slip fault systems. Prerequisites: 1, calculus. Recommended: 80, 102. (WIM)

5 units, Spr (Miller)

Structural Geology and Rock Mechanics—Same as Civil and Environmental Engineering 195.) Observational techniques, analysis methods, and the theoretical foundations of structural geology, engineering geology, and rock mechanics. Computer exercises are integrated with field data to understand the role of geologic structures in the evolution of the earth's crust (folding, faulting, flow, and fracturing of rock) and geologic hazards (earthquakes and volcanoes). Topics: structural quantities and dimensional analysis; use of stress, strain, displacement, and velocity fields in structural analysis; concept and measurement of deformation; mechanical properties of rock (elasticity, viscosity, strength, friction, fracture toughness); case studies of typical geologic structures using continuum mechanics. Computer labs. Prerequisites: 1, calculus, Macintosh skills.

5 units, Aut (Pollard)

Mapping the Geological Environment—Introduction to modern techniques for mapping and measurement of geological features associated with natural resources recovery, geological hazards, and environmental problems. Use of descriptive geometry and stereographic projections to analyze geological field data. Total Positioning System (TPS) and the satellite-based Global Positioning System (GPS) are used for field data acquisition. Compilation, visualization, and presentation of 2D and 3D field data is implemented using computer graphics applications and Geographic Information Systems (GIS). Field trips. (WIM)

4 units, Spr (Einaudi, Pollard)

Engineering Geology Practice—Same as Civil and Environmental Engineering 196.) The application of geologic fundamentals to the planning and design of civil engineering projects. Emphasis is on the development of geologic skills to identify, describe, and map earth materials and geologic structures as a means of determining the impact on site development. Topics: weathering and soil-forming processes, soil and rock mechanics, site investigation techniques, surface and groundwater regimes, stream and coastal processes, quaternary tectonics, deposits and geomorphology, environmental concerns, and geologic and geotechnical hazards. Field/lab exercises and case history studies emphasize the impact of site geology on the safe planning, design, and construction of civil engineering projects such as foundations, transportation facilities, excavations, tunnels and underground storage space, water supply facilities, and marine works. Prerequisite: 111 or consent of instructor.

3 units, Holzer alternate years, given 2000-01

Geosphere—(Same as Earth Systems 110.) Geological processes, from local to global, affect people and civilization. The reverse is also true; civilization is beginning to influence the geosphere. The processes experienced at the earth's surface (catastrophic earthquakes, volcanic eruptions, and longer term atmospheric and climate changes) are linked to what goes on in the earth's deep interior. How geochemical, geophysical, and biological processes interact over time scales ranging from 4.5 billion years to the nearly instantaneous. Topics: the origin and evolution of the atmosphere and oceans, heat flow and global tectonics and how they have changed over time, geochemical cycles, climate change, catastrophic impacts, and the roles played by organisms. Prerequisite: 1 or 2.

3 units, Aut (Stebbins, McWilliams)

Environmental Earth Sciences I—First of three-part sequence on the relationship of environmental earth sciences to land use planning. Project throughout sequence involves preparation of a land-use plan for a selected Bay Area location. Topics: introduction to city and regional planning, legal basis for land use planning and regulation, determinants of land use, land capability systems, geologic hazards, hydrology, use of topographic and geologic maps. Students individually or in groups prepare a reconnaissance report on a selected topic for the project area and present results to class. Field trips to project area and San Mateo county coast. (WIM) GER:2b (DR:6)

5 units, Aut (Loague, Mader)

Environmental Earth Sciences II—Topics: earthquake, landslide, and volcanic hazards, and approaches to mitigation; weather and climate; environmental optimization; environmental transport; environmental impact analysis. Groups prepare and present computer generated land capability maps for the project area. Field trips to observe examples of land use projects adapted to environmental constraints.

5 units, Win (Loague, Mader)

Environmental Earth Sciences III—Topics: procedures for the preparation of general plans, urban design, new town concepts, and site planning. Groups prepare and present a general plan diagram and text along with a proposed implementation program for the project area. Formal presentation to guest critics/city planners from project area. Field trips to examples of good design on the San Francisco Peninsula.

5 units, Spr (Mader)

Introduction to Assessment of Environmental Risk—Interdisciplinary approach to evaluate environmental and natural hazard risks; combines economics with earth-science information. The earth sciences, applied statistics, geographic information systems (GIS) and microeconomics are integrated in a decision framework (cost-benefit analysis) to address site-specific issues such as locating a waste-disposal facility and regional issues such as reducing earthquake-related damage. Techniques developed are applied in an in-class bargaining exercise to evaluate a current land-use issue. Prerequisite: 160 or equivalent, or consent of instructor.

3 units, Win (Bernkopf)
140. Geomorphology—Focus is on the materials and surface/near-surface processes of fluvial landscapes. Topics: hillslope hydrology, weathering of rocks and soils, erosion, sediment transport, flow failures, mass wasting, and conceptual models of landscape evolution. Prerequisite: 1. Recommended: 151. (WIM)

3 units (Logue) alternate years, given 2000-01

147. The Road to Buenos Aires: Controlling Climate Change in the 21st Century—(Enroll in Human Biology 147.)

3 units (Schneider, Rosencranz) given 2000-01

151. Sedimentary Geology and Petrography: Depositional Systems—Topics: weathering, erosion and transportation, deposition, the origins of sedimentary structures and textures, sediment composition, diagenesis, sedimentary facies, tectonics and sedimentation, and the characteristics of the major siliciclastic and carbonate depositional environments. Lab: methods of analysis of sediments in hand specimen and thin section. Field trips required. Prerequisites: 1, 2. (WIM)

4 units, Spr (Lowe, Graham)

152. Stratigraphy and Applied Paleontology—The rudiments of interpreting sedimentary sequences. Emphasis is on integration of paleontologic and sedimentologic evidence to reconstruct depositional environments, basin history, and paleogeographic and paleoceanographic settings. The nature of the fossil record, the use of fossils for dating, correlation, and paleoenvironmental and paleoceanographic reconstructions. Characteristic variations of modern and ancient biotas and lithofacies. Biostratigraphy, magnetostratigraphy, and radiometric dating and correlation. Term paper. Lectures supplemented by classic and current scientific literature. Weekly lab; two required field trips. Prerequisites: 1, 2. (WIM)

4 units, Spr (Ingle)

155A. Biogeochemistry of the Southern Ocean—Intensive introduction to the science of southern ocean biogeochemistry and ecology. The principles underlying the research cruise, e.g., Research on Ocean-Atmosphere Variability and Ecosystem Response in the Ross Sea (ROAVERRS).

3 units, Aut (Dunbar)

155B. Directed Research in Biogeochemistry of the Southern Ocean—Undergraduate research experience in Antarctica.

9 units, Aut (Dunbar)

160. Introduction to Statistical Methods for Earth and Environmental Sciences—(Same as Petroleum Engineering 160.) Data summaries, graphical display of data, measures of association, time series and trends, sampling, quantification of uncertainty, statistical models, statistical testing, and prediction. Analysis of spatial information, introduction to geostatistical methods for estimating spatial phenomena. Examples of prediction and uncertainty quantification in geology and environmental monitoring. Issues of statistical computing and software.

4 units, Spr (Caers)

162. Cosmochemistry—Ashes to ashes, dust to dust: building a solar system from the ashes of stellar winds and the remains of exploded stars. Topics: basic nuclear astrophysics, stellar evolution; dust in the cosmos; formation of solar systems; preservation of presolar grains in meteorites.

3 units (Ireland) alternate years, not given 2000-01

163. Introduction to Isotope Geology—Introduces the use of stable and radiogenic isotopes in earth and planetary sciences; intended as a foundation for 164 and/or 165. Basic cosmochemistry and nucleosynthesis; the origin, abundance, and distribution of the elements in the solar system; factors that control elemental abundance and distribution; isotope systematics; nuclear and chemical processes affecting isotope distribution. Mass spectrometry and introduction to isotopic measurements including ion counting, thermal ionization mass spectrometry (TIMS), secondary ion mass spectrometry (SIMS), noble gas mass spectrometry, accelerator mass spectrometry (AMS), and inductively coupled plasma mass spectrometry (ICP-MS). Prerequisites: undergraduate-level physics, chemistry, and differential calculus.

3 units, Aut (McWilliams, Ireland, Dunbar)

164. Stable Isotopes—Light stable isotopes and their application to geological and geophysical problems. Topics: isotopic systematics of hydrogen, carbon, nitrogen, oxygen, and sulfur; chemical and biogenic fractionation of light isotopes in the atmosphere, hydrosphere, and in minerals. Isotopic composition of water in the oceans. Paleothermometry and paleoclimatology. Isotope fractionation in igneous, sedimentary, and metamorphic rocks, and in ore-forming fluids. Prerequisite: 163 or consent of the instructor.

3 units, Win (Dunbar)

165. Geochronology—The principles of geochronology and thermochronology and their application to geological and geophysical problems. Topics: nuclear structure, isotope systematics, decay schemes for the principal nuclides used in earth sciences, equilibrium and disequilibrium, diffusion and transport phenomena, blocking (closure) of isotopic and magnetic systems, creation and annealing of fission tracks, neutron activation, a review of geologic timescales, chronostratigraphy, magnetostratigraphy, and cosmogenic exposure ages. Alpha counting, mass spectrometry by gas source, solid source, ion probe and accelerator methods. Fundamentals of K-Ar, Ar-Ar, Rb-Sr, U-Pb fission track and cosmogenic isotope methods. Recommended: undergraduate training in calculus, chemistry, geology, and physics.

3 units, Spr (McWilliams, Ireland)

170. Environmental Geochemistry—Introduction to the solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and their chemical interactions, emphasizing the contrast between natural sources of hazardous elements and compounds and the types and sources of anthropogenic contaminants and pollutants. Identification of chemical and physical processes that result in weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. Emphasis is on processes that control the release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The scientific basis for evaluation of the impact of contaminants and the design of remediation strategies. Case studies: mercury on the San Francisco Peninsula, heavy metals in the Sierra Nevada and Central Valley of California, and high-level radioactive waste disposal sites in the U.S. Prerequisite: 90 or consent of instructor.

4 units, Win (Brown)

171. Geochemical Thermodynamics—Introduction to the application of chemical principles and concepts to geologic systems. The chemical behavior of fluids, minerals, and gases using simple equilibrium approaches to modeling the geochemical consequences of diagenetic, hydrothermal, metamorphic, and igneous processes. Topics: reversible thermodynamics, solution chemistry, mineral-solution equilibria, reaction kinetics, and the distribution and transport of elements by geologic processes. Prerequisite: 80.

3 units, Aut (Bird)

175. Science of Soils—The physical, chemical, and biological processes that occur within soil systems. The factors governing nutrient availability, plant growth/production, land-resource management, and pollution within soils.

3 units, Aut (Fendorf)

181. Igneous and Metamorphic Processes—The origin of igneous and metamorphic rocks, emphasizing magmatic differentiation and subduction recrystallization processes and their imposed physiochemical and tectonic conditions. The physical properties of magmas, role of volatile components, applications of trace elements and isotopes to igneous processes, geodynamics, and evolution of the crust-mantle system mod-
eling of crystal fractionation and partial melting, relevant experimental data and phase diagrams, and relations of magma types to tectonic settings. Mineral paragenesis, phase relations, metamorphic reactions, fluid/rock interactions, P-T-time paths and their imposed tectonic settings. Lab hand-specimen and petrographic examinations of suites of igneous and metamorphic rocks. Graduate students may take without lab for 3 units. Prerequisites: 80, 90, or equivalents. 
3 or 5 units, Spr (Liou) alternate years, not given 2000-01

185. Volcanology—For juniors, seniors, and beginning graduate students in all the earth sciences. Eruptive mechanisms, models of emplacement of pyroclastic flows and characteristics of resulting deposits, volcanic landforms and their relation to the composition and physical properties of magmas, calderas, volcanic gases, eruptive histories of volcanic centers, effects of volcanic eruptions on climate and the atmosphere, volcanic hazards and their mitigation, volcanic-hosted geothermal energy and mineral resources. One four-day field trip over Memorial Day weekend required. Prerequisite: 1 or equivalent. (WIM) 
4 units (Mahood) alternate years, given 2000-01

185L. Volcanology Laboratory—Hand sample and petrographic microscope examination of volcanic rocks. Labs key to 185 lectures taken concurrently. Prerequisite: some experience with a petrographic microscope.
1 unit (Mahood) alternate years, given 2000-01

187. Introduction to Ore Deposits—The geology of hydrothermal systems, their products and processes, including: chemical, fluid inclusion, and isotopic characterization of fractures/veins and altered rocks, mineralogical, structural; distribution, geologic settings, and temporal evolution; and general models and interpretation of metasomatic processes. Focus is on understanding active hydrothermal systems in continental and oceanic settings and applications to ancient analogues: hot springs and mercury deposits, geothermal reservoirs and gold-silver deposits, volcanic fumaroles and magmatic-hydrothermal systems, mid-ocean-ridge hot springs and submarine massive sulfide deposits, and sedimentary basin brines and stratabound sulfide deposits. Lab: methods of study and description of veins and altered rocks; introduction to fluid inclusion microthermometry. Field trips required. Prerequisites: 80, 90.
4 units (Einaudi) alternate years, given 2000-01

190. WIM Project—Students in a GES WIM (51Q, 110, 112, 130, 151, 152 or 185), enroll in 190 using the section # of the appropriate faculty member.
1 unit (Staff)

192. Special Projects in Geological and Environmental Sciences— Supervised reading, field, and/or lab research with written reports.
1-10 units, any quarter (Staff)

195. Integrating Remote Sensing and Geographic Information Systems (GIS)—Entry-level survey of remote sensing and GIS; weekly computer-based lab session involving both subjects, stressing the interrelationships of the information from remotely sensed environmental data with the techniques and methodology of GIS. Lab enrollment limited to 20. 
3 units, Aut (Lyon)

196. Introduction to GIS: ARC/Info and Arc-View—(Graduate students enroll in 296; same as Geophysics 196.) Hands-on experience with ESRI’s ARC/INFO or Arc-View commercial GIS packages. Topics: setting up geographic databases and manipulating spatial data, including database query and analysis; hands-on computer-based exercises using sample ARC datasets on workstations. Guest lectures on GIS application in environmental, geological and biological sciences, and town planning. Students unable to register for 196 may sign up, with consent of instructor, for a self-paced computer tutorial version in 197, any quarter.
2 units, Win (Klemperer)

197. Research in the Application of Geographic Information Systems (GIS) —1-5 units, Aut, Win, Spr (Klemperer)

198. Special Problems in Geological and Environmental Sciences— Supervised reading, field, and/or lab research with written reports. Undergraduates must take a minimum of 3 units for a letter grade to meet the WIM requirement. (WIM) 
1-10 units, any quarter (Staff)

199. Honors Program—Research on a topic of special interest. See “Undergraduate Honors Program” above.
3 units, Aut, Win, Spr, Sum (Staff)

GRADUATE

202. Reservoir Geomechanics—(Enroll in Geophysics 202.) 
3 units, Win (Zoback)

205. Advanced Oceanography—For upper-division undergraduates and graduate students in the earth, biologic, and environmental sciences. Topical issues in marine science/oceanography. Topics vary each year following or anticipating research trends in oceanographic research. The focus is on links between the circulation and physics of the ocean with climate in the North Pacific region, and marine ecologic responses. Lectures/discussion, with participation by marine scientists from various marine research groups and organizations including the Monterey Bay Aquarium Research Institute.
3 units, Aut (Dunbar) alternate years, not given 2000-01

210. Geologic Evolution of the Western U.S. Cordillera—For undergraduates and graduates. Overview of the geology of the western states. The evolution of the mountain belt from its inception in the Precambrian to its contemporary history of extension and strike-slip faulting, based on the description, analysis, and interpretation of the rock record through time. Characteristic structural styles developed during crustal shortening, extension, and strike-slip tectonic regimes; tectonic controls on sedimentary basin formation; plate margin magmatism and metamorphism; and the relation of plate motions to the land geologic record provide insight into the crustal-scale processes and driving mechanisms common to mountain chains.
2-3 units, Win (Miller) alternate years, not given 2000-01

211. Topics in Regional Geology and Tectonics—Seminar.
2 units, Win (Miller)

215. Advanced Structural Geology and Rock Mechanics—(Same as Geophysics 215.) The observational techniques, analysis methods, and theoretical foundations of structural geology, engineering geology, and rock mechanics. Computer exercises are integrated with field data to understand the role of geologic structures in the evolution of the earth’s crust (folding, faulting, flow, and fracturing of rock) and geologic hazards (earthquakes and volcanoes). Topics: structural quantities and dimensional analysis; use of stress, strain, displacement, and velocity fields in structural analysis; concept and measurement of deformation; mechanical properties of rock (elasticity, viscosity, strength, friction, fracture toughness); case studies of typical geologic structures using continuum mechanics. Computer labs.
5 units, Aut (Pollard)

216. Rock Fracture Mechanics—(Same as Geophysics 216.) Theoretical and experimental principles of continuum and fracture mechanics applied to the origin and physical behavior of faults, dikes, joints, veins, solution surfaces, and other natural structures in rock. Field observations, engineering rock fracture mechanics, and the elastic theory of cracks. The role of natural fractures in brittle rock deformation, fluid flow, and heat transport in the earth’s crust with applications to crustal deformation and tectonophysics, structural geology, petroleum geology and engineering, and hydrogeology. Prerequisite: 215 or equivalent.
5 units, Spr (Pollard) alternate years, not given 2000-01
217. Characterization and Hydraulics of Rock Fractures—Interdisciplinary survey of natural fractures (faults, joints, veins, and solution seams) and their geological, geophysical, geomechanical, stochastic, and hydraulic properties. Case studies of fracture characterization experiments and problems related to fluid flow in aquifers, oil and gas reservoirs, and waste repository sites in fractured rock. Invited lecturers from various disciplines and one weekend field trip. Prerequisite: equivalent of first-year graduate student in Geological and Environmental Sciences, Geophysics, or Petroleum Engineering.

3 units; (Aydin) alternate years, given 2000-01

220. Biogeochemistry—For upper-division undergraduates and graduate students in the earth and biological sciences. The processes by which components of terrestrial ecosystems interact, drawing on areas of geology, soil science, hydrology, chemistry, biology, and ecology.

3 units; (Matson) alternate years, given 2000-01

221. The Origins of Life in the Solar System—Interdisciplinary seminar for upper-division undergraduates and graduate students in the physical and biological sciences. Current topics in exobiology and the origins of life from a planetary sciences perspective. Definitions of life and the origin of information; water, carbon, and energy; phylogenetic and fossil inferences about early life on Earth; the early terrestrial environment, including asteroid and comet impacts; prebiotic organic syntheses and the RNA world; panspermia; the search for life on Mars; Europa, including prospects for an ocean and speculative ecologies; upcoming spacecraft missions and mission planning; planetary protection, back contamination, and legal and ethical issues; and student-suggested topics. Student presentations, group discussion, and lectures.

3 units; (Chyba)

223. Seminar in Environmental Problem Solving—(Same as Earth Systems 223.) For upper-division undergraduates and graduate students in the earth and biological sciences. Using case studies, evaluates and contrasts the approaches that different natural and social science disciplines bring to environmental problem solving.

3 units; (Matson, Naylor) alternate years, not given 2000-01

230. Physical Hydrogeology—(Same as Civil and Environmental Engineering 260A.) Theory of underground water, analysis of field data and pumping tests, geologic groundwater environments, solution of field problems, groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Prerequisite: elementary calculus.

5 units; (Gorelick)


4 units; (Gorelick)

235. Role of Fluids in Geologic Processes—The principles governing groundwater flow and its interaction with crustal stress, heat flow, and chemical mass transport. Topography-driven flow of groundwater on a regional scale; compaction-driven flow in the sedimentary basin; development of anomalous fluid pressure; the role of fluid in tectonism; migration and entrapment of petroleum; density driven flow and thermal anomaly; formation of mineral deposits. Prerequisite: 230.

3 units; (Hsieh) alternate years, given 2000-01

236. Hydraulic and Tracer Tests for Groundwater Resource Evaluation—Theory and application of hydraulic and tracer tests to determine flow and the transport properties of aquifers. Analysis of well tests in single-layer aquifers and multiple aquifer-aquitard systems; water table conditions; anisotropy; double-porosity; effects due to wellbore storage, wellbore skin, aquifer boundaries, and heterogeneities such as faults and fracture zones; natural and forced gradient tracer tests. Prerequisite: 230.

3 units; Spr (Hsieh) alternate years, not given 2000-01


4 units; Aut (Loague) alternate years, not given 2000-01

238. Soil Physics—Advanced level, focusing on the physical and chemical properties of the soil solid phase, with emphasis on the transport, retention, and transformation of water, heat, gases, and solutes in the unsaturated subsurface. Agricultural systems. Field techniques and classic experiments demonstrated and reproduced in the lab. Prerequisite: elementary calculus.

4 units; (Loague) alternate years, given 2000-01


3 units; (Loague) alternate years, not given 2000-01

240. Geostatistics for Spatial Phenomena—(Same as Petroleum Engineering 240.) Probabilistic modeling of spatial and/or time dependent phenomena. Kriging and co-kriging for gridding and spatial interpolation. Integration of heterogeneous sources of information. Stochastic imaging of reservoir/field heterogeneities. Introduction to GSLIB software. Case studies from the oil and mining industry and environmental sciences. Prerequisites: introductory calculus and linear algebra, Statistics 116 or equivalent.

3-4 units; Win (Journel, Gómez)

241. Practice of Geostatistics on Exhaustive Data Bases—(Same as Petroleum Engineering 241.) The study of a real data set; examples have been a large N. Sea clastic reservoir with well and seismic data, a lead contamination site, a large polymetallic porphyry deposit in Chile, topographic data in Nevada. Data includes sparse hard data, extensive soft information. Student teams independently perform site characterizations and share results in class. Reservoir study through maps, variograms, kriging, and stochastic models. Extensive use of GSLIB and 3D visualization software. Flow simulations for recovery forecast and placement of additional wells. Engineering design for site remediation. Prerequisites: 240, Fortran/Unix. Recommended: 246.

3-4 units; Spr (Journel, Caers)

242. Topics in Advanced Geostatistics—(Same as Petroleum Engineering 242.) Conditional expectation theory and projections in Hilbert spaces; parametric vs. non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, annealing approaches to stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, Fortran/Unix.

3 units; (Journel) alternate years, given 2000-01

245. Computer Simulation in Geology—(Students may participate in 345.) Procedures for developing dynamic geologic process simulation models in geology, stressing numerical solutions of differential equa-
246. Reservoir Characterization and Flow Modeling with Outcrop Data—(Same as Petroleum Engineering 246.) Project provides earth science students with an understanding of how to use outcrop observations in quantitative geological modeling and flow simulation, and addresses a specific reservoir management problem by studying a suitable outcrop analogue (weekend field trip), constructing geostatistical reservoir models, and performing flow simulation. An introduction, through an applied example, to the relationship between the different disciplines. A different reservoir management question and outcrop analogue is studied each year.

3 units (Harbaugh) alternate years, given 2000-01

248. Risk Analysis in Petroleum Exploration—Use of formal procedures to make optimum financial decisions in petroleum exploration and exploitation. The estimation of probabilities attached to exploration actions and their utilization in financial forecasts. Extensive use of PC-based problem sets that include a computerized exploration exercise with competing teams. Concepts are applicable to resource exploration and development in general.

3 units (Harbaugh) alternate years, given 2000-01

249. Application of Biological Markers to Understanding Petroleum Systems—Biological markers (molecular fossils) are introduced and described from fundamentals to their application to understanding and mapping petroleum systems. Biomarkers in rocks and petroleum provide information on the paleoenvironment, geologic age and stratigraphy, thermal maturity, migration, diagenesis, and biodegradation. Biomarker “fingerprints” are useful to monitor and determine the environmental fate of petroleum. Current research topics and a detailed introduction to the petroleum systems used for basin analysis by modern exploration geologists. Global applications of regional studies.

2-4 units, Win (Moldowan)

250. Sedimentation Mechanics—The mechanics of sediment transport and deposition and the origins of sedimentary structures and textures as applied to interpreting ancient rock sequences. Dimensional analysis, fluid flow, drag, boundary layers, open channel flow, particle settling, erosion, sediment transport, sediment gravity flows, soft sediment deformation, and fluid escape. Field trip required.

3 units (Lowe) alternate years, not given 2000-01

251. Sedimentary Basins—Analysis of the depositional framework and tectonic evolution of sedimentary basins. Topics: tectonic and environmental controls on facies relations, synthesis of basin development through time in terms of depositional systems and tectonic settings. Weekend field trip required. Prerequisites: 110, 151.

3 units (Graham) alternate years, given 2000-01

252. Sedimentary Petrology—Examination/interpretation of siliciclastic sediments and sedimentary rocks. Lectures/readings stress research in modern sedimentary mineralogy and petrology and the relationship between the composition and texture of sediments and their provenance, tectonic settings, and diagenetic histories. Class is topical and varies yearly. Prerequisite: 151 or equivalent.

4 units (Lowe) alternate years, given 2000-01


3 units (Graham) alternate years, given 2000-01

254. Paleoceanography—Paleochemistry and paleocirculation of the oceans as deduced from the study of marine sediments.

3 units (Dunbar) alternate years, not given 2000-01

255. Introduction to Micropaleontology—Microscopic marine fossils including diatoms, ostracods, and radiolarians, with emphasis on foraminifera. Principles of classification, evolutionary trends, common genera, ecology, and environmental distribution of foraminifera. Application of planktonic and benthic foraminifera to interpretation of paleoenvironments, paleoceanographic and paleoclimatic analysis, and correlation of marine sequences. Paleoenviornmental and age analysis of an unknown microfossil sample serves as a term research project.

5 units, Aut (Ingle) alternate years, not given 2000-01

256. Advanced Micropaleontology—The use of marine microfossils (mainly benthic and planktonic foraminifera) to solve fundamental geologic and oceanographic problems. Applications to geochronology, correlation, paleoecology, and paleoceanography. Individual analysis of a series of unknown samples provides intensive experience in applying basic concepts of biostratigraphy and paleoenvironmental analysis to interpretation of Paleozoic, Mesozoic, and Cenozoic microfossil assemblages. Lectures on classic and current examples of research in this field. Prerequisite: 255.

3 units, Win (Ingle) alternate years, not given 2000-01

257. Climate Variability and Forcing Mechanisms of the last 2000 Years: Implications for Life in the 21st Century—Open to graduate students and seniors in the earth sciences, earth systems, ecology, and anthropology. Overview of large-scale features of the climate systems that control interannual variability in temperature and rainfall. Recent studies in climate reconstruction and the influence of climate change on man. Lectures/readings and discussions.

3 units, Win (Dunbar) alternate years, not given 2000-01

258. Introduction to Depositional Systems—The characteristics of the major sedimentary environments and their deposits in the geologic record, including alluvial fans, braided and meandering rivers, aeolian systems, deltas, open coasts, barred coasts, marine shelves, and deep-water systems. Emphasis is on subdivisions, morphology, the dynamics of modern systems, and the architectural organization and sedimentary structures, textures, and biological components of ancient deposits.

3 units (Lowe) given 2000-01

261. Physics and Chemistry of Minerals and Mineral Surfaces—The concepts of symmetry and periodicity in crystals; the physical properties of crystals and their relationship to atomic-level structure; basic structure types; crystal chemistry and bonding in solids and their relative stability; the interaction of x-rays with solids and liquids (scattering and spectroscopy); structural variations in silicate glasses and liquids; UV-visible spectroscopy and the color of minerals; review of the mineralogy, crystal chemistry, and structures of selected rock-forming silicates and oxides; mineral surface and interface geochemistry.

4 units, Spr (Brown) alternate years, not given 2000-01

262. Thermodynamics and Disorder in Minerals and Melts—The thermodynamic properties of crystalline, glassy, and molten silicates and oxides in light of microscopic information about short range structure and ordering. Measurements of bulk properties, e.g., enthalpy, density, and their pressure and temperature derivatives, and structural determination by spectroscopies such as Nuclear Magnetic Resonance and Mössbauer. Basic formulations for configurational entropy, heats of mixing in solid solutions, activities, and the energetics of exsolution, phase transitions, and nucleation. Quantitative models of silicate melt thermodynamics are related to atomic-scale views of structure. A general view of geothermometry and geobarometry. Prerequisites: introductory mineralogy and thermodynamics.

3 units (Siebbins) alternate years, given 2000-01
264. Low Temperature Aqueous Geochemistry—(Same as Civil and Environmental Engineering 273.) Chemical principles and application of those principles to the analysis and solution of problems in aqueous geochemistry (temperatures near 25°C and atmospheric pressure). Emphasis is on the analysis of natural water systems and the understanding and solution of specific chemical problems in water purification technology and water pollution control. Prerequisites: Chemistry 31 and 33, or equivalents.

3 units, Aut (Leckie)

265. Soil Chemical Dynamics—Chemical and biologically mediated chemical processes within soils and surface waters; emphasis is on oxidation-reduction reactions and processes at the solid-water interface. Electron transfer processes, dissimilatory metal reduction. Ion exchange, electrified interfaces, specific adsorption, and dissolution/precipitation.

3 units, Win (Fendorf)

266. Soil Chemistry—Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. The three primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. The special considerations required for acid, saline, and wetland soils.

3 units, Win (Fendorf)


3 units (Bird) alternate years, given 2000-01


4 units (Einaudi) alternate years, given 2000-01

270. Petrologic Phase Equilibria—The principles of phase equilibrium determined by lab experimentation and thermochemical calculation, as applied to igneous and metamorphic petrology. Focus is on the underlying principles of classical thermodynamics which govern mineral equilibria. Introduction to phase relations, element partitioning, chemical kinetics, and order-disorder phenomena in geologic systems.

4 units, Spr (Ernst) alternate years, not given 2000-01

275. Electron Microanalytical Techniques—The practical and theoretical aspects of x-ray generation and detection and the behavior of electron beams and x-rays in solids. The basic principles needed to quantitatively analyze chemically complex geological materials. Operation of the JEOL 733 electron microprobe and associated computer software for quantitatively analyzing materials. X-ray chemical mapping. Enrollment limited to eight.

3 units, Win (Jones)

285. Isotopes and Trace Elements in Petrogenesis and Crustal Evolution—Radiogenic isotopes (Rb-Sr, Sm-Nd, Re-Os, U-Pb, and U-series disequilibrium systems) and stable isotopes applied to igneous processes; continental growth curves; evidence for the nature of basalt sources and implications for mantle convection; interaction of magmas with mantle and crust; residence times of magmas and magma chamber processes; granites as imperfect mirrors of their source regions; trace-element modeling of igneous processes; trace-element discriminant diagrams in tectonic analysis; sedimentary recycling; sources of ore forming metals. Emphasizes interests of students. Prerequisites: 151, 165, 181, or their equivalents.

3 units (Mahood) alternate years, given 2000-01

289. Ion Microprobe Mass Spectrometry—Basics of mass spectrometry, sputtering and ionization theory, instruments, microanalytical techniques; applications in geochemistry, cosmochemistry, and geochronology including trace elements, stable isotopes, and radiogenic systems. Practical application on the SHRIMP RG.

3 units (Irland) alternate years, given 2000-01

290. Numerical Analysis of Geological Time Series—Seminar for graduate students interested in a variety of statistical tools appropriate for analysis of time series topics. Fourier transform techniques, singular spectrum analysis, evolutionary spectral analysis, and filtering. Some knowledge of UNIX required.

3 units (Dunbar) alternate years, given 2000-01

292. Field Mapping of Mineral Deposits—Seven-day field trip to the Yerington district, Nevada, emphasizing detailed mapping of hydrothermal alteration features in porphyry copper and skarn deposits. Students prepare maps and produce a report. Prerequisite: 187.

3 units, Spr (Einaudi)

295. Integrating Remote Sensing and Geographic Information Systems (GIS)—For graduate students; see 195.

296. Introduction to GIS: ARC/Info and ARC-View—(Same as Geophysics 296.) For graduate students; see 196.

297. Research in the Application of Geographic Information Systems (GIS)—For graduate students; see 197.

310. Advanced Field Mapping—10-14 days mapping in a structurally complex region. Emphasis is on collecting detailed structural, stratigraphic, and sedimentologic data to solve a topical problem in either regional and/or local geology. Prerequisite: consent of instructor.

3 units, any quarter (Miller)

314A,B,C. Research Seminar: Structural Geology and Geomechanics—Selected topics. May be repeated for credit.

1 unit, Aut, Win, Spr (Pollard, Aydin)

322A,B,C. Seminar in Biogeochemistry—Presentations and discussion of current topics in biogeochemistry. May be repeated for credit.

1-2 units, Aut, Win, Spr (Matson)


1-2 units, Aut, Win, Spr (Loague)

330A,B,C. Advanced Topics in Hydrogeology—Critical discussion of modern topics in groundwater hydrology. Topics: questioning classic explanations of physical processes; consideration of coupled physical, chemical, and biological processes affecting heat and solute transport.

1-2 units, Aut, Win, Spr (Gorelick)

332. Seminar in Hydrogeology

1 unit, Aut (Gorelick)

333. CESIR Seminar—The Center for Earth Science Information Research seminars are a multi-disciplinary lecture series. Emphasis is on the utilization of science for policy analysis and decision making. Speakers are from the physical and social sciences.

1-2 units, Spr (Bernknopf)
342A,B,C. Seminar: Geostatistics—Discussion of classic results and current research in geostatistics. Topics selected on basis of interest and timeliness. May be repeated for credit.

1-2 units, Aut, Win, Spr (Journel)

350. Seminar in Sedimentary Geology
1-3 units, Win, Spr (Staff)

360. Topics in Low Temperature Surface and Aqueous Geochemistry—Guided independent study, analysis, and critical oral and written reports on selected topics in environmental, surface, and/or aqueous geochemistry under earth-surface conditions. Prerequisites: 80 and 264; consent of instructor.

2-4 units, one quarter annually (Brown, Parks)

362. Seminar on Silicate Glasses and Liquids
2-3 units, Spr (Stebbins)

373. Seminar in Metamorphic Petrology—Selected topics in metamorphic and tectonic processes, research problems, and methods of study of metamorphic rocks and their tectonometamorphic evolutions. Prerequisite: consent of instructor.

1-2 units, Spr (Liou, Ernst)

375. Seminar and Field Trip: Ore Genesis—Research aimed at understanding the features and processes related to a particular class of mineral deposits. Topics are selected on basis of participant interest and timeliness. Field trip (1-2 wks.) and guidebook preparation. Papers and oral presentations. Pre-or corequisite: 268.

2 units, Win (Einaudi)

385. Practical Experience in the Geosciences—On-the-job training in the geosciences. May include summer internships; emphasizes training in applied aspects of the geosciences, and technical, organizational, and communication dimensions. Meets INS requirements for F-1 Curricular practical training.

1 unit, any quarter (Staff)

Problems in Various Fields of Geological and Environmental Sciences

313. Problems in Structural Geology and Geomechanics

319. Problems in Structural Geology

339. Problems in Hydrogeology

349. Problems in Geomathematics

357. Problems in Sedimentary Geology

358. Problems in Oceanography and Paleoclimatology

363. Problems in Organic Geochemistry

369. Problems in Geochemistry

377. Problems in Ore Deposits and Exploration

379. Problems in Metamorphic Petrology

386. Problems in Volcanology and Igneous Petrology

389. Problems in Geochronology and Isotope Geology

Research in Various Fields of Geological and Environmental Sciences

413. Research in Structural Geology and Geomechanics

419. Research in Structural Geology

422. Research in Biogeochemistry

438. Research Methods in Hydrology

439. Research in Hydrogeology

440. Research in Geostatistics for Natural Resources Management

449. Research in Geomathematics

452. Research in Basin Analysis Petroleum Geology

457. Research in Sedimentary Geology

458. Research in Oceanography and Paleoclimatology

460. Research in Low Temperature Surface and Aqueous Geochemistry

463. Research in Organic Geochemistry

465. Research in Soil Chemistry

469. Research in Geochemistry

477. Research in Ore Deposits and Exploration

479. Research in Metamorphic Petrology

480. Research in Remote Sensing

486. Research in Volcanology and Igneous Petrology

489. Research in Geochronology and Isotope Geology

GEOPHYSICS

Emeritus: George A. Thompson (on active duty)

Chair: Amos M. Nur

Professors: Jon F. Claerbout, Steven Gorelick, Jerry M. Harris, Robert L. Kovach, Marcia McNutt††, Amos M. Nur, Joan Roughgarden*, Paul Segall, Norman H. Sleep, Mark D. Zoback

Associate Professors: Gregory C. Beroza, Simon L. Klemperer, Howard Zeckert**

Assistant Professor: Kevin Arrigo

Professors (Research): Antony Fraser-Smith**, Gerald M. Mavko

Lecturer: Tapan Mukerji

Consulting Professors: James Berryman, William Ellsworth, Rosemary Knight, Walter Mooney, Hagai Ron, David Scholl, Paul Spudich

Consulting Associate Professors: Biondo Biondi, Stewart Levin, David Lumley, Daniel Moos, Zhijing Wang

Visiting Professor: William Symes

Visiting Associate Professor: Goetz Bokelmann

Senior Research Associate: Jack Dvorkin

Research Associates: Mark H. Murray, Manika Prasad

* Joint appointment with Biological Sciences
† Joint appointment with Geological and Environmental Sciences
** Joint appointment with Electrical Engineering
†† Joint appointment with Monterey Bay Aquarium Research Institute

Geophysics is the branch of earth science concerned with exploring and analyzing active processes of the earth through physical measurement. The undergraduate and graduate programs are designed to provide (1) a background of fundamentals in science, and (2) courses in geophysics to coordinate these fundamentals with the principles of geophysics. The program leading to the Bachelor of Science (B.S.) in Geophysics permits many electives and a high degree of flexibility for each individual student. Graduate programs provide specialized training for professional work in exploration, research, and education and lead to the degrees of Master of Science and Doctor of Philosophy.

The Department of Geophysics is housed in the Ruth Wattis Mitchell Earth Sciences Building. It has numerous research facilities, among which are a state-of-the-art broadband seismic recording station, a rock-magnetism laboratory, a geochronology laboratory, many computers, high pressure-and-temperature rock properties and deformation laboratories, various instruments for field measurements including 200 seismic recorders, nine dual frequency GPS receivers, and field equipment for measuring in-situ stress at great depth. Current research activities include behavior of the geomagnetic field, earthquake mechanics, isotopic age dating, paleomagnetic investigations, reflection, refraction and tomographic seismology, rock physics, seismic studies of the continental lithosphere, and studies of crustal deformation (strain) and crustal force (stress).

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

Objectives—To provide a solid background in the essentials of math, physics, and geology, while at the same time providing knowledge about the entire spectrum of geophysics ranging from exploration geophysics to earthquake seismology and plate tectonics. Students are prepared for
either an immediate professional career in the resources and environmental sciences industries or future graduate study.

The following courses are required for the B.S. degree in Geophysics, in addition to the University requirements in general studies. A written report on original research or an honor’s thesis is also required. Normally, this is undertaken as part of the student’s participation in three quarters of Research Seminar (the Geophysics 185 series) during the senior year. Seniors in Geophysics who expect to do graduate work are urged to take the Graduate Record Examination as early as is convenient in their final undergraduate year.

CURRICULUM
Course No: and Subject
Chem. 31. Chemical Principles
Chem. 135. Physical Chemical Principles
or Physics 170, 171, Thermodynamics
Elect. Engr. 141. Electromagnetic Fundamentals
or Physics 120. Electricity and Magnetism
Geol. & Envir. Sci. 1. Planet Earth
Geol. & Envir. Sci. 80. Earth Materials
Geol. & Envir. Sci. 102. Introduction to Field Geology
Geol. & Envir. Sci. 110*, 111. Structural Geology
Geophys. 185 series. Research Seminar
Math. through 44 or through 53. Analytical Geometry and Calculus
Math. 130. Ordinary Differential Equations
Physics 41, 43, 45, 46, and 47. Elementary Physics
Physics 110, 111. Mechanics

* Indicates that the course meets the Writing in the Major (WIM) requirements.

The curriculum includes 9 units of Geophysics electives. Particularly recommended to fill the 9-unit requirement are 150, 174, 190. Other suggested Geophysics electives are 102, 180, 182, 183, 190, 195, 200, 262, 285.

Recommended elective courses that do not fill the 9-unit requirement are Comp. Sci. 105 or 106; Geol. and Envir. Sci. 190A and B, and 181; Physics 46, 48, 120, 121, 212, 210, 211, or Elect. Engr. 142; Math. 103, 106, 113, 114, 131, 132; and Chem. Engr. 140, 150.

MINORS
The objective of the Geophysics minor is to provide students with a general knowledge of geophysics in addition to a background in the related fields of physics, mathematics, and geology.

Curriculum—
1. Geophysics 110. Geosphere
2. Geophysics 150. General Geophysics and Physics of the Earth
   or Geophysics 174. Seismology
   or Geophysics 182. Reflection Seismology
4. Math. 44. Vector Calculus
5. Math. 130. Ordinary Differential Equations
6. Physics 41. Mechanics
7. One approved 100-level (or higher) course on either electricity and magnetism, wave propagation, continuum mechanics, or the physics of materials.

HONORS PROGRAM
The department offers a program leading to the B.S. degree in Geophysics with Honors. The guidelines are:
1. Select a research project, either theoretical, field, or experimental, that has the approval of an adviser.
2. Submit a proposal to the department, which will decide on its suitability as an honors project. Necessary forms are in the department office.
3. Course credit for the project is assigned by the adviser within the framework of Geophysics 205.
4. The decision as to whether a given independent study project does or does not merit an award of honors shall be made jointly by the department and the student’s adviser. This decision shall be based on the quality of both the honors work and the student’s other work in earth sciences.
5. The work done on the honors program should not be used as a substitute for regularly required courses.

GRADUATE PROGRAMS
University requirements for the M.S. and Ph.D. are described in the “Graduate Degrees” section of this bulletin.

MASTER OF SCIENCE

Objectives—To enhance the student’s training for professional work in geophysics through the completion of fundamental courses, both in the major fields and in related sciences, and to begin independent work and specialization.

Requirements for the Degree—The candidate must:
1. Be registered as a graduate student for at least three quarters at full tuition.
2. Complete 45 units with a grade point average (GPA) of at least ‘B.’ Geophysics 110, 111, 112, 120, 150, 190, and Engineering 102W are required. If appropriate, requirements may be waived and additional electives substituted with consent of the candidate’s faculty adviser and of the Geophysics Graduate Coordinator. Recommended electives are Geophysics 160, 170, 174, 180; Mechanical Engineering 200A; and Electrical Engineering 261. At least 6, but not more than 18, of these units must be independent work on a research problem, resulting in a written report accepted by the candidate’s faculty adviser. Normally, this research is undertaken as part of the candidate’s participation in multiple quarters of Research Seminar (the Geophysics 385 series).
3. Make up deficiencies in previous training. Not more than 10 units of such work may be counted as part of the minimum total of 45 units.
4. Submit a Program Proposal for the Master’s Degree in the first quarter of enrollment.
5. Each student must present and defend the results of his or her research at a public oral presentation attended by at least two faculty members. Students who do not meet the standard course requirements (see the undergraduate curriculum), but who have unusual competence in other areas such as earth systems or science or space physics, may petition the Geophysics faculty to arrange individual programs.

M.S. IN EXPLORATION AND DEVELOPMENT

Objectives—To provide the theoretical and practical background needed for a career in petroleum exploration and development geophysics. The program takes a minimum of four quarters (beginning and ending in the Autumn Quarter), but more typically six quarters. A summer internship working in industry or a research or experimental laboratory is an integral part of the program. A written report based on the summer internship is publicly presented and defended. Some MS students also accomplish independent research during their degree program through their participation in one or multiple quarters of Research Seminar (the Geophysics 385 series).

Prerequisites—B.S. degree in engineering, geology, geophysics, mathematics, or physics; a sequence of courses in mathematics at least through ordinary differential equations; and at least one course in introductory geology. The following additional undergraduate courses are recommended: computer science, complex variables, linear algebra, petrography, and structural geology.

Requirements for the Degree—Geophysics 111, 112, 120, 150, 174, 182, 183, 190, 210, 262, 380A, 380B; Geological and Environmental Sciences 110 or 111, 240, 247 or 248, 251, 253; Petroleum Engineering 120, 130; Electrical Engineering 104 or 261; and elective courses in earth sciences, mathematics, physics, and engineering. If appropriate, requirements may be waived and additional electives substituted with consent of the candidate’s faculty adviser and of the Geophysics faculty Graduate Coordinator. Recommended electives include Geophysics 160, 170, 180, 202, 230, 285, 397; Geological and Environmental Sciences 151, 249; and Mechanical Engineering 200A. At least 45 units with a grade point average (GPA) of at least ‘B’ are required for the completion of this degree.
DOCTOR OF PHILOSOPHY

Objectives—The Ph.D. degree is conferred upon evidence of high attainment in Geophysics and ability to conduct an independent investigation and present the results of such research.

Requirements for the Degree—A minimum of three years and the completion of 108 units of graduate study at Stanford must be satisfactorily completed. During their first two years, candidates must complete a core sequence of classes: Geophysics 111, 112, 120, 150, 160; Mechanical Engineering 200A, 238A; Electrical Engineering 261 or Mechanical Engineering 308; and one data analysis course such as Geophysics 180 or 211, Petroleum Engineering 284, Civil and Environmental Engineering 267, Geological and Environmental Sciences 160 or 240, Statistics 110, or equivalent. Candidates must also participate in Research Seminars (the Geophysics 385 series) from their first quarter.

During the course of their studies, Ph.D. candidates are additionally required to complete Geophysics 170, 190; Engineering 102W; Physics 210 or Mathematics 220A or Mechanical Engineering 200B. Students are also encouraged to complete Physics 211 or Mathematics 220B or Mechanical Engineering 200C. Candidates are required to complete lectures outside the core sequence from at least two different Geophysics faculty members; and at least two non-Geophysics lecture classes in Earth Sciences (that is, the Department of Geological and Environmental Sciences and/or the Department of Petroleum Engineering). A minimum equivalent knowledge at the level of Geological and Environmental Sciences 1 is required. Highly recommended non-Geophysics Earth Science courses are Geological and Environmental Sciences 111, 120, 140, 231, and 251; and Petroleum Engineering 120, 130, 221, 224, and 240. Additional advanced courses should be selected from other science and engineering departments. A typical sequence for entering graduate students in their first year is: Autumn—Geophysics 111, 112, 120, 150 and Mechanical Engineering 200A or 238A; Winter—Geophysics 160, 385 and one elective; Spring—Geophysics 180, 385 and Electrical Engineering 261 or other elective. All students prepare a proposed study list for each year by the end of the first quarter of that year.

If appropriate, any class requirement may be waived, or electives substituted, with written consent of both the candidate’s faculty adviser and the Geophysics Graduate Coordinator.

The candidate’s record must indicate outstanding scholarship, and deficiencies in previous training must be improved. Experience as a teaching assistant (quarter-time for at least two academic quarters) is required for the Ph.D. degree. The student must pass the departmental oral examination by presenting and defending a written research paper or proposal by the end of the second year; prepare under faculty supervision a dissertation that is a contribution to knowledge and the result of independent work expressed in satisfactory form; and pass the University oral examination. The candidate for the Ph.D. degree must submit the final form of the dissertation within five calendar years from the date of admission to candidacy. The Geophysics faculty monitors student progress by carrying out an annual performance appraisal (at a closed faculty meeting) of all students who have not yet passed their departmental oral examination. Following successful completion of the departmental oral examination, candidates are required to organize an annual meeting of their research committee to review their progress towards the Ph.D. degree.

COURSES

4. Natural Hazards and Human Survival—For non-majors and potential earth scientists. Introduction to understanding natural and other hazards, earthquakes, volcanic eruptions, tsunamis, toxic waste disposal, nuclear power plant siting, their risk assessment, possible mitigation, and protective measures. GER: 2a (DR: 5)

5Q. Stanford Introductory Dialogue: Earthquakes of the Americas—Preference to sophomores. Earthquakes have had an impact on the development of cultures and societies. The early empires of the Maya and the Aztecs undoubtedly experienced earthquakes and volcanic eruptions and we rely on archaeological remains and glyphs from codices to ascertain past occurrences. Evidence from several Mexican and Central American archaeological sites uncovers the societal consequences and possible role of these natural events in the abandonment, migration, and settlement of cultural centers.

3 units, Aut (Kovach)

30Q. Stanford Introductory Dialogue: Earthquake Prediction—Preference to sophomores. Recently, some scientists who believe that earthquake prediction is fundamentally impossible, have stated that the effort should be abandoned. Is this view justified? The history of efforts at earthquake prediction by scientists and others, the state of earthquake science as it relates to the prediction problem, and the prospects for progress in the future.

2 units, Spr (Beroza)


3 units, Spr (Zebker)

50Q. Stanford Introductory Dialogue: Earthquakes and Archaeology in the Eastern Mediterranean—Lectures and Field Trip—Preference to sophomores. Why are there so many archaeological ruins in the eastern Mediterranean? Assumed by many to be the result of time and wars, many of these ruins are due to historic and prehistoric earthquakes. Modern science reveals that some of these earthquakes must have been so destructive, or happened at times of such political and military stress, that they changed history (e.g., the fall of Jericho before Joshua, the catastrophic collapse at the end of the Bronze Age.) Lectures in Winter Quarter, followed during spring break by a 10-day field trip to Israel and a neighboring country (Jordan, Egypt, or Greece). Students complete a term report on a site or event covered in the field trip.

2 units, Win (Nur)

50Q. Stanford Introductory Seminar: Viewing Hazards on Earth from Space—(Same as Electrical Engineering 60Q.) Preference to sophomores. Natural hazards (earthquakes, volcanoes, floods, hurricanes, and fires) affect thousands of people everyday. Twenty years of developments in spaceborne imaging technology monitor and respond to such disasters more rapidly than in the past, saving lives and money. Understanding the physical processes involved allows us to anticipate and plan for mitigation of the consequences. Students consider how these new tools are applied to natural disasters, and how remotely-sensed data are manipulated and analyzed.

3 units, Win (Zebker)

100. Directed Reading—Intensive study of the literature of any special topic. Preparation and presentation of reports. Individual assignments with any faculty member on any topic in Geophysics.

1-2 units, any quarter (Staff)

106. Planetary Exploration—(Enroll in Electrical Engineering 106.)

3 units, Spr (Fraser-Smith)

111. Introduction to Computing in Earth Science—Computing tools for research in earth sciences. How to use existing hardware and software tools. Focuses on: UNIX operating system, computer networking, graphics software, text processing software, and management of programming projects.

1 unit (Farrell) not given 1999-2000

112. Exploring Geosciences with MATLAB—Introduction to efficient use of Matlab as a tool for research in Engineering and Earth Sciences. Hands-on, computer-based exercises explore the 2-D and 3-D visualization.
tion, and applications to earth structure and exploration. Prerequisites: Probing earth structure with seismic waves. Measurements, interpretationary processes in ecology. Prerequisites: first-year calculus (Math.


170. Fluids in the Earth’s Crust—Interdisciplinary problems involving the state and movement of fluids in the earth’s crust: basics of the coupling in porous rocks between chemical transport, fluid flow, deformation and stress, and waves; applications to gas hydrates under the oceans; reservoir geophysics; geophysical recovery monitoring; aquifer geophysics; pore pressure in faulting and aftershocks and in the earth’s crust; permeability from seismic; viscoelastic rebound; pore fluids and subduction; sediment transport to seismic reflection; pressure solution and stylolites. Prerequisite: consent of instructors.


180. Geophysical Inverse Problems—Fundamental concepts of inverse theory, with application to geophysics. Inverses with discrete and continuous models, generalized matrix inverses, resolving kernels, regularization, use of prior information, singular value decomposition, nonlinear inverse problems, back-projection techniques, and linear pro-

182. Reflection Seismology—The principles of seismic reflection profiling, focusing on methods of seismic data acquisition and seismic data processing for hydrocarbon exploration.

183. Interpretation of Seismic Reflection Profiles—Lectures and workshops on structural and stratigraphic interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lecture only=1 unit. Prerequisite: 182, or consent of instructor.

184. Seismic Data Processing—Workshop experience in computer processing of seismic reflection data. Students individually process a commercial seismic reflection profile from field tapes to migrated stack, using interactive software on a workstation. Prerequisite: consent of instructor.

185. Research Seminar Series—Limited to Geophysics undergraduates and coterminal master’s candidates. Undergraduates participate directly in an ongoing research project: experimental and computational work, joining in reading and study groups, giving seminar papers, and doing original research for the undergraduate thesis. Prerequisite: consent of instructor.

185A. Reflection Seismology—Department research in reflection seismology and petroleum prospecting.

185D. Topics in Crustal Fluids—Research in interdisciplinary problems involving the state and movement of fluids in the earth’s crust. Content varies each quarter.

185E. Tectonics—Research on the origin, major structures, and tectonic processes of the earth’s crust. Emphasis is on use of deep seismic reflection and refraction data.

185K. Borehole Geophysics—Research in areas of petrophysics, seismology, in situ stress, and subjects related to characterization of the physical properties of rock in situ.

185L. Earthquake Seismology, Deformation, and Stress—Current research on seismic source processes, crustal stress, and deformation associated with faulting and volcanism.

185S. Seismic Tomography—Current research in transmission and reflection tomography, including topics on forward modeling, inversion, and data acquisition.

185V. Poroelasticity—Current research topics on the mechanical properties of porous rocks: dynamic problems of seismic velocity, dispersion, and attenuation; and quasi-static problems of faulting, fluid transport, crustal deformation, and loss of porosity. Participants define, investigate, and present an original problem of their own.

185V. Theoretical Ecology—(Same as Biology 384.) Discussions of recent and classical research papers in ecology, and presentation of work in progress by seminar participants.

185Z. Seminar in Radio Remote Sensing—Radar remote sensing techniques and applications. Emphasis is on current research applications, especially crustal deformation measurements. Recent instrumentation and system advancements.
190. Environmental and Applied Geophysics—Utilization of geophysical techniques, seismic reflection and refraction, gravity, magnetism, electromagnetics, resistivity and ground penetrating radar for problems related to environmental clean-up, civil engineering, and site characterization.

2 units, Spr (Harris, McWilliams)

196. Introduction to GIS: ARC/Info and Arc-View—(Graduate students enroll in 296; same as Geological and Environmental Sciences 196.) Hands-on experience with ESRI's ARC/INFO or Arc-View commercial GIS packages. Topics: setting up geographic databases and manipulating spatial data, including database query and analysis. Hands-on computer-based exercises using sample ARC datasets on workstations. Guest lectures on GIS applications in environmental, geological and biological sciences, and town planning. Students unable to register for 196 may sign up, with consent of instructor, for a self-paced computer tutorial version in 197, any quarter.

2 units, Win (Klemperer)

197. Research in the Application of Geographic Information Systems (GIS)—(Same as Geological and Environmental Sciences 197.)

1-5 units, Aut, Win, Spr (Klemperer)

202. Reservoir Geomechanics—Basic principles of rock mechanics and the state of stress and pore pressure in sedimentary basins related to exploitation of hydrocarbon and geothermal reservoirs. Mechanisms of hydrocarbon migration, exploitation of fractured reservoirs, reservoir compaction and subsidence, hydraulic fracturing, utilization of directional and horizontal drilling to optimize borehole stability, minimization of sand production.

3 units, Win (Zoback)

205. Honors Program—Experimental, observational, or theoretical honors project and thesis in geophysics under supervision of a faculty member. Students who elect to do an honors thesis should begin planning it no later than Winter Quarter of the junior year. Prerequisites: superior work in the earth sciences and approval of the department.

1-3 units, Aut, Win, Spr (Staff)


3-4 units, Spr (Claerbout)


3 units, Win (Claerbout)

215. Advanced Structural Geology and Rock Mechanics—(Same as Geological and Environmental Sciences 215.)

5 units, Aut (Pollard)

216. Rock Fracture Mechanics—(Same as Geological and Environmental Sciences 216.)

5 units, Spr (Pollard) alternate years, not given 2000-01

230. Advanced Topics in Well Logging—(Same as Petroleum Engineering 230.) Designed to follow a course in standard well logging, and assumes knowledge of standard practice and application of geophysical well logs. State-of-the-art tools and analyses; the technology, rock physical basis, and applications of each measurement. Hands-on computer-based analyses illustrate instructional material. Prerequisite: Petroleum Engineering 130 or equivalent.

3 units (Lindblom) given 2000-01

240. Borehole Seismology—The study and application of seismic-acoustic waves in and around boreholes for application to sonic well logging, crosswell seismic profiling, and vertical seismic profiling. Topics: forward modeling, seismogram interpretation, data processing, imaging, and inversion. Application from reservoir and site characterization studies and reservoir monitoring. Prerequisite: consent of instructor.

3 units, Aut (Harris) alternate years, not given 2000-01


4 units, Aut (Roughgarden)

255. Report on Energy Industry Training—Provides on-the-job training for master’s and doctoral degree students under the guidance of experienced, on-site supervisors. Students must submit a concise report detailing work activities, problems, assignments, and key results. Prerequisite: written consent of adviser.

1-3 units, any quarter (Staff)

262. Rock Physics—Properties of and processes in rocks as related to geophysical exploration, crustal studies, and tectonic processes. Emphasis is on wave velocities and attenuation, hydraulic permeability, and electrical resistivity in rocks. Application to in situ problems, using lab data and theoretical results.

3 units, Spr (Mavko)

280. 3-D Reflection Seismology—The principles of imaging complex structures in the Earth subsurface by use of 3-D reflection seismology. Emphasis is on processing methodologies and algorithms, with examples of applications to field data. Topics: acquisition geometries of land and marine 3-D seismic surveys, time vs. depth imaging, prestack Kirchhoff migration, dip moveout, zero-offset downward continuation, full separation and splitting, migration velocity analysis, velocity model building, imaging irregularly sampled and aliased data. Computational labs involve some programming.

1-2 units, Spr (Biondi)

285. Earth Soundings Analysis—Convolution, spectra, discrete Fourier transform, Z-plane, feedback, adjoint operators, model fitting by least squares, time series analysis, missing data restoration, phase, resolution and random signals, signal entropy.

3 units, Spr (Claerbout) alternate years, not given 2000-01

286. Electromagnetic Techniques in Geophysics—The general principles behind the electromagnetic techniques used to study the interior of the earth and to detect ore bodies, oil reservoirs, and underground man-made structures. Topics: the earth’s magnetic and electric fields, electromagnetic wave propagation through the earth (and through earth materials), electric and magnetic properties of earth materials, earth resistivity methods, magnetotellurics, magnetometers and magnetic-field gradiometers, electromagnetic induction, and ground-penetrating radar. Recommended: undergraduate electromagnetism.

4 units (Fraser-Smith) alternate years, given 2000-01

287. Earthquake Seismology—Topics: basic theorems in elastodynamics, Green’s functions, attenuation, wave propagation in layered media, ray theory, seismic moment tensors, finite-source effects, kinematics and dynamics of earthquakes, engineering aspects of seismology.

3 units (Beroza) alternate years, given 2000-01

288. Crustal Deformation—Collection, reduction, and analysis of crustal deformation measurements for the study of relative plate motions, plate boundary deformation, earthquake and volcanic processes, postglacial rebound, and land subsidence. Mechanical models of faulting and
385A. Seismic Tomography
(Harris)

385V. Poroelasticity.
(Mavko)

385Y. Theoretical Ecology—(Same as Biology 384.)
Spr (Roughgarden)

385Z. Radar Remote Sensing
(Zebker)

397. Introduction to Contemporary Geophysics—Attendance expected of all graduate students for credit or as auditors. Seminar or current topics of interest in geophysics emphasizing active research within the department and at other institutions.
1 unit, Win, Spr (Staff)

399. Teaching Experience in Geophysics—On-the-job training in the teaching of geophysics. An opportunity to develop problem sets and lab exercises, grade papers, and give occasional lectures under the supervision of the regular instructor of a geophysics course. Regular conferences with instructor and with students in the class provide the student teacher with feedback about effectiveness in teaching.
2-4 units, any quarter (Staff)

400. Research in Geophysics
any quarter (Staff)

PETROLEUM ENGINEERING

Emeriti: (Professors) William E. Brigham (on active duty), John W. Harbaugh*, Sullivan S. Marsden, Jr., Frank G. Miller; (Consulting Professors) Alvah J. Horn, Marshall B. Standing

Chair: Roland N. Horne
Associate Chair: Thomas A. Hewett
Assistant Professors: Jeff Caers, Anthony R. Kovscek
Associate Professor (Research): Louis J. Durlofsky

Consulting Professors: Warren K. Kourt, Robert G. Lindblom
Consulting Associate Professor: Clayton V. Deutsch
Consulting Assistant Professor: Jane Woodward

* Joint appointment with Geological and Environmental Sciences

Petroleum engineers are concerned with the design of processes for energy recovery from oil and gas reservoirs. Included in the design process are characterizing the spatial distribution of reservoir properties, drilling wells, designing and operating production facilities, selecting and implementing methods for enhancing fluid recovery, predicting recovery process performance, monitoring reservoirs, and examining environmental aspects of petroleum exploration and production. The Department of Petroleum Engineering curriculum provides a sound background in basic sciences and their application to practical problems to address the complex and changing nature of the field. Course work includes the fundamentals of chemistry, computer science, engineering, geology, geophysics, mathematics, and physics. Applied courses cover most aspects of petroleum engineering and some related fields like geothermal engineering and geostatistics. The curriculum emphasizes the fundamental aspects of fluid flow in the subsurface. These principles apply equally well to optimizing oil recovery from petroleum reservoirs and remediating contaminated groundwater systems.

Faculty and graduate students in the department conduct research in a variety of areas including: enhanced oil recovery by thermal means, gas injection, and the use of chemicals; flow of fluids in pipes; geostatistical reservoir characterization and mathematical modeling; geothermal en-
ENGINEERING; natural gas engineering; optimization; properties of petroleum fluids; reservoir simulation using computer models; and well test analysis. Undergraduate students are encouraged to participate in research projects. Graduate programs lead to the degrees of Master of Science (M.S.), Engineer, and Doctor of Philosophy (Ph.D.) in Petroleum Engineering.

M.S., Engineer, and Ph.D. degrees may be awarded with field designations for students who follow programs of study in the fields of geostatistics, geothermal, crustal fluids, or environmental specialties.

The department is housed in the Green Earth Sciences Building and it operates laboratories for research in various enhanced oil recovery processes and geothermal engineering. Students have access to a variety of computers for research and course work. Computers available for instruction and research include 13 UNIX workstations and two multiprocessor WinDD servers within the department as well as extensive campus-wide computer clusters. Each graduate student office has one X-terminal per student.

UNDERGRADUATE PROGRAMS
BACHELOR OF SCIENCE

The four-year program leading to the B.S. degree provides a foundation for careers in many facets of the energy industry. The curriculum includes basic science and engineering courses that provide sufficient depth for a wide spectrum of careers in the energy and environmental industries.

One of the goals of the program is to provide experience integrating the skills developed in individual courses to address significant design problems. In Petroleum Engineering 180, taken in the senior year, student teams design facilities for a real petroleum reservoir to meet specific management objectives.

PROGRAM

The requirements for the B.S. degree in Petroleum Engineering are similar to those described in the "School of Engineering" section of this bulletin. Students must satisfy the University general education, writing, and language requirements. The normal Petroleum Engineering undergraduate program automatically satisfies the University General Education Requirements (GERs) in area 2a (Natural Sciences), area 2b (Technology and Applied Sciences), and area 2c (Mathematics). Engineering fundamentals courses and petroleum engineering depth and elective courses must be taken for a letter grade.

In brief, the credit and subject requirements are:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering fundamentals</td>
<td>25</td>
</tr>
<tr>
<td>General Education, writing, language, and electives</td>
<td>68-69</td>
</tr>
<tr>
<td>Mathematics</td>
<td>21</td>
</tr>
<tr>
<td>Petroleum engineering depth</td>
<td>39-40</td>
</tr>
<tr>
<td>Science</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
</tr>
</tbody>
</table>

The following courses constitute the normal program leading to a B.S. in Petroleum Engineering. The program may be modified to meet a particular student's needs and interests with the adviser's prior approval.

MATHMATICS

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 41. Single Variable Calculus</td>
<td>5</td>
</tr>
<tr>
<td>and Math. 42. Single Variable Calculus</td>
<td>5</td>
</tr>
<tr>
<td>or Math. 19. Calculus</td>
<td>3</td>
</tr>
<tr>
<td>and Math. 20. Calculus</td>
<td>3</td>
</tr>
<tr>
<td>and Math. 21. Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Math. 43. Calculus of Several Variables</td>
<td>5</td>
</tr>
<tr>
<td>Math. 44. Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Math. 130. Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>or Mech. Engr. 100. Differential Equations in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
</tr>
</tbody>
</table>

SCIENCE

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 31. Chemical Principles</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 33. Structure and Reactivity</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 171. Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>Geol. &amp; Envir. Sci. 1. Fundamentals of Geology</td>
<td>5</td>
</tr>
</tbody>
</table>

PHYSICS

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 41. Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Physics 43. Electricity</td>
<td>3</td>
</tr>
<tr>
<td>Physics 45. Magnetism</td>
<td>3</td>
</tr>
</tbody>
</table>
| Physics 46. Electricity and Magnetism Laboratory | 1

Total                                      | 26    |

ENGINEERING FUNDAMENTALS

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comp. Sci. 106A. Programming Methodology</td>
<td>5</td>
</tr>
<tr>
<td>or Comp. Sci. 106X. Programming Methodology and Abstractions</td>
<td>5</td>
</tr>
<tr>
<td>and Engr. 15. Dynamics</td>
<td>5</td>
</tr>
<tr>
<td>Engr. 30. Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Mech. Engr. 33. Introductory Fluids Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Pet. Engr. 167. Engineering Valuation of Oil and Gas Wells</td>
<td>3</td>
</tr>
<tr>
<td>or Engr. 60. Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
</tr>
</tbody>
</table>

ENGINEERING DEPTH

The following courses constitute the core program in Petroleum Engineering:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. Engr. 140. Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or Chem. Engr. 160. Chemical Engineering Plant Design</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 180A. Chemical Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 180B. Chemical Engineering Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>Geol. &amp; Envir. Sci. 111. Structural and Engineering Geology</td>
<td>3</td>
</tr>
<tr>
<td>Geol. &amp; Envir. Sci. 151. Sedimentary Geology and Petrography: Depositional Systems</td>
<td>4</td>
</tr>
<tr>
<td>Pet. Engr. 120. Reservoir Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 130. Well Log Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 140. Drilling and Completion Technology</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 175. Well Test Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 180. Oil and Gas Production Engineering</td>
<td>3-4</td>
</tr>
<tr>
<td>Pet. Engr. 260. Groundwater Pollution and Oil Spills</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>39-40</td>
</tr>
</tbody>
</table>

A list of suggested electives and sample course programs are available in the Department of Petroleum Engineering, room 65, Green Earth Sciences Building. It is important to start mathematics courses in the first year and engineering and geology early in the second year. Computers are used extensively in most petroleum engineering courses. Students must develop programming skills through appropriate course work and self-study and are expected to achieve fluency in the use of FORTRAN, C, or C++ by their junior year.

MINORS

To be recommended for a B.S. degree with Petroleum Engineering as a minor subject, a student must take the following courses in addition to those required by the major department or program: Petr. Engr. 120, 121, 130, 175, 180, Geol. & Envir. Sci. 111 and 151. In some programs, Geol. & Envir. Sci. 111 or 151 may also satisfy major requirements.

HONORS PROGRAM

A limited number of undergraduates may be admitted to the honors program at the beginning of their senior year.

To be admitted, the student must have a grade point average (GPA) of at least 3.0 in all course work in the University. In addition to the minimum requirements for the B.S. degree, the student must complete 6 units of advanced petroleum engineering courses and at least 3 units of research (Pet. Engr. 193).

Students who wish to be admitted to the honors program should consult with their adviser before the start of their senior year. Those who do not meet all of the formal requirements may petition the department for admission. Those completing the program receive the B.S. degree in Petroleum Engineering with Honors. An overall 3.5 GPA is required in all petroleum engineering courses for graduation with honors.

COTERMINAL B.S. AND M.S. PROGRAM

The coterminal B.S./M.S. program offers a unique opportunity for Stanford University students to pursue a graduate experience while completing the B.S. degree in any relevant major. Petroleum Engineering graduate students generally come from a variety of backgrounds such as Chemical, Civil, or Mechanical Engineering; Geology or other Earth Sciences; or Physics or Chemistry. Students should have a background
at least through Mathematics 130 and Computer Science 106 before beginning graduate work in this program.

The two types of M.S. degrees, the course-work only degree, and the research degree, as well as the courses required to meet degree requirements are described below in the M.S. section. Both degrees require 45 units and may take from one to two years to complete depending on various circumstances unique to each student.

Requirements to enter the program are two letters of recommendation from faculty members or job supervisors, a statement of purpose, scores from the GRE general test, and a copy of Stanford University transcripts. While the department does not require any specific GPA or GRE score, potential applicants are expected to compete favorably with graduate student applicants.

A Petroleum Engineering master's degree can be used in a variety of ways. It is considered a terminal professional degree which prepares the student to obtain a professional job in the petroleum or geothermal industry, or in any related industry where analyzing flow in porous media or computer simulation skills are required. It can also be a stepping stone to a Ph.D. degree, which usually leads to a professional research job or an academic position.

Students should apply to the program any time after they have completed 105 undergraduate units, and in time to take PE 120, the basic introductory course in Autumn Quarter of the year they wish to begin the program. Please contact the Department of Petroleum Engineering to obtain additional information.

### GRADUATE PROGRAMS

The University's basic requirements for M.S. Engineer, and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

The energy industry provides a variety of employment opportunities for petroleum engineers with advanced training. A balanced master's degree program including both engineering course work and research requires a minimum of one maximum tuition academic year beyond the baccalaureate to meet the University residence requirements. Most full-time students spend at least one additional summer to complete the research requirement. An alternative master's degree program based only on course work is available that also requires at least one maximum tuition academic year to meet University residence requirements.

Students who anticipate continuing in the Ph.D. program should follow the research option. M.S. students receiving financial aid normally require two academic years to complete the degree. Such students must take the research option and are limited to a 9-unit course load per quarter.

The degree of Engineer requires a comprehensive maximum tuition two-year program of graduate study. This degree permits more extensive course work than the master's degree, with an emphasis on professional practice. All Engineer's degree students receiving financial aid are also limited to a 9-unit course load per quarter and need at least ten quarters of work to complete the degree.

The Ph.D. degree is awarded primarily on the basis of completion of significant, original research. Extensive course work and a minimum of three maximum tuition years of graduate work beyond the master's degree is required. Doctoral candidates planning theoretical work are encouraged to gain experimental research experience in the M.S. program. Ph.D. students receiving financial assistance are limited to 9 units per quarter and often require more than three years to complete the Ph.D.

In special cases, the M.S., Engineer, and Ph.D. degrees may be awarded with field designations for students who follow programs of study in the particular fields of (1) geostatistics, (2) geothermal, (3) crustal fluids, or (4) environmental. For example, students may be awarded the degree Master of Science in Petroleum Engineering (Geothermal).

### MASTER OF SCIENCE

The objective is to prepare the student for professional work in the energy industry through completion of fundamental courses in the major field and in related sciences as well as independent research.

Students entering the graduate program are expected to have an undergraduate-level petroleum engineering background. Competence in computer programming in a high-level language (Computer Science 106X or the equivalent) and knowledge of petroleum engineering and geological fundamentals (Pet. Engr. 120, 130, 140, and Geol. & Envir. Sci. 151) are prerequisites for taking most graduate courses.

The candidate must fulfill the following requirements:

1. Register as a graduate student for at least three quarters at maximum tuition or the equivalent of partial-tuition quarters.
2. Submit a Program Proposal for the Master's Degree approved by the adviser during the first quarter of enrollment.
3. Complete 45 units with at least a grade point average (GPA) of 3.0. This requirement is satisfied by taking the Core Sequence, selecting one of the seven elective sequences, an appropriate number of additional courses from the list of technical electives, and completing 6 units of master's level research. Students electing the "course work only" M.S. degree are strongly encouraged select an additional elective sequence in place of the research requirement. Students interested in continuing for a Ph.D. are expected to choose the research option and enroll in 6 units of Pet. Engr. 361. All courses must be taken for a letter grade.
4. Students entering without an undergraduate degree in Petroleum Engineering must make up deficiencies in previous training. Not more than 10 units of such work may be counted as part of the minimum total of 45 units toward the M.S. degree.

Research subjects include certain groundwater hydrology and environmental problems, energy industry management, flow of non-Newtonian fluids, geothermal energy, natural gas engineering, oil and gas recovery, pipeline transportation, production optimization, reservoir characterization and modeling, reservoir engineering, reservoir simulation, and transient well test analysis.

### RECOMMENDED COURSES AND SEQUENCES

The following list is recommended for most students. With the prior special consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

#### CORE SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mech. Engr. 200A. Mathematical &amp; Computational Methods in Mechanical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 175. Well Test Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or Pet. Engr. 130. Well Log Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 222. Reservoir Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Pet. Engr. 251. Thermodynamics of Phase Equilibrium*</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 21

* Optional for students taking the Geostatistics and Reservoir Modeling sequence.

### ELECTIVE SEQUENCE

Choose one of the following:

#### Crustal Fluids:

- Geol. & Envir. Sci. 230. Physical Hydrogeology | 5 |
- Geol. & Envir. Sci. 231. Contaminant Hydrogeology | 4 |
Total: 12

#### Environmental:

- Geol. & Envir. Sci. 231. Contaminant Hydrogeology | 4 |
Plus two out of the following courses:

- Civ. & Envir. Engr. 270. Movement, Fate, and Effect of Contaminants in Surface Water and Groundwater | 3 |
- Civ. & Envir. Engr. 274A. Environmental Microbiology | 3 |
- Geol. & Envir. Sci. 230. Physical Hydrogeology | 3 |
- Geol. & Envir. Sci. 264. Low Temperature Aquifer Geochemistry | 3 |
- Pet. Engr. 240. Geostatistics | 3-4 |
Total: 13-14

#### Enhanced Recovery:

**Geostatistics and Reservoir Modeling:**
- Geophys. 182. Reflection Seismology: 3
- Geophys. 240. Geostatistics for Spatial Phenomena: 3-4
- Pet. Engr. 241. Practice of Geostatistics: 3-4
- Total: 9-11

**Total:**
- Total: 9

**Geothermal:**
- Pet. Engr. 269. Geothermal Reservoir Engineering: 3
- Total: 10

**Reservoir Performance:**
- Geophys. 202. Reservoir Geomechanics: 3
- Pet. Engr. 180. Oil and Gas Production Engineering: 3-4
- Pet. Engr. 223. Reservoir Simulation: 3-4
- Total: 9-11

**Simulation and Optimization:**
- Pet. Engr. 223. Reservoir Simulation: 3-4
- Pet. Engr. 284. Optimization: 3
- Total: 9-10

**RESEARCH SEQUENCE**
- Total units required for M.S. degree: 45

* Students selecting the company sponsored "course work only" for the M.S. degree are strongly encouraged to substitute an additional elective sequence in place of the research.

**TECHNICAL ELECTIVES**

Technical electives from the following list of advanced-level courses usually complete the M.S. program. In unique cases, when justified and approved by the adviser prior to taking the course, courses listed here may be substituted for courses listed above in the elective sequences.

- Geophys. 182. Reflection Seismography: 3
- Geophys. 190. Environmental and Applied Geophysics: 4
- Geophys. 202. Reservoir Geomechanics: 3
- Pet. Engr. 130. Well Log Analysis: 3
- Pet. Engr. 180. Oil & Gas Production Engineering: 3
- Pet. Engr. 211. Computer Applications for Petroleum Engineers: 3
- Pet. Engr. 269. Geothermal Reservoir Engineering: 3
- Pet. Engr. 281. Applied Mathematics in Reservoir Engineering: 3
- Pet. Engr. 284. Optimization: 3

**ENGINEER**

The objective is to broaden training through additional work in engineering and the related sciences and by additional specialization.

Basic requirements include registering for at least six quarters at maximum tuition or the equivalent of partial-tuition quarters; completion of 72 units of course work including 15 units of research (Pet. Engr. 362), and including all course requirements of the department’s master’s degree (39 units, excluding research). If the candidate has received credit for research in the M.S. degree, this credit ordinarily would be transferable to the Engineer degree, in which case a total of 9 additional research units would be required. No more than 10 of the 90 required units can be applied to overcoming deficiencies in undergraduate training.

At least 30 units in engineering and closely allied fields must be taken in advanced work, that is, work beyond the master’s degree requirements and in addition to research (Pet. Engr. 362). These may include courses from the Ph.D. degree list below or advanced-level courses from other departments with prior consent of the adviser. All courses must be taken for a grade letter. The student must have a grade point average (GPA) of at least 3.0 in courses taken for the degree of Engineer. A thesis based on 15 units of research must be submitted and approved by the adviser, another faculty member, and the University Committee on Graduate Studies.

**DOCTOR OF PHILOSOPHY**

The Ph.D. degree is conferred upon demonstration of high achievement in independent research and by presentation of the research results in a written dissertation and oral defense.

Basic requirements include a minimum of nine quarters of registration at maximum tuition or the equivalent in partial-tuition quarters of satisfactorily completed graduate study. Students must take at least 72 units beyond the 45 units required for the master’s degree. The 72 units are composed of 36 units of research and 36 units of course work. The student’s record must indicate outstanding scholarship. The student must pass the department’s qualifying examination, submit an approved research proposal, fulfill the requirements of the minor department if a minor is elected, and pass the University oral examination, which is a defense of the dissertation. The student must prepare a dissertation based on independent research and that makes a significant contribution to the field.

The specification of 36 units of course work is a minimum; in some cases the research adviser may specify additional requirements to strengthen the student’s expertise in particular areas. The 36 units of course work does not include teaching experience (Pet. Engr. 359), which is a requirement for the Ph.D. degree, nor any units in research seminars, which students are required to attend. All courses must be taken for a letter grade, with an average GPA of at least 3.25 in the 36 units of course work. The 36 units of course work may include graduate courses in petroleum engineering (numbered 200 and above) and courses selected from the following list. Other courses may be substituted with prior approval by the adviser. In general, non-technical courses are not approved.

**MATH AND APPLIED MATH**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
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<tbody>
<tr>
<td>Aero. &amp; Astro. 210A. Fundamentals of Compressible Flow</td>
<td>3</td>
</tr>
<tr>
<td>Aero. &amp; Astro. 214A. Numerical Methods in Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Aero. &amp; Astro. 214B. Numerical Computation of Compressible Flow</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 220. Applied Mathematics in Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Comp. Sci. 106X. Programming Methodology and Abstractions</td>
<td>5</td>
</tr>
<tr>
<td>Comp. Sci. 138A. Numerical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Comp. Sci. 133B. Numerical Solution of Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Comp. Sci. 193D. C++ and Object Oriented Programming</td>
<td>4</td>
</tr>
<tr>
<td>Comp. Sci. 193U. Software Engineering in C</td>
<td>3</td>
</tr>
<tr>
<td>Math. 106. Introduction to Theory of Functions of a Complex Variable</td>
<td>3</td>
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<tr>
<td>Math. 113. Linear Algebra and its Applications</td>
<td>3</td>
</tr>
<tr>
<td>Math. 114. Linear Algebra and Matrix Theory</td>
<td>3</td>
</tr>
<tr>
<td>Math. 131. Partial Differential Equations I</td>
<td>3</td>
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<tr>
<td>Math. 132. Partial Differential Equations II</td>
<td>3</td>
</tr>
<tr>
<td>Stat. 110. Statistical Methods in Engineering and Physical Sciences</td>
<td>4</td>
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<tr>
<td>Stat. 201. Statistical Methods</td>
<td>3</td>
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**SCIENCE**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Geol. &amp; Envrir. Sci. 231. Contaminant Hydrogeology</td>
<td>4</td>
</tr>
<tr>
<td>Geol. &amp; Envrir. Sci. 247. Oil Field Exploration and Development</td>
<td>3</td>
</tr>
<tr>
<td>Geophys. 182. Reflection Seismology</td>
<td>3</td>
</tr>
<tr>
<td>Geophys. 190. Environmental and Applied Geophysics</td>
<td>4</td>
</tr>
<tr>
<td>Geophys. 262. Rock Physics</td>
<td>3</td>
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</tbody>
</table>

**ENGINEERING**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Chem. Engr. 110. Equilibrium Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 140. Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 221. Transport Phenomena</td>
<td>3</td>
</tr>
</tbody>
</table>
Chem. Engr. 222. Transport Phenomena II 3
Engr. 298. Seminar in Fluid Mechanics 1
Mech. Engr. 250. Heat Transfer 4
Mech. Engr. 252C. Convective Heat 3

Ph.D. students are required to take the doctoral qualifying examination at the beginning of the second year of study. Students receiving a master’s degree from the Department of Petroleum Engineering and continuing on for a Ph.D. are required to take the qualifying examination at the first opportunity after the completion of the requirements for the master’s degree.

The qualifying examination consists of both a written and an oral section. The written part consists of three or four three-hour examinations on different subjects. The oral part is a three-hour examination in which members of the department faculty question the student. Students are required to apply for candidacy for the Ph.D. degree after passing the department’s qualifying examination.

Within a year of passing the qualifying examination, the student must prepare a short written report that contains a literature review and a research proposal. This proposal must be approved after oral examination by a committee made up of the student’s adviser and two other faculty, one of whom must be from the department.

The dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy by the University Committee on Graduate Studies. Candidates who fail to meet this deadline must submit an Application for Extension of Candidacy for approval by the department chair if they wish to continue in the program.

Ph.D. MINOR

To be recommended for a Ph.D. degree with Petroleum Engineering as a minor subject, a student must take 20 units of selected graduate-level lecture courses in the department. These courses must include Pet. Engr. 221 and 222. The remaining courses should be selected from Pet. Engr. 175, 180, 223, 224, 225, 226, 281, and 284.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

103. Energy Resources—Overview of oil, natural gas, coal, nuclear, hydro, solar, geothermal, biomass, wind, and ocean energy resources in terms of supply, distribution, recovery and conversion, environmental impacts, economics, policy, and technology. The opportunities for energy efficiency, electric power basics, the changing role of electric utilities, transportation basics, and energy use in developing countries. Field trips. Recommended: Civil and Environmental Engineering 170. GER:2b (DR:6)

3 units (Woodward) given 2000-01

104. Seminar: The Coming Energy Revolution—(Same as 204.) The three forces driving an energy revolution: environmental pressures, global social and economic revolution, and technological change. Assesement of evolution vs. revolution, developed vs. developing countries, transportation, electric power, resource development and extraction, end use technologies, deregulation, privatization and globalization, barriers to change, and assessment of the mechanisms to overcome them. Enrollment limited to 15; presentations every class. Prerequisite: 103. GER:2b (DR:6)

3 units, Aut (Woodward)

109Q. Stanford Introductory Seminar: What Determines the Price of Oil?—Preference to sophomores. Historical predictions of oil prices have been very poor. Most models attempt to simply extrapolate the past without considering the political, economic, and technical factors that affect the availability and price of oil. The objective is to build new approaches to mathematical models to predict the future price of oil, looking at the changing role of oil and natural gas in the energy picture of developing countries, and how these factors may influence future prices. Prerequisites: Math. 41 and 42, ability to write simple computer programs. GER:2b (DR:6)

3 units (Aziz) alternate years, given 2000-01

110Q. Stanford Introductory Seminar: Soap Bubbles, Raindrops, and Inkjets—Preference to sophomores. The behavior of bubbles and drops whose shapes are controlled by surface tension. Readings of Newton, Young, Laplace, and Plateau show how thinking about curved surfaces occupied scientists and mathematicians of the 18th and 19th centuries. A mathematical picture of a curved surface permits prediction of the shape of a bubble surface, and the physical effects of surface tension in daily life. Physical manifestations of these curved liquid surfaces are: the distribution of raindrops on a spider web, why sand grains stick together when damp, how the effects of surface tension work in an inkjet printer, why it is hard to remove oil and grease from clothes, and how detergent works. Prerequisite: Math. 42. GER:2b (DR:6)

3 units (Orr) alternate years, given 2000-01

120. Fundamentals of Petroleum Engineering—(Same as Engineering 120.) Lectures, problems, field trip. Basic engineering topics in petroleum discovery and recovery; and the origin, discovery, and development of oil and gas. The chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media.

3 units, Aut (Hewett)

121. Fundamentals of Multiphase Flow—See 221.

3 units, Win (Hewett)

130. Well Log Analysis—For earth scientists and engineers. Interdisciplinary, providing a practical understanding of the interpretation of well logs using real field examples. Lectures, problems. Methods for evaluating the presence of hydrocarbons in rock formations penetrated in exploratory and development drilling. Concentrates on the fundamentals of all types of logs including electrical and nonelectric logs.

3 units, Aut (Lindblom)

140. Drilling and Completion Technology—The principles applied to the drilling and completion of oil, gas, and geothermal wells for off- and onshore operations. Rig mechanics, drilling fluid technology (drilling hydraulics, clay chemistry, and pressure control), cementing technology, bit mechanics, casing design, and directional drilling.

3 units (Staff) not given 1999-2000

155. Undergraduate Report on Energy Industry Training—Provides on-the-job practical training under the guidance of experienced, on-site supervisors geared to undergraduate level students. A concise report detailing work activities, problems, assignments and key results is required. Prerequisite: written consent of instructor.

1 unit, any quarter (Staff)

160. Introduction to Statistical Methods for Earth and Environmental Sciences—Data summaries, graphical display of data, measures of association, time series and trends, sampling, quantification of uncertainty, statistical models, statistical testing, and prediction. Analysis of spatial information, introduction to geostatistical methods for estimating spatial phenomena. Examples of prediction and uncertainty quantification in geology and environmental monitoring. Issues of statistical computing and software.

4 units, Spr (Caers)


3 units, Spr (Horne)

76
180. Oil and Gas Production Engineering—The design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120. Recommended: 130. (WIM)

3-4 units (Kovscek, Aziz) alternate years, given 2000-01

192. Undergraduate Teaching Experience—Leading field trips, preparing lecture notes, quizzes under supervision of the instructor.

1-3 units, any quarter (Staff)

193. Undergraduate Research Problems—Original and guided research problems with comprehensive report.

1-3 units, any quarter (Staff)


1-3 units, any quarter (Staff)

202. Reservoir Geomechanics—(Enroll in Geophysics 202.)

3 units, Win (Zoback)


3 units, Aut (Woodward)

211. Computer Applications for Petroleum Engineers—Lectures, seminars, and class projects. Provides "seed" knowledge of the software and hardware available to petroleum engineering students, effective use of computer resources, and some software tools. X-Windows, use of graphics, interlanguage communication, and user interfaces.

1 unit (Horne) not given 1999-2000


3 units, Win (Hewett)


3 units, Spr (Durlofsky)

223. Reservoir Simulation—Lectures, problems, and class project provide a thorough understanding of the fundamentals of petroleum reservoir simulation. Development of equations for multicomponent, multiphase flow between gridblocks comprising a petroleum reservoir. Relationships between black-oil and compositional models. Various techniques for developing black-oil, compositional, thermal, and dual-porosity models. Practical considerations in the use of simulators for predicting reservoir performance. Prerequisite: 221 and 246, or consent of instructor. Recommended: Mechanical Engineering 200C.

3-4 units, Win (Durlofsky, Aziz)


3 units (Hewett) alternate years, given 2000-01


3 units, Win (Orr) alternate years, not given 2000-01


3 units (Castanier) alternate years, given 2000-01

227. Enhanced Oil Recovery—Lectures, problems. Introduction to the physics, theories, and methods of evaluating chemical, miscible, and thermal enhanced oil recovery projects. Existing methods and screening techniques, and analytical and simulation based means of evaluating project effectiveness. Dispersion-convection-adsorption equations, coupled heat and mass balances and phase behavior provide requisite building blocks for evaluation.

3 units, Spr (Kovscek) alternate years, not given 2000-01

230. Advanced Topics in Well Logging—(Same as Geophysics 230.) Designed to follow a course in standard well logging, and assumes knowledge of standard practice and application of geophysical well logs. State-of-the-art tools and analyses; the technology, rock physical basis, and applications of each measurement. Hands-on computer-based analyses illustrate instructional material. Prerequisite: 130 or equivalent.

3 units (Lindblom) given 2000-01

240. Geostatistics for Spatial Phenomena—(Same as Geological and Environmental Sciences 240.) Stochastic modeling of spatial and/or time dependent phenomena. Kriging and cokriging for gridding and spatial interpolation. Integration of heterogeneous sources of information. Stochastic imaging of reservoir/field heterogeneities. Introduction to GSLIB software. Case studies from the oil and mining industry and environmental sciences. Prerequisites: introductory calculus and linear algebra, Statistics 116 or equivalent.

3-4 units, Win (Journel, Gomez)

241. Practice of Geostatistics on Exhaustive Data Bases—(Same as Geological and Environmental Sciences 241.) The study of a real data set; examples have been a large N. Sea clastic reservoir with well and seismic data, a lead contamination site, a large polymetallic porphyry deposit in Chile, topographic data in Nevada. Data includes sparse hard data, extensive soft information. Student teams independently perform site characterizations and share results in class. Reservoir study through maps, variograms, kriging, and stochastic models. Extensive use of GSLIB and 3D visualization software. Flow simulations for recovery forecast and placement of additional wells. Engineering design for site remediation. Prerequisites: 240, Fortran/Unix. Recommended: 246.

3-4 units, Spr (Journel, Caers)

242. Topics in Advanced Geostatistics—(Same as Geological and Environmental Sciences 242A.) Conditional expectation theory and projections in Hilbert spaces; parametric vs. non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, annealing approaches to...
stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, Fortran/Unix.

3 units (Journel) alternate years, given 2000-01

246. Reservoir Characterization and Flow Modeling with Outcrop Data—(Same as Geological and Environmental Sciences 246.) Project provides earth science students with an understanding of how to use outcrop observations in quantitative geological modeling and flow simulation, and addresses a specific reservoir management problem by studying a suitable outcrop analogue (weekend field trip), constructing geostatistical reservoir models, and performing flow simulation. An introduction, through an applied example, to the relationship between the different disciplines. A different reservoir management question and outcrop analogue is studied each year.

3 units, Aut (Aziz, Graham, Journel)


3 units, Aut (Kovscek)

255. Master's Students' Report on Energy Industry Training—Provides on-the-job training for master’s degree students under the guidance of experienced, on-site supervisors. Students must submit a concise report detailing work activities, problems, assignments, and key results. Prerequisite: consent of adviser.

1 unit, Sum (Staff)


3 units, Win (Archer, Schafer)

268. Seminar in Petroleum Engineering

1 unit, any quarter (Staff)

269. Geothermal Reservoir Engineering—Conceptual models of heat and mass flows within geothermal reservoirs. The fundamentals of fluid/heat flow in porous media; convective/conductive regimes, dispersion of solutes, reactions in porous media, stability of fluid interfaces, liquid and vapor flows. Interpretation of geochemical, geological, and well data to determine reservoir properties/characteristics. Geothermal plants and the integrated geothermal system.

3 units (Horne) alternate years, given 2000-01


1-3 units, any quarter (Staff)


3 units, Spr (Archer) alternate years, not given 2000-01


3 units, Aut (Caers)

285A,B,C,D,E,F,G. Research Seminars—Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Prerequisite: consent of instructor.

285A. Research Seminar: Enhanced Oil Recovery—Current research in the SUPRI-A group. Thermal and enhanced oil recovery. (AU)

1 unit, Aut, Win, Spr (Kovscek, Castanier, Brigham)

285B. Reservoir Simulation—Current research in SUPRI-B (Reservoir Simulation) program. (AU)

1 unit, Aut, Win, Spr (Aziz, Durlofsky, Edwards)

285C. Research Seminar: Gas Injection Processes—Current research in the SUPRI-C group. (AU)

1 unit, Aut, Win, Spr (Orr)

285D. Research Seminar: Well-Test Analysis—Current research in the SUPRI-D well test analysis group. (AU)

1 unit, Aut, Win, Spr (Home)

285E. Research Seminar: Geostatistics—Current research in the SCRF (Stanford Center for Reservoir Forecasting) program. (AU)

1 unit, Aut, Win, Spr (Journel, Hewett, Caers)

285F. Research Seminar: Geothermal Reservoir Engineering—Current research in the geothermal energy group. (AU)

1 unit, Aut, Win, Spr (Home)

285G. Research Seminar: Horizontal Well Technology—Current research in SUPRI-HW (productivity and injectivity of horizontal wells) program. (AU)

1 unit, Aut, Win, Spr (Aziz, Durlofsky)

355. Doctoral Report on Energy Industry Training—Provides on-the-job training for doctoral students under the guidance of experienced, on-site supervisors. Students must submit a concise report detailing work activities, problems, assignments, and key results. Prerequisite: consent of adviser.

1 unit, Sum (Staff)

359. Teaching Experience in Petroleum Engineering—On-the-job training in teaching petroleum engineering. Student prepares and presents several lectures, problem sets, grades problems, and prepares lab experiments under the supervision of regular instructor. Performance is evaluated by students and the regular instructor.

1-3 units, any quarter (Staff)

360. Advanced Work in Petroleum Engineering—Graduate-level work in experimental, computational, or theoretical research.

1-9 units, any quarter (Staff)


1-6 units, any quarter (Staff)

362. Engineer's Thesis Research in Petroleum Engineering—Graduate-level work in experimental, computational, or theoretical research. Advanced technical report writing. Limited to 15 units total, or 9 units total if 6 units of 361 were previously credited.

1-9 units, any quarter (Staff)
363. Doctoral Dissertation Research in Petroleum Engineering—
Graduate-level work in experimental, computational, or theoretical 
research. Advanced technical report writing. 
1-9 units, any quarter (Staff)

365. Special Research in Petroleum Engineering—Graduate-level 
research work not related to report, thesis or dissertation. 
1-15 units, any quarter (Staff)
School of Education


Dean: Richard J. Shavelson
Associate Dean for Academic Affairs: Denis C. Phillips
Associate Dean for Administration: Vicki Oldberg
Associate Dean for External Relations: Patricia Nicholson


Associate Professors: Arneitha Ball, Patricia J. Gumport, Teresa C. LaFromboise, David Rogosa

Assistant Professors: Anthony L. Antonio, Brigid J. Barron, Joanne T. Boaler, Mike Copland, Susanna Loeb, Karen E. Mundy, Robert Roeser, Joy Williamson

Professor (Teaching): Alan Peshkin
Associate Professor (Teaching): Rachel Lotan

Courtesies: Professor: Paul Brest, Shirley Heath, Herant Katchadourian, Donald Kennedy, Mark Lepper, John Meyer, Brad Osgood, John Rickford

Courtesies Assistant Professor: Robert Reich

Senior Lecturer: Philip Hubbard

Lecturers: Margaret Azevedo, Byron Bland, Beverly Carter, Colin Hayman, Cathy Humphreys, Alexis Kaminisky, Al Levin, Kay Moffett, Kathleen Morrison, Stan Pesick, Ann Porteus, Nicole Ramos-Beban, Susan Schultz, James Steyer, Ann Vocovic, Rochelle Weintraub, Lori White, Rachel Zorman

Acting Assistant Professors: Susan Christopher, Diana Rhoten

Consulting Professors: George Bohrnstedt, Jay Chambers, David Petterman, Thomas Parrish

Visiting Professor: Paul Black

* Recalled to active duty.

The School of Education prepares scholars, teachers, teacher educators, counseling psychologists, policy analysts, evaluators, researchers, administrators, and other educational specialists. Four graduate degrees with specialization in education are granted by the University: Master of Arts, Master of Arts in Teaching (Subject), Doctor of Education, and Doctor of Philosophy. While no undergraduate majors are offered, the school does offer a number of courses for undergraduates, an undergraduate honors program, and a variety of tutoring programs.

The School of Education is organized into three Program Area Committees: Curriculum Studies and Teacher Education (C&TE); Psychological Studies in Education (PSE); and Social Sciences, Policy, and Educational Practice (SSPEP).

In addition, four cross-area programs are sponsored by faculty from more than one area. These programs include the doctoral Symbolic System Program and three master’s level programs: the Stanford Teacher Education Program (STEP), the Prospective Principals Program (PPP) and the Learning, Design and Technology Program (LDT).

These committees and programs function as administrative units that act on admissions, plan course offerings, assign advisers, and determine program requirements. Various subcommittees or concentrations exist within most of these areas and programs. Faculty members are affiliated primarily with one area but may participate in several programs. While there is a great deal of overlap and interdisciplinary emphasis across areas and programs, students are affiliated with one area committee or program and must meet its degree requirements.

Detailed information about admission and degree requirements, faculty members, and specializations related to these area committees and programs can be found in the publication School of Education Guide to Graduate Studies and at http://www.stanford.edu/dept/SUSE/.

The School of Education offers an eight-week summer session for admitted students only. The school offers no correspondence or extension courses.

UNDERGRADUATE PROGRAMS

The School of Education focuses on graduate education and research training and does not offer an undergraduate major. However, undergraduate education is of concern to the school, and courses and programs are available to those interested in the field of education. Several courses at the 100 level are especially designed for undergraduates, and some higher-level courses are open to undergraduates. An honors program is available to undergraduates to supplement their regular majors outside the school. In conjunction with the Haas Center and the Undergraduate Advising Center, the school offers a variety of courses for undergraduates interested in developing educationally oriented skills.

HONORS PROGRAM

This program permits interested and able undergraduates at Stanford to build on the training received in their major field of study by pursuing additional courses and a research or practicum project in a related area of education.

Students apply for entry during the junior year. Applications are available at the Dean’s office in Cubberley room 101 or at http://www.stanford.edu/dept/SUSE/navigation/programsnavfrm.html. At least one course must be taken from each of the following areas:

1. Educational policy and history in the U.S.: courses include American Education and Public Policy; History of Education in the United States; Children, Civil Rights, and Public Policy in the U.S.; Introduction to the Study of International Comparative Education; History of Higher Education in the U.S.

2. Contemporary problem areas: courses include Urban Youth and their Institutions: Research and Practice; Theory and Issues in the Study of Bilingualism; Education and the Status of Women: Comparative Perspectives; Contemporary Social Issues in Child and Adolescent Development.

3. Foundational disciplines: courses include Social Sciences and Educational Analysis; Problems in Sociology of Education; Problems of Intelligence, Information, and Learning; Introduction to Philosophy of Education.

A directed reading course as well as directed research courses with a faculty member in Education is also required. Students in the program should enroll in the Undergraduate Honors Seminar, 199A.B.C during their senior year.

Near the end of Spring Quarter, successful candidates for honors orally present brief reports of their work and findings at a mini-conference. All honors students in Education are expected to attend this conference.

COTERMINAL DEGREE PROGRAM

The School of Education admits a small number of students from undergraduate departments within the University into a coterminal A.B. and A.M. program. Not all of the four area committees offer coterminal degrees. Students in such a program receive the bachelor’s degree in their undergraduate major and the master’s degree in Education. Approval of the student’s undergraduate department and of the School of Education is required. Undergraduates may apply when they complete 105 units, but no later than the end of the 11th quarter of undergraduate work. Students study for both the bachelor’s and master’s degrees simultaneously and must complete a total of 15 full-tuition quarters or three full-tuition quarters after completing 180 units toward the undergraduate degree. The number of units required for the A.M. degree depends on the
GRADUATE PROGRAMS

Several advanced degree programs are offered by the School of Education and are described below. Requirements vary somewhat across programs. Both University and School of Education requirements must be met for each degree. The University requirements are detailed in the “Graduate Degrees” section of this bulletin. Students are urged to read this section carefully, noting residency, tuition, and registration requirements. A student who wishes to enroll for graduate work in the School of Education must be qualified and admitted to graduate standing by one of the school’s area committees.

Complete information about admissions procedures and requirements is available by writing Stanford University Graduate Admissions, Old Union, Room 137, Stanford, CA 94305-3005 or at http://www.stanford.edu/dept/SUSE/. The admissions packet includes the publication School of Education Guide to Graduate Studies, which outlines degrees, programs, admission and graduation requirements, and research interests of the faculty. All applicants must submit scores from the Graduate Record Examination General Test (verbal, quantitative, and analytical areas); TOEFL scores are also required from those whose first language is not English.

MASTER OF ARTS

The A.M. degree is conferred by the University upon recommendation of the faculty of the School of Education and the University Committee on Graduate Studies. The University residency requirement is three full-tuition quarters of registration as a graduate student at Stanford. The minimum unit requirement is 36 quarter units earned at Stanford as a graduate student. Some programs require as many as 45 units. At least 12 units must be taken for a grade point average (GPA) of “B” or better, and a minimum of 18 units must be taken in the School of Education. Master’s students should obtain detailed program requirements from the master’s coordinator, located in Academic Services in the School of Education. No thesis is required to earn a master’s degree; however some programs require a final project, paper, or monograph. Additional detailed information regarding entrance and degree requirements is available at http://www.stanford.edu/dept/SUSE/ and in the School of Education Guide to Graduate Studies. Upon admission, each student is assigned a faculty adviser from the appropriate area committee to begin early planning of a coherent program.

Master of Arts degrees are offered for the following specializations (the sponsoring area committee and concentration is listed in parenthesis):

- Art Education (C&TE)
- Bilingual Education (SSPEP-LLP)
- Dance Education (C&TE)
- English as a Second/Foreign Language (SSPEP-LLP)
- English Education (C&TE)
- Evaluation (SSPEP-APA)
- General Curriculum Studies (C&TE)
- International Comparative Education (SSPEP-ICE)
- International Educational Administration and Policy Analysis (SSPEP-ICE)
- Joint Program with Graduate School of Business (SSPEP-APA)
- Learning Design and Technology (Cross-Area)
- Mathematics Education (C&TE)
- Policy Analysis (SSPEP-APA)
- Prospective Principals Program (SSPEP-APA)
- Science Education (C&TE)
- Social Sciences in Education—Gender Studies (SSPEP-SSE)
- Social Sciences in Education—Interdisciplinary (SSPEP-SSE)
- Teacher Education (C&TE)

In addition, an A.M. degree with a teaching or administrative credential is offered in Stanford Teacher Education Program (Cross-Area—STEP).

STANFORD TEACHER EDUCATION PROGRAM (STEP)

STEP offers a Master of Arts program to prepare humanities and sciences college graduates for careers as secondary teachers of English, languages (French, German, Japanese, Spanish), mathematics, science (biology, chemistry, physics), and social studies. To be successful in classrooms with diverse students, STEP helps participants become more aware of their values, more flexible in their teaching and learning styles, and more knowledgeable in their subject matter.

The 12-month STEP year begins in June with a summer quarter of intensive academic preparation and experience in the Stanford Summer Teaching School. During the academic year, students take courses in professional education and academic subjects; they also teach part-time in middle or high schools for the entire public school year. The master’s degree and Single Subject (secondary) Teaching Credential require 45 quarter units, taken during four quarters of continuous residency. Applicants are required to pass the California Basic Educational Test (CBEST), and must demonstrate subject matter competence in one of two ways: (1) by passing the Praxis II and SSAT subject assessment tests in their field, or (2) by completing a California state-approved subject matter preparation program. For further information, contact STEP Academic Services at (650) 723-2110.

STEP also includes the optional California Cultural Language and Academic Development (CLAD) emphasis program. CLAD provides enhanced opportunities for candidates to learn about and work with linguistically and ethnically diverse students. The program focuses on theories of language acquisition, English as a second language methodologies, and development of cross-cultural understanding and appreciation of multicultural diversity. Further information regarding admission requirements, course work, and credential requirements is available at http://www.stanford.edu/dept/SUSE/ and in the School of Education Guide to Graduate Studies.

PROSPECTIVE PRINCIPALS PROGRAM (PPP)

The Prospective Principals Program at Stanford offers the A.M. degree with a specialization in Administration and Policy Analysis, which can be combined with the Preliminary Administrative Services Credential. It enables prospective principals to become leaders and to manage ideas, resources, and themselves to achieve worthwhile educational results for a diverse student population. This is accomplished through three consecutive summers of full-time study and is therefore available to persons working in a school system during the academic year. Teaching experience is a prerequisite for admission to this program. This master’s degree requires 45 quarter units. In order to qualify for the credential, three additional quarter units for a total of 48 quarter units, including internship units, are necessary. Additional information regarding admission requirements, course work, and credential requirements is available in the School of Education Guide to Graduate Studies.

MASTER OF ARTS IN TEACHING (M.A.T.)

The degree of Master of Arts in Teaching (M.A.T.) is reserved for experienced teachers or individuals who have completed a program of teacher preparation; it is offered in conjunction with a variety of academic departments in the School of Humanities and Sciences. Further details are available from the A.M. programs office in the School of Education.

DOCTORAL DEGREES

The School of Education offers two types of doctoral degrees. The Doctor of Philosophy (Ph.D.) degree is offered by all program area committees. The Doctor of Education (Ed.D.) degree is offered only in the concentrations of Policy Analysis and Higher Education Administration within the area of SSPEP. Both degrees are conferred by the University upon recommendation by the faculty of the School of Education and the University Committee on Graduate Studies. University residency requirements (nine full-tuition quarters or the equivalent), amount of trans-
fer credit applicable (no more than three full quarters), and the timetable for the stages of progress are the same for both degrees. Additionally, the School of Education unit requirement for both degrees is a minimum of 72 units of course work and research completed at Stanford beyond the baccalaureate degree. (If more than 72 are needed to meet particular Program Area requirements, students may transfer up to 36 units of graduate course work taken within the past seven years.)

Students should note carefully that admission to graduate standing by the University to work toward a doctoral degree does not in itself constitute admission to candidacy for the degree. Students must qualify and apply for candidacy by the end of their second year of study and should obtain information about procedures and requirements during their first year.

The two doctoral degrees offered in the School of Education differ in emphasis, purpose, and the intended careers of those who pursue them. They are equivalent with respect to the amount of time required and the course work taken within the past seven years.

Program Area requirements, students may transfer up to 36 units of graduate course work within the past seven years.

The two doctoral degrees offered in the School of Education differ in emphasis, purpose, and the intended careers of those who pursue them. They are equivalent with respect to the amount of time required and the rigor and quality of work demanded. In the Ph.D. degree program, there is greater emphasis on theory and research; the emphasis in the Ed.D. program is on informed and critical applications of existing knowledge to educational practice.

The Ph.D. degree is designed for students who are preparing for (1) research work in public school systems or specialized institutions; (2) teaching roles in education in colleges or universities, and research connected with such teaching; or (3) other careers in educational scholarship and research.

The Ed.D. degree is a professional educational degree intended to meet the needs of (1) those who wish a thorough and comprehensive professional understanding of and competence in dealing with educational problems met by administrators, supervisors, and curriculum specialists; and (2) those who wish a scholarly preparation for teaching education in colleges or universities.

Ph.D. students must complete a minor in another discipline taught outside the school, or hold an acceptable master's degree outside the field of education, or complete an approved distributed minor that combines relevant advanced work taken in several disciplines. A minor is not required for the Ed.D.

Upon admission, an adviser assigned from the admitting area committee works with the student to establish an appropriate and individualized course of study, a relevant minor, and project research plans. Other faculty members may also be consulted in this process. Details about the varying administrative and academic requirements for each area committee and the School of Education, along with general time frame expectations, are given at http://www.stanford.edu/dept/SUSE/ and in the School of Education Guide to Graduate Studies. Complete guidelines may be obtained from the specific area committees.

The following doctoral specializations (with their sponsoring area and concentration) are offered:

**Social Sciences in Education—Interdisciplinary (SSPEP-SSE)**

**Social Studies Education (C&TE)**

**Sociology of Education (SSPEP-SSE)**

**Symbolic Systems in Education (Cross-Area)**

**Teacher Education (C&TE)**

**Ph.D. MINOR FOR STUDENTS OUTSIDE EDUCATION**

Candidates for the Ph.D. degree in other departments or schools of the University may elect to minor in Education. Requirements include a minimum of 30 quarter units of graduate course work in Education and a clear field of concentration. Students choosing to minor in education should meet with the relevant area chair to determine a suitable course of study early in their program.

**COURSES**

**OTHER DIVISIONS OF THE UNIVERSITY**

Teachers, administrators, researchers, and specialists are expected to have substantial knowledge of a variety of academic fields outside the areas encompassed by professional education. Graduate students in the School of Education are, therefore, urged to consider the courses offered in other divisions of the University in planning their programs.

The numbering of courses in the School of Education identifies approximately the course level and the audience to which a given course is offered:

**Below 100-level**—For undergraduates

**100-level**—Primarily for undergraduates (graduates may enroll)

**200- and 300-level**—For A.M. and first- and second-year doctoral students

**400-level**—Research seminars or similar courses primarily for third-year doctoral students and beyond

Course descriptions are in numerical order and indexed by professional program areas.

An "X" suffix denotes a new experimental course. With faculty approval, after being taught twice, it can be offered as a regular course in the School of Education.

An "S" suffix denotes a special course, given only once and usually taught by visiting faculty.

**LEARNING SKILLS**

The following courses are offered by the Undergraduate Advising Center (UAC). The UAC provides and coordinates services to help student and adviser work together toward the establishment and accomplishment of the student's academic and personal goals. For detailed description of services and advising resources, see http://uac-server.stanford.edu/.

The UAC is on the first floor of Sweet Hall, and is open Monday through Friday 9:00 a.m. to 12:00 noon and 1:00 to 5:00 p.m., telephone: (650) 723-2426.

**50. Accelerated Learning**—Interactive, providing various methods for approaching difficult concepts which cannot be comprehended even after multiple efforts. The techniques for active learning, making it possible to accelerate the process of conquering difficult concepts while also achieving higher levels of understanding. Learn how to: identify your individual style and channels, practice locating areas of confusion, and formulate workable, individualized approaches.

1 unit, Aut, Spr (Townsend)

**51. Self Coaching: Learning Rapidly from Experience**—Self-coaching offers students a simple model for learning through experience. It emphasizes the value of awareness, observation, experimentation, and evaluation as a self-reinforcing method for development, growth, and change.

1 unit, Spr (Matthies, Worline)

**52. Practices in Critical Thinking**—Critical thinking is one of the most important skill sets we need to be successful in college and in the
workplace across subject areas. It encompasses knowing how to find assumptions, recognize ambiguity, evaluate arguments, and judge the credibility of sources of expert opinion. To think critically in one’s daily life and studies requires being comfortable with questions instead of answers, complexity instead of simplicity, uncertainty instead of certainty. These abilities are developed through practical exercises based on contemporary issues and through practice with texts from a variety of disciplines. Emphasis is on the value of developing a questioning mind and the importance of differentiating between academic and intellectual motivation.

3 units, Sum (Townsend)

53. Working Smarter through Precision Questioning—When life-long reading or classroom work is driven by questions, concentration is better, recall is more complete, motivation improves. Understanding the basic categories of questions and their interrelationships enables us to be more precise, better organized, and more critical. In-class exercises provide incrementally complex question ladders and increase skills in delivering questions and answers.

2 units, Win (Townsend)

54. Reading Faster—Coping with information overload requires speed reading as it traditionally has been defined, and the ability to overview, skim, extract, browse, and navigate through hypertext. To decide what is worth reading, quick and reliable judgments must be made about relevance and credibility. Academic texts, technical manuals, major newspapers, etc.

1 unit, Aut (Townsend)

55. Think On Your Feet—Learn how to be effective in small group discussions; quickly grasp the point being made, the supporting arguments, and the nature of the responses to arguments on the other side of the question. Increase your capacity for effective teamwork through in-depth, collaborative thinking exercises. Practice presenting your ideas to your peers and colleagues so that you are prepared to take advantage of Stanford’s numerous small group courses.

2 units, Win (Townsend)

58. Breakthrough Learning—Drawing on research in cognitive science, human motivation, and developmental psychology, the focus is on a key meta-skill: learning how to learn. Strategies help students construct new learning practices by becoming deeply aware of one’s own learning processes. Topics: the art of unlearning, language structure and change; learning styles and the intelligence trap; meta-cognition; harnessing paradox and intuition; communities of inquiry.

1 unit, Sum (Milojkovic)

EDUCATION

95S. Issues in Leadership—Priority given to undergraduates and master’s degree students. Basic theories and concepts in leadership and group process. Topics: identification of core values, building shared vision, group problem solving, leadership styles, decision-making, power and influence, conflict management, ethical dilemmas, community building, and personal policy development. Interactive and experiential, and for students currently in leadership positions in the University or who have jobs or volunteer roles where they are working in groups. Enrollment limited to 24. (SSPEP)

3-4 units, Win (Porteous)

105. American Education and Public Policy—(Meets with 215; same as History 158B.) Treats policy issues in education, drawing on history and political science. Who influences schooling and how? How have American schools responded to human diversity? What consequences does schooling have? What are the prospects for reform in public education? Lectures and small group discussions. (SSPEP/APA)

4 units (Kirst, Tyack) not given 1999-2000

106. Interactive Media in Education—Introduction to the use of interactive media for education and analyzes/criticizes them. Ideas are used to interpret/understand the experience of learning with interactive media. (CTE)

3-5 units, Sum (Walker)

107. Seminar: The Politics of International Cooperation in Education—For undergraduates and master’s students; see 306B.

3-4 units, Spr (Mundy)

109X. The Politics of Language Education in California Schools—Controversies surrounding language and educational policies pertaining to African Americans and English language learners are explored in the wake of legislation that was formulated to restrain curricula for language minority students throughout California. Interdisciplinary studies of language in schools and society are compared to legislation and educational policies within their historical and political contexts.

3-4 units, Win (Baugh)

120. Symbolic Systems Seminar: Problems in Intelligence, Information, and Learning—(Same as Symbolic Systems 200, Linguistics 137, Philosophy 200.) Interdisciplinary topics in cognitive science, (e.g., modularity, representation, reasoning, situated action, or creativity.) Prerequisites: Computer Science 109, Linguistics 120 or 130, Philosophy 80, Psychology 40, or consent of instructors.

3 units, Win (Greeno, Wasow)

130. Introduction to Counseling—The theories and techniques of counseling, emphasizing the clients’ individual and cultural differences, and construction of one’s own theory of the counseling process and outcome. Two psychotherapeutic theories, cognitive-behavioral and existential-humanistic, are supplemented with a third theory of each student’s choice. Experiential, problem-based focus on how to develop self-awareness and conceptual understandings of the counseling process in culturally diverse contexts. (PSE)

3 units, Win (Staff)

136. World, Societal, and Educational Change: Comparative Perspectives—See 306D. (SSPEP/ICE)

3-5 units, Aut (Ramirez)

137Q. Stanford Introductory Seminar: Conceptualizing Human Motivation—East and West—Preference to sophomores. What motivates behavior? This question is linked to one’s view of human nature and of the relationship between individuals and their social worlds. The multiple perspectives on human motivation, including Western psychological traditions and the contemplative spiritual psychologies of the East. Historical and cross-cultural approaches to understanding how different traditions treat motivation. Readings from personality, clinical, and developmental psychology, and from Eastern psycho-spiritual traditions such as Buddhism and yoga. How world views of human nature and development are related to theories of human motivation. Prerequisite: introductory psychology.

3 units, Win (Reesser)

138Q. Stanford Introductory Seminar: Educational Testing in American Society—Preference to sophomores. Tests are used for college admissions, program evaluation, and educational reform. In the classroom, grades are used to communicate about achievement, and sometimes to reward effort, improvement, or good behavior. Explanations for group and individual differences in test performance have been controversial this century, right up to current debates over affirmative action. The purposes and the logic of various testing programs, including classroom testing, admissions testing, and state and national testing programs. The meanings of reliability, validity, bias, and fairness in testing, developing the notion of validity argument as a conceptual tool for analyzing testing applications. Paper on some educational testing application.

3 units, Win (Haertel)
141. Race, Education and the Media—See 241. (SSPEP/APA)
   5 units, Spr (Carnoy, Stierer)

149. Theory and Issues in the Study of Bilingualism—(Same as Spanish 207.)
     For undergraduates; see 249.
     3-4 units (Valdés) not given 1999-2000

155. Development of Measuring Instruments—For students planning to
develop written or performance tests or questionnaires for research
and evaluation, and for teachers wishing to improve classroom examina-
tions. Planning tests, writing items, item tryout and criticism, qualities
desired in tests, and interview techniques. Lectures, case studies, and
practical exercises. (PSE)
   3 units (Haertel) not given 1999-2000

156X. Understanding Racial and Ethnic Identity—African American,
     Native American, Mexican American, and Asian American racial
     and ethnic identity development is explored to better understand
     the influence of social/political and psychological forces in shaping
     the experience of people of color in the U.S. Issues: the relative salience
     of race in relationship to other social identity variables, including gender,
     class, occupational, generational, and regional identifications. Bi-
     and multiracial identity status, and types of white racial consciousness.
     5 units (LaFromboise) not given 1999-2000

158. Children's Citizenship: Justice across Generations—(Enroll in
     Political Science 158R.)
     5 units, Aut (Reich)

160X. Introduction to Statistical Methods in Education—Master's
     students register for 266X; doctoral students in SSPEP/LLP register for
     216. Introduction to quantitative methods in educational research for
     doctoral students with little or no prior statistics. Organization of data,
     descriptive statistics, elementary methods of inference, hypothesis test-
     ing, and confidence intervals. Computer package used. Students cannot
     also receive credit for Psychology 60, or for Statistics 60 or 160. (All
     Areas)
     4 units, Aut (Hakuta)

161. Statistical Analysis in Educational Research—Primarily for
     doctoral students. Basic statistical methods for experimental and non-
     experimental educational research. Topics: analysis of variance methods
     up to factorial designs; regression methods up to multiple regression;
     basic methods for analysis of categorical data. Integrated with the use of
     statistical computer packages. See http://www.stanford.edu/class/ed 161/
     Prerequisite: 160 or consent of instructor. (All Areas)
     3 units, Win (Rogosa)

165X. History of Higher Education in the U.S.—(Same as 265X.)
     Introduction to historical perspectives on the development of higher
     education. Readings/discussions address the major periods of evolution,
     emphasizing the mid-19th century. Premise: insights into contemporary
     higher education can be obtained by examining its antecedents, particu-
     larly issues of governance, mission, access, curriculum, and the changing
     organization of colleges and universities. (SSPEP/APA)
     3-5 units (Staff) not given 1999-2000

166X. Teaching Reading, Writing, and the Language Arts—For
     STEP students. Focuses on application and psychological principles
     in understanding, assessing, and supporting the reading and writing pro-
     cesses, and the acquisition of literacy, especially in secondary school
     settings. Key concepts include language acquisition, perception, congnit-
     ion, motivation, and individual differences. (STEP)
     3 units, Sum (Rickford)

167X. Educating for Equity and Democracy—Introduction to the
     theories and practices of equity and democracy in education. How to
     think about teaching and schooling in new ways; the individual moral
     and political reasons for becoming a teacher. (STEP)
     3 units, Sum (Moffett)

170. Gender and Education—The concept of gender in educational
     contexts, focusing on formal schooling from elementary to graduate
     education, primarily within the U.S. Lecture/discussion and group activity
     formats consider the relationship between gender and education from
     social science perspectives. The advantages and disadvantages of differ-
     ent kinds of research about gender and education. Data is ethnographic,
     experimental, historical, statistical, and narrative. What gender differ-
     ences exist, what difference gender makes in various educational set-
     tings. (SSPEP)
     4 units, Aut (Christopher)

171X. Peer Health Education—Preference to students who make a
     commitment to serving as a Peer Health Educator. Instruction in peer
     health education leading to a Stanford University Peer Health Education
     certificate. Topics: health promotion program planning, theory and
     practice of behavior change, and an exploration of contemporary college
     Prerequisite: consent of instructor. (PSE)
     3-4 units, Spr (Pertofsky)


177X. Education of Immigrants in Cities—(Same as 277X.) Historical
     and contemporary approaches to educating immigrant students. Case
     study approach focuses on urban centers to demonstrate how stressed
     urban educational agencies serve immigrants and native-born U.S.
     students when confronted with overcrowded classrooms, controversy
     over curriculum, current school reform movements and government
     policies regarding equal educational opportunity. (SSPEP/LLP)
     4 units (Padilla) not given 1999-2000

179X. Urban Youth and their Institutions: Research and Practice—
     (Same as 279X.) The determinants and consequences of urban life for
     youth, emphasizing disciplinary and methodological approaches to the
     study of policies and practices and the growing gap between the perspec-
     tives of state and local organizations and those of youth and their
     communities. The diversity of urban youth experiences with respect to
     ethnicity, gender, and immigration histories: case studies illustrate civic-
     level and grassroots institutions, their structures, networks, and philos-
     ophies; historical and contemporary examination of diverse realities of
     urban youth for policymakers, educators, and researchers. Enrollment
     limited. Prerequisite: consent of instructor. (SSPEP/APA)
     3-4 units, Aut (McLaughlin)

180. Directed Reading in Education—For undergraduates and mas-
     ter's degree students. (All Areas)
     1-15 units, any quarter (Staff)

181X. Mind, Body, and Spirit: Spiritual Health through the Life
     Span—(Same as 281X.) The spiritual components of daily living and
     optimal health are commonly neglected in prevailing educational, med-
     ical, and psychological paradigms. Introduction to the spiritual features
     of everyday life, primarily from a psychosocial perspective with a focus
     on health and well being. Readings and problem-based learning tasks in
     solving spiritually-related problems. Introduction to elementary spiritual
     practices. Topics applicable in one's personal and professional life.
     Enrollment limited. Prerequisite: consent of instructor. (PSE)
     3 units (Thoresen) not given 1999-2000

188B. Bilingual Education—(Same as 388B.) For undergraduates; see
     388. (SSPEP, LLP, STEP).
     3 units, Win (Hakuta)
190. Directed Research in Education—For undergraduates and master's degree students. (All Areas)
1-15 units, any quarter (Staff)

192A. Peer Tutor Training—Readings/discussions of videotapes, and individual and group projects. Topics: problem-solving, study skills, effective listening and feedback, cross-cultural sensitivity, and teaching with questions. Short internship required for new tutors.
1 unit, Aut, Win (Freeman)

192B. Peer Tutoring in Writing—Writing tutors become familiar with the written work of fellow students and learn how to comment on it helpfully. Tutoring skills are developed through listening to experienced tutors, reflecting on our own writing processes, considering sample writing projects, role-playing tutoring situations, and discussing reading, assignments and projects.
2 units, Spr (Freeman)

193A. Peer Counseling: Bridge Community—Instruction in peer counseling. Topics: verbal and non-verbal skills, the use of open and closed questions, paraphrasing, working with feelings, summarization, and integration. Lectures, individual training, group exercises, role-play practice with optional video feedback. Sections on the relevance to crisis counseling and student life. Guest speakers from University and community agencies. Students develop and apply skills in a variety of settings in the University. (PSE)
2 units, Aut, Win, Spr (Moreno)

193B. Peer Counseling: Chicano Community—Instruction in basic counseling. Topics: verbal and non-verbal attending and communication skills, the use of open and closed questions, working with feelings, summarization and integration. Counseling issues that may be salient when working with Chicanos, including the significance and process of Spanish-English code switching in communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, and the experience of Chicano students in university settings. Lectures, individual training, group exercises, discussion, role-play, and videotape practice. (PSE)
2 units, Aut (Martinez)

193C. Peer Counseling: The African-American Community—Instruction in peer counseling with Blacks. Topics: the concept of culture, Black cultural attributes and their effect on Blacks' reactions to accepting counseling, verbal and non-verbal attending, the use of open and closed questions, working with feelings, summarization, and integration. Geared toward counseling with Blacks; methods of instruction include reading assignments, lectures, guest speakers, group discussion, role-play, and videotaped practice. Students develop and apply skills in the Black community on campus or in other settings that the student may choose.
(PSE)
2 units, Aut (Edwards, Reede-Hoskins)

193F. Peer Counseling: The Asian American Community—Topics: the Asian family structure, concepts of identity, ethnicity, culture, and racism in terms of their impact on individual development and the counseling process. Emphasis is on the development of an appreciation and empathic understanding of Asians in America. Lectures, readings, discussion, and group exercises. (PSE)
2 units, Win (Brown)

193N. Peer Counseling in the Native American Community—Instruction in basic counseling techniques. Topics: verbal and non-verbal communication, strategic use of questions, methods of dealing with strong feelings, and conflict resolution. Emphasizes how basic elements of counseling apply to Native Americans, including client, counselor, and situational variables in counseling, the significance of non-verbal communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, the impact of family on personal development, gender roles and Native Americans, and the experience of Native American Indian students in university settings. Lectures, individual skill development, group exercises, and role practice. (PSE)
2 units, Win (Simms, Martinez)

193P. Peer Counseling Practicum—For those who continue to study counseling methods while counseling students.
1-5 units, Aut, Win, Spr (Staff)

194. Leadership in Academic Advising—Focus is on the skills needed to be an active leader in the academic advising process through the role of Head Advising Associate, taught simultaneously with the HAA selection process through the Undergraduate Advising Center. Students develop the advising process as it applies to the advising process for freshmen and sophomore students. Workshops, focus groups, guest speakers, role playing, and case studies develop listening and counseling skills, ask critical questions, and learn about group facilitation. Corequisite: students must be applying for the position of Head Advising Associate for 2000-01.
2 units, Aut (Freeman)

197. Education and the Status of Women: Comparative Perspective—Theories and perspectives from the social sciences relevant to an understanding of the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of women and its uses to evaluate knowledge claims from varying perspectives. (SSPEP) GER:4c (DR:†)
4-5 units, Win (Ramirez)

199A,B,C. Undergraduate Honors Seminar—Required for all juniors and seniors in the honors program in the School of Education. Supports students' actual involvement and apprenticeships in educational research. Participants are expected to share ongoing work on their honors thesis. Prerequisite: consent of instructor. (All Areas)
1 unit, Aut, Win, Spr (Ramirez)

200. The Work of Art and the Creation of Mind—Collaboration between the Art, Dance, Drama, and Music programs, and the School of Education examines the relationship between the work of art and the creation of mind, i.e., the work of art as a task of making something and as a form that has been made. The ways a conception of art develops and refines the mind. Discussion, readings, and observation of artists at work. The relationship between forms of art and forms of thought. What does either the perception or creation of art in any of its forms do to how we think and know? (CTE)
4 units, Win (Eisner, Chagoya, Rehm, Ross, Sano)

201. History of Education in the United States—(Same as History 158.) Analysis of selected turning points in education in relation to religion, political socialization, race relations, gender, immigration, and urbanization. Limited enrollment. (SSPEP)
3 units, Aut (Tyack, Williamson)

201A. History of African American Education through 1940—A survey of pivotal points in African American educational history, including literacy attempts during slavery, the establishment of historically Black colleges and universities, the debate between liberal and vocational education, and Black student rebellions on campuses. (SSPEP)
3 units, Win (Williamson)

201B. Education for Liberation—Focusing on African Americans, investigates how education has been employed to advance group self-determination and autonomy from the 1954 Brown decision to contemporary Afro-centric/African-centered educational initiatives. (SSPEP)
3 units, Spr (Williamson)
202. Introduction to Comparative and International Education—Introduction to the field of comparative and international education. Contemporary theoretical debates about educational change and development, and the international dimension of several contemporary issues in education. Emphasis is on the development of students' abilities to engage in cross-national and historical comparisons of educational phenomena. (SSPEP/ICE)
4-5 units, Aut (Carnoy)

203X. Education and Inequality in American Culture: Discussion—Overview of the cultural production of inequalities in school performance by class, race, ethnicity, gender, and individual style. Students exploring the same themes in small group discussions enroll in 220Y for additional 2 units.
2 units, Aut (McDermott)

203Y. Discussion: Education and Inequality in American Culture—Overview of the cultural production of inequalities in school performance by class, race, ethnicity, gender, and individual style. Small group discussions of competition and unequal access in notable American texts. Corequisite: 203X.
2 units, Aut (McDermott)

204. Introduction to Philosophy of Education—Introduces current approaches and techniques in the philosophy of education; material has been selected for its general relevance to students of education. Feminist and radical theories of education. Introductory philosophical material is presented in the context of educational issues. (SSPEP)
4 units, Aut (Callan)

205. Group Counseling—Develops the ability to identify and understand the interpersonal processes in a small group. First-hand experiences simulate group processes that can be examined and conceptualized. Prerequisite: consent of instructor.
1-4 units (Staff) not given 1999-2000

206A. Applied Research Methods in International and Comparative Education I: Introduction—Required for all A.M. students in ICE and IEAPA, others by consent of instructor. Orientation to the A.M. program and research project, exploration of resources for study and research. (SSPEP/ICE)
1 unit, Aut (Rhoten)

206B. Applied Research Methods in International and Comparative Education II: The Master's Monograph Proposal—Required for all A.M. students in ICE and IEAPA; others by consent of instructor. Development of research skills through discussion of theoretical and methodological issues in comparative and international education. Preparation of a research proposal for the A.M. monograph. (SSPEP/ICE)
3-5 units, Win (Rhoten)

206C. Applied Research Methods in International and Comparative Education III: Master's Monograph Workshop—The conclusion of the four-quarter A.M. program in ICE and IEAPA, required of all A.M. students. In-depth reviews of students' research in preparation for the completion of their master's monograph. (SSPEP/ICE)
3-5 units, Sum (Rhoten)

208B. Curriculum Construction—The practice of curriculum improvement including planning, policy making, development, implementation, and evaluation. Extensive, in-depth treatment of methods and approaches to curriculum improvement and their strengths and limitations. (CTE)
3 units, Spr (Staff)

208C. Introduction to Curriculum—Restricted to students enrolled in the Prospective Principals Program. Curriculum studies for those concerned primarily with school administration. Topics: curriculum theory, the relation of theory and practice, schools and classrooms as contexts for curriculum, curricular policy mandates, leadership in school curricular issues, curriculum development, curriculum implementation. (CTE)
3 units, Sum (Staff)

209X. The Politics of Language Education in California Schools—(Same as 109X.)
3-4 units, Win (Baugh)

210. Problems in Sociology of Education—(Meets with 310; same as Sociology 223/230.) Introduction to sociological approaches to educational phenomena. Topics: school organization and environment, the relationship of education to adult roles, the impact of social class and ethnicity on classroom learning, and the social structure of the classroom. Read/evaluate social sciences research. Short written assignments and individual feedback. (SSPEP)
4 units, Spr (Ramirez)

211. Master's Seminar in Social Sciences in Education—Limited to master's students in SSE. Directed, hands-on forum for SSE students to critically examine the process of developing and shaping a research program, integrating it with academic and field experiences, and building relationships beyond the program. Students conceptualize their projects and focus on researchable topics: effective revising and editing, job searches, working with your adviser, "what next?", or a celebration of our achievements so far. (SSPEP)
1 unit, Aut, Win, Spr (Christopher)

213. Aesthetic Foundations of Education—What role might the arts play in education? Do the arts contribute to the development of cognitive skills? Do they help humans understand the world in which they live? Are aesthetic considerations central in the way we think about the aims of education? Do they enhance teaching and school organization? (CTE)
4 units (Eisner) not given 1999-2000

214. Popper, Kuhn, and Lakatos—(Same as Philosophy 156.) Popper, Kuhn, and Lakatos are 20th-century philosophers of science who have raised fundamental issues dealing with the nature of scientific progress: the rationality of change of scientific belief: science vs. non-science; the role of induction in science, truth, or verisimilitude as regulative ideals. Their impact in the social sciences and applied areas such as educational research. (SSPEP)
3 units, Spr (Phillips)

215. American Education and Public Policy—(Same as History 158B.) For graduate students. See 105. (SSPEP/APA)
4 units (Kirst, Tyack) not given 1999-2000

216. Survey of Educational Research Methods—For first-year SSPEP/LLP doctoral students and others. The basics of conceptualization, design, instrumentation, and interpretation of empirical research using quantitative and qualitative approaches. Designed around individual student projects. (SSPEP/LLP, CTE)
2 units, Win, Spr (Padilla)

219. Artistic Development of the Child—How can children's and adolescents' development in the arts be described? What roles do the symbolic transformation of experience play in the creation of those images we regard as art? What can teachers do to promote the development of artistic thinking? These and other questions are examined through the study of theory and research conducted within the social sciences. (CTE)
4 units, Aut (Eisner)

220A,B,C,D,Y. The Social Sciences and Educational Analysis—Required of students in APA and open to all. Economics, political science, sociology, and history, and their applications to education in the U.S.
220A. The Social Sciences and Educational Analysis: Introduction to the Economics of Education—Overview of the relationship
between education and economic analysis. Topics: labor markets for teachers, the economics of child care, the effects of education on earnings and employment, the effects of education on economic growth and distribution of income, and the financing of education. Students who lack training in micro-economics enroll in 220Y for one additional unit of credit. (SSPEP/APA)

220B. Introduction to the Politics of Educational Analysis—The relationships between political analysis and policy formulation in education; focus is on alternative models of the political process, the nature of interest groups, political strategies, community power, the external environment of organizations, and the implementations of policy. Applications to policy analysis, implementation, and politics of reform are emphasized. Prerequisite: Political Science or Public Policy major, or student in SSPEP. (SSPEP/APA)

4 units, Win (Loeb)

220C. Education and Society—(Same as Sociology 130.) The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. Social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling. (SSPEP/APA) GER:3b (DR:9)

4-5 units, Aut (Staff)

220D. History of School Reform: Origins, Policies, Outcomes, and Explanations—Restricted to graduate students and undergraduates planning to work on honors theses in education or in directly related areas. Focus is on school reform in the U.S. during the last 50 years. Reform and practice in other nations for comparative purposes. Topics: theories of reform; school choice; academic standards and systemic reform; civil rights issues including racial and social integration, and the education of limited English speaking students; governance approaches; and the implementation of reform. Why and how some school reforms persist, why some fail or fade, and why some recur periodically. Students investigate a particular reform: its sources, policy development and implementation, and the consequences, intended and unintended, using one or more of the analytic frameworks presented. (SSPEP/APA)

4 units, Spr (Kirst)

220Y. Introduction to the Economics of Education: Economics Section—Introduction to micro-economics for those taking 220A who have not had micro-economics before or who need a refresher. Corequisite: 220A. (SSPEP/APA)

1-2 units, Win (Loeb)

221A. Issues in Policy Analysis—Major concepts associated with the development, enactment, and execution of social policy. Issues of policy implementation, agenda setting and problem formulation, coalition politics, and intergovernmental relations are examined through case materials and supplementary readings. Objective: identify and understand the factors that affect the ways in which analysts and policymakers learn about the policy system and the ways in which they can influence it. Enrollment limited. Prerequisite: consent of instructor. (SSPEP/APA)

4-5 units, Win (McLaughlin, Darling-Hammond)

221B. Issues in Policy Analysis—Provides doctoral students an opportunity to analyze the macro- and micro-dimensions of policy issues in education. Students use their own research interests to explore the analytical, empirical, and methodological aspects of these two different perspectives on policy and action.

3 units (McLaughlin) not given 1999-2000

222. Resource Allocation in Education—Problems of optimization and design, and evaluation of decision experience. Marginal analysis, educational production functions, cost effectiveness and cost-benefit analysis, constrained maximization, program evaluation. Introduction to linear models for large-scale data analysis. Implications to model assumptions. (SSPEP/APA)

4-5 units, Spr (Loeb)

223. Effective Schools: Research, Policy, and Practice—Recent studies of schools that exceed expectations in producing desired results. Research methodologies, findings of studies, and efforts to implement results. Components of "good" schools analyzed: effective teaching, principal leadership, organizational processes, parent involvement, cultures in schools, the role of the superintendent. Required project studies a school and determines "goodness." (SSPEP/APA; CTE)

3-4 units (Cuban) not given 1999-2000

224. Information Technology in the Classroom—STEP teachers have priority. Use of information technology (computers, interactive video, telecommunications) in secondary school classroom teaching. Basic computer operations and terminology; challenges of planning and teaching with technology; judging the merits of products for educational uses; survey of the types of uses made of technology in schools; and economic, social, and ethical issues, emphasizing equity. Meets fifth-year teacher credential requirement. (CTE, STEP)

3 units, Win (Walker)

226. Classroom Assessment—Research on classroom testing; creating and selecting classroom tests; instructional uses of tests, performance tests, classroom observations, linking testing and instruction, using standardized test results. (PSE)

3 units (Haertel) not given 1999-2000

228. Research on Reading and Reading Acquisition—For doctoral and master's students in SSPEP/LLP, PSE, CTE, and SSPEP. Focus is on the application of psychological principles in understanding the reading and writing process and the acquisition of literacy in school and non-school settings. Key concepts: psycholinguistics, perception and cognition, motivation, and individual differences. (SSPEP/LLP)

3-4 units (Kamil) not given 1999-2000

229A,B,C,D. Seminar in Learning Design and Technology—Four-quarter core of the LDT master's program. Topics: learning, cognition, and development; design principles for technological learning environments; technological literacy and skills; research methods and evaluation; curriculum and content; and organization structure and operation. Students navigate one or more design sequences in learning environments rooted in a practical problem. Topics in learning, design, and technology are examined from a theoretical and a practical application perspective. Readings and hands-on development are a team-collaborative effort. (All Areas)

229A. 3 units, Sum (Walker)

229B. 3 units, Aut (Staff)

229C. 3 units, Win (Kamil)

229D. 3 units, Spr (Barron, Greeno)

230. Ethnographic and Empowerment—The role of ethnography in addressing contemporary and socially significant issues. The value of ethnographic evaluation in educational settings. Successful strategies to effectively communicate qualitative findings with powerful policymaking bodies to improve our world, including testifying on the hill and sharing findings through the media. The role of ethnographic and empowerment evaluation in contributing to organizational transformation. (SSPEP)

5 units, Spr (Fetterman)

232A. Teaching and Teacher Education—First of three core courses in CTE. Theory and the practice of teaching, past and present (K-12 and higher education). (CTE)

4 units, Win (Staff)

232B. Introduction to Curriculum—Second of CTE core. What should American schools teach? How should school programs be organized? How can schools determine whether the goals they have formulated have been achieved? What kind of school organization helps teachers improve their teaching practices? Students secure a historical and contemporary
238B. Counseling and Health Psychology: Supervised Applications—For first-year counseling psychology students. Integration of counseling practice with research findings. Continuing review of training tapes, role-playing, and supervision of counseling experiences. Prerequisite: consent of instructor. (PSE)
3 units, Win (Thoresen)

238C. Counseling and Health Psychology: Supervised Applications—For first-year counseling psychology students. Advanced study of counseling theories, techniques, and assessment methods. Emphasis is on the integration of counseling practice within a research framework. Continuing review of training tapes, role-playing, and supervision of counseling experiences. Prerequisite: consent of instructor. (PSE)
3 units, Spr (Krumholz)

239. Contemporary Social Issues in Child and Adolescent Development—Focuses on critical social and developmental issues that affect children and adolescents. Topics: divorce and single parenting, child care, poverty, sexuality, and mass media, emphasizing the impact of these conditions on normal development, education, and school-related social and cognitive performance. (PSE)
4 units, Spr (Padilla)

240. Adolescent Development and Learning—Two presuppositions: that fruitful instruction takes into account the developmental characteristics of learners and the task demands and structure of specific curricula; and that teachers can promote learning and motivation by mediating between the characteristics of students and of the curriculum and the wider social context of the classroom. The strategies and issues involved in this mediational process with secondary students. Prerequisite: STEP student or consent of instructor. (STEP)
3 units, Aut (Roeser, Darling-Hammond, Padilla)

241. Race, Education, and the Media—(Same as 141.) In-depth overview of the critical issues and policies that impact race relations and education in our society. Lectures, readings, discussions on the debates on affirmative action, merit, racial inequality, improving educational quality, and how these issues are shaped by a rapidly changing media industry.
5 units, Spr (Carnoy, Stierer)

242. First-Year Proseminar in Language, Literacy, and Culture—For master’s and first-year doctoral students in SSPEP/LLP. Introduces the basic concepts and pragmatics of the field, providing opportunities to meet faculty, respond to critical readings, and explore professional matters. (SSPEP/LLP)
4 units (Hakuta, Kamil, Valdés) not given 1999-2000

243. Research in Writing and Writing Instruction—Tradition and change in writing research, emphasizing theoretical and pedagogical implications. Topics: formalist, cognitive, and social-contextual approaches; writing and learning; writing/reading connections; writing/speaking connections; the composing process; writing pedagogy; individual research projects. (SSPEP/LLP, CTE)
4 units, not given 1999-2000

245X. Seminar in Teacher Education—For doctoral students interested in preparing to become teacher educators or who have interests in policy issues related to teacher education. Directed reading, discussion, and analysis of teacher education program models; new approaches to support teacher learning in the pre-service and in-service contexts; and changes in policies relevant to teacher education. The theoretical frames include adult learning theory, organizational supports for professional learning, and issues of institutional change.
3 units, Win (Darling-Hammond)

246A,B,C,D. Secondary School Teaching Practicum—Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with
accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student. (STEP)

246A. 2 units, Sum (Carter)
246B. 1-4 units, Aut (Lotan)
246C. 7-10 units, Win (Lotan)
246D. 3 units, Spr (Lotan)

247. Moral Education—Issues in moral theory and education, including consideration of the Kohlberg-Gilligan debate, character education, and contemporary issues on values and religious education. (SSPEP)
3 units, Win (Damon)

248. Theory and Issues in Literacy—Theoretical issues in writing and literacy, and implications for education. Connections between literacy, thinking, and learning, emphasizing the kinds and definitions of literacy, oral and written language, social construction of literacy, historical perspectives, and the functions of reading and writing. (SSPEP/LLP)
4 units (Staff) not given 1999-2000

249. Theory and Issues in the Study of Bilingualism—For graduate students. Key issues in the study of bilingualism from a sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, the description and measurement of bilingualism, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings. (SSPEP/LLP)
3-4 units (Valdés) not given 1999-2000

250B. Statistical Analysis in Educational Research: Analysis of Variance—Sequence, primarily for doctoral students. Analysis of variance models are among the most widely used data analytic procedures, especially in experimental, quasi-experimental, and criterion-group designs. Topics: single-factor ANOVA, factorial between and within subjects and mixed design ANOVA (fixed, random, and mixed models), analysis of covariance, multiple comparison procedures. Prerequisite: 160X or equivalent. (All Areas)
4 units (Shavelson) not given 1999-2000

4 units (Okin) not given 1999-2000

252. Introduction to Test Theory—Concepts of reliability and validity; derivation and use of test scales and norms; mathematical models and procedures for test validation, scoring, and interpretation. Prerequisite: Statistics 190 or equivalent. (PSE)
3-4 units, Spr (Haertel)

253X. The Principalship: Theory and Practice—For those interested in leadership roles in K-12 education, or for those interested in the theory and practice of school administration. Seminar immerses students in a broad study focused on conceptions of the role of the school principal.
3-4 units, Spr (Copland)

257A,B. Statistical Methods for Behavioral and Social Sciences—For students with experience and training in empirical research. Analysis of data from experimental studies through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through log-linear models, logistic regression. Integrated with the use of statistical computing packages. Prerequisite: analysis of variance and regression at the level of Statistics 161.
3 units (Rogosa) not given 1999-2000

259. Seminar in Higher Education—Students learn about different collegiate cultures, are introduced to several common administrative services, discuss and share internship experiences, develop some practical skills needed to work in the collegiate setting, and learn to recognize and evaluate some perennial ethical and governance issues on college and university campuses. (SSPEP/APA)
3 units (Staff) not given 1999-2000

260X. Popular Advanced Statistical Methods—Overview and implementation of some advanced statistical methods currently popular in educational research. Methods for accommodating the nested structure of much educational data (e.g., students within classrooms within schools) which arise as units of analysis problems, ecological regression, or hierarchical linear models. Methods for complex measurement models in regression settings known as structural equation models, causal models, covariance structures. See http://www.stanford.edu/class/ed 260
3 units, Aut (Rogosa)

261X. Critical Reading in the Content Areas—Topics: introduction to models of reading, functions of literacy, components of reading instruction, content reading vs. recreational reading, literacy vs. expository materials, and reading to learn vs. learning to read; text types; testing and assessment; vocabulary and reading instruction; comprehension and background knowledge; study skills and aids; metacognition; strategies; writing and reading instruction; technological applications; affective concerns and motivations. (SSPEP/LLP)
3 units (Kamil) not given 1999-2000

262A,B,C. Curriculum and Instruction in English—Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP)
262A. 3 units, Sum (Vosovic)
262B. 2 units, Aut (Vosovic)
262C. 3 units, Win (Vosovic)

263A,B,C. Curriculum and Instruction in Mathematics—The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP)
263A. 3 units, Sum (Boaler)
263B. 2 units, Aut (Boaler)
263C. 3 units, Win (Boaler)

264A,B,C. Curriculum and Instruction in Foreign Languages—Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP)
264A. 3 unit, Sum (Azevedo)
264B. 2 unit, Aut (Azevedo)
264C. 3 units, Win (Azevedo)

265X. History of Higher Education in the U.S.—See 165X.
3-5 units (Staff) not given 1999-2000

266X. Social Science Research Methods in Education—Introduction to the social science research methods commonly used in the study of education, primarily for master's students with little or no quantitative background, or who desire an integrated, general introduction to quantitative and qualitative methods in educational research. Objectives: prepare students to be thoughtful consumers of educational research; cultivate skills in critiquing research for its strengths and weaknesses; prepare for further SUSE courses which assume some competence in these areas and/or provide hands-on opportunities to use these research methods. Quantitative and qualitative forms of inquiry are integrated and contrasted, emphasizing correlational and case study research problems
and research questions, issues of design, and issues that commonly arise during data collection and data analysis procedures. (SSPEP)

4 units, Aut (Haertel, Pettekman)

267A, B, C. Curriculum and Instruction in Science—Examination of the possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP)

267A. 3 unit, Win (Atkin)
267B. 2 unit, Aut (Schultz)
267C. 3 units, Win (Schultz)

268A, B, C. Curriculum and Instruction in Social Studies—Emphasis is on the methodology of social studies instruction: review of curriculum trends, survey of teaching materials, opportunities to develop teaching and resource units. Prerequisite: STEP student.

268A. 3 unit, Sum (Pesick)
268B. 2 unit, Aut (Pesick)
268C. 3 units, Win (Pesick)

269. Principles of Learning for Teaching—Student learning and the epistemology of school subjects as they relate to the planning and implementation of teaching, the analysis of curriculum, and the evaluation of performance and understanding. Readings and activities are coordinated with internship and the student teaching activities of participants. Prerequisite: STEP student or consent of instructor.

3 units, Win (Darling-Hammond, Shulman)

273X. Women in Higher Education—Overview of the historical, theoretical, and ideological issues related to women's lived experiences as students, faculty, and administrators in higher education, and to the inclusion of feminist scholarship in higher education curricula. (SSPEP/APA)

4 units (Christopher) not given 1999-2000

277X. Education of Immigrants in Cities—For graduate students; see 177X.

4 units (Padilla) not given 1999-2000

278. Introduction to Issues in Evaluation—Focus is on the basic literature and major theoretical and practical issues facing the evaluation field. Topics: evaluation as a branch of experimental science, models of evaluation, quantitative and qualitative approaches to evaluation, evaluation as related to decision-making and the political process, and professional standards of evaluation. (SSPEP)

3 units, Win (Staff)

279X. Urban Youth and their Institutions: Research and Practice—For graduate students; see 179X. Enrollment limited, consent of instructor required. (SSPEP/APA)

3-4 units, Aut (McLaughlin)

280. Ethnographic Approaches to Cultural Diversity in Schooling—(Same as Cultural and Social Anthropology 280.) How to learn about culture and to analyze education-relevant situations such as the culturally diverse classroom. The cultural process is approached by acquiring techniques of observation, interview, and interpretation of behavior in context, and soliciting and recording the "native" explanations of their own behavior; developing an internally consistent conceptual structure that orients observation and elicitation productively; and being sensitized to one's own culture and how it influences perception and interpretation of behavior. Techniques of ethnographic research applicable to the study of schooling are demonstrated and applied in field research projects. Research report or proposal for research. (SSPEP)

4 units, Spr (Spindler)

281X. Mind, Body, and Spirit: Spiritual Health through the Life Span—For graduate students; see 181X. (PSE)

3 units (Thoresen) not given 1999-2000

282. Linguistics and the Teaching of English as a Foreign/Second Language—(Enroll in Linguistics 189/289.) (SSPEP/LLP)

4-5 units, Win (Hubbard)

283. Attitudes toward Languages and Language Study—With language viewed as an intergroup phenomenon, examines attitudes people hold toward their own and different languages, the bias toward and against speakers of different languages, how personal and societal attitudes affect the study and learning of a foreign or second language. A socio-psychological perspective is used as a central framework to guide the study of attitudes toward language. (SSPEP/LLP)

3 units (Padilla) not given 1999-2000

284. Teaching in Heterogeneous Classrooms—Teaching in academically and linguistically heterogeneous classrooms requires a repertoire of pedagogical strategies. Focus is on the ways to provide access to intellectually challenging curriculum and equal-status interaction for students in diverse classrooms. Emphasis is on groupwork, a highly recommended and documented instructional approach, and its cognitive, social, and linguistic benefits for students. How to prepare students for groupwork, equalize participation, design learning tasks that support conceptual understanding, mastery of content and language growth, and assess group products and individual contributions. (STEP)

3-4 units, Aut, Win (Lotan)

285X. Teaching in Higher Education—Preference given to doctoral candidates within two years of completing their dissertation and who are interested in embarking upon a career in university teaching. Course design, teaching, and evaluation of university teachers and of their students, providing an overview of the field of university teaching as an arena for faculty development and research. Enrollment limited. (CTE, PSE)

3 units (Staff) not given 1999-2000

286A. Second Language Acquisition—For students interested in teaching English as second/foreign language. Second language learning and teaching. Serves as basis of second language pedagogy, preparing STEP students for CLAD certification. (SSPEP/LLP, STEP)

3-4 units, Sum (Staff)

286B. Second Language Acquisition Research—Review of major research findings and theories in second language acquisition. Discussion of second language research and theories in formal and informal settings where a second language is learned. (SSPEP/LLP)

4 units (Padilla) not given 1999-2000

287. Culture and Learning—(Same as Cultural and Social Anthropology 158.) Learning in various institutional settings in the U.S. and around the globe. Learning in families, in schools, on the job, and on the streets. Emphasis is on the cultural organization of success and failure in American schools. Tentative consideration of opportunities for making less inequality. (SSPEP, STEP)

3-4 units, Win (McDermott)
289. Introduction to Linguistics for Educational Researchers—For graduate students with interests in educational research, and who plan to concentrate on language or linguistics. Basic linguistic concepts, complementary surveys of educationally oriented studies that explore quantitative linguistic analyses, qualitative ethno-linguistic analyses, discourse analyses, conversation analyses, and studies of bilingualism. Emphasis is on the linguistic analyses of language minority populations and related educational policies.
4 units, Aut (Baugh, Hakata)

290. Leadership in Education: Research and Practice—Conceptions of leadership that include the classroom, school, district office, and state capital. The role of complexity; organizational leaders outside of schools past and present, and how that complexity permitted leadership to arise. Case studies. (SSPEP/APA)
3-4 units (Cuban) not given 1999-2000

295. Psychology of Problem Solving and Reasoning—(Same as Psychology 261.) Introduction to the results and methods of research on the cognitive processes of solving problems and reasoning. Focus is on the accomplishments and limitations of research conducted since 1970, including views of cognition as situated activity. (PSE)
3 units (Greeno) not given 1999-2000

296. Substance Dependence: Assessment, Treatment, and Prevention—Open to graduate students in the social sciences. Survey of prevalence, etiology, and treatment of alcohol and drug-related disorders. Focus is on a developmental perspective and how substance abuse disorders manifest themselves in men and women at different ages from childhood through late adulthood. Various treatment approaches that have been beneficial, such as AA, individual and group work, family treatment, and inpatient vs. outpatient care. Required visit to relevant treatment programs during the quarter. (PSE)
3 units, Win (Gallagher-Thompson, Moffett)

297X. Research in Second Language Classrooms—Introduction to qualitative research methods in applied linguistics. Review of classroom-based research on second language teaching and learning. Discussion and critique of research methods including classroom observation, interaction analysis, classroom ethnography, interviews and questionnaires, and case studies. Individual projects utilize data gathered in second language classrooms. (SSPEP/LLP)
3 units (Valdés) not given 1999-2000

301. Graduate Colloquium: Historiography of American Education—(Same as History 301.) Analysis of the literature of American education history for students doing further work in the field. Weekly colloquium discussions, plus an opportunity to pursue specialized topics in small group tutorial sessions. Limited enrollment. Prerequisite: consent of instructor. (SSPEP)
3-4 units, Aut (Tyack)

302X. The Role of Knowledge and Learning in Teaching—Focuses on current literature relevant to the structure of subject matter of instruction in schools, and to the cognitive processes involved as students try to learn material. The implications of the literature on the role of the teacher. (CTE)
3 units, Win (Shulman, Darling-Hammond)

303. Qualitative Inquiry in Education—The ways in which artistically and humanistically based approaches to the study of teaching, classroom life, and schooling can improve the understanding of education. Introduces qualitative methods of inquiry that emphasize literary and other interpretive forms, and new approaches to inquiry in education. A study using methods. (CTE)
4 units (Eisner) not given 1999-2000

304. The Philosophical and Educational Thought of John Dewey—Analysis of important works of John Dewey. Readings vary each year. Emphasis may be on his social and moral writings. (SSPEP)
4 units, Win (Callan, Phillips)

5 units, Win (Carnoy)

306B. Seminar: The Politics of International Cooperation in Education—(Same as 107.) Analysis of policies and practices in international cooperation, assistance, and exchange. Emphasis is on the role of international organizations (World Bank, UNESCO, OECD) and the politics of multilateral and bilateral assistance programs. (SSPEP/ICE, APA)
3-4 units, Spr (Mundy)

4 units, Spr (McDermott)

306D. World, Societal, and Educational Change: Comparative Perspectives—(Same as Sociology 231.) Analysis of the relations between educational and societal developments from a comparative perspective. Readings on various theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation-building; education, mobility, and equality; education, international organizations, and world culture. (SSPEP/ICE)
3-5 units, Aut (Ramirez)

308. The Analysis of Teaching—Teaching is often considered an art or craft rather than a science. Is this true? Do teachers function as performers? Videotapes of teachers in action serve as a resource for the analysis of teaching. Concepts and methods from the field of criticism provide tools to analyze teaching. Literature in criticism, aesthetics, and qualitative evaluation secures the conceptual tools for the analysis of teaching. (CTE)
4 units (Eisner) not given 1999-2000

309X. Personality and Emotions in Organizations—The connection between personality and emotions with the work and home environments is seldom recognized in organizational theory. Human emotions are highlighted, coupled with selected personality typologies. Their relevance to effective organizations. Students concerned with leadership learn about their own personality/emotional styles and consider how that information might be used to increase their effectiveness as leaders in organizations.
3 units (Thoresen) not given 1999-2000

310. Problems in Sociology of Education—(Same as Sociology 232/330.) For doctoral and master's students. Meets with 210. Emphasis is on conceptualizing and analyzing applied sociological research in education. Short written assignments, individual feedback, and work with actual research data. (SSPEP)
4 units, Spr (Ramirez)
311X. First-Year Doctoral Seminar: Introduction to Research—Introduction to the broad range of methods used in current educational research, focusing on the logical and epistemological, design, and ethical issues. (All Areas)
1-2 units, Aut, Win, Spr (Shavelson, Phillips)

312. Interaction Processes in Education: Design and Evaluation—(Same as Sociology 224.) The educational applications of sociological/social psychological theory and research to classroom processes, staff relations, teams, and task forces. The principles for design and evaluations of group work for students and teamwork for teaching staff. Topics: social processes of influence, role differentiation, and evaluation. Methods for systematic evaluation and observation. Students receive practical experience in using these methods. (SSPEP)
4 units (Staff) not given 1999-2000

313X. Mathematics, Equity, and Situated Learning—The ways in which mathematics intersects with people’s lives, the reasons why it is practiced only by the elite few and the potential of situated perspectives for the attainment of equitable practices. Drawing on theories of learning, curriculum, equity, and schooling, students research these and related issues.
3 units (Boaler) not given 1999-2000

314. Workshop in Economics of Education—Research by students and faculty engaged in problems in the economics of education. Students must have advanced graduate training in economics theory and methodology and be engaged in research on the topic. (SSPEP)
1-2 units, Aut, Win, Spr (Carnoy)

315X. Vouchers and Choice in Education—The theory and empirical data on issues of educational choice and vouchers in the U.S., Europe, and other countries. Recommended: background in economics. (SSPEP)
3 units, Win (Carnoy)

320. Instruction of Heterogeneous Populations—The challenges facing schools having multilingual, multiracial, and multicultural populations, emphasizing the critical evaluation of problem statements and proposed solutions. The role of the principal in promoting innovations designed to address these challenges. Issues related to leadership for staff support and training and program coordination. (SSPEP/APA)
3 units (Staff) not given 1999-2000

321B. Analysis of Social Interaction—Practicum on discourse, interactional, and cultural analysis of videotaped data. Various levels of analysis of interactional data, and the basis on which analytic claims can be founded. The transcription of speech and movement in social interaction, and how to identify the patterns which participants use to display and interpret cultural meanings. The theoretical assumptions hidden in transcription systems. Prerequisite: first- or second-year graduate student. (SSPEP/ICE)
4 units, Aut (McDermott)

322X. Discourse Analysis in Educational Research—Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in the context of school. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor. (SSPEP/LLP)
5 units (Staff) not given 1999-2000

3 units, Aut (Kirst)

324X. Emerging Business Opportunities in Education and Training—(Same as Business 345G.) For students in the joint degree program with business and education, and others. A combination of changing market mechanisms and emerging technologies is fueling new opportunities for for-profit education and training organizations. The interaction of firms with the public sector presents special challenges for these organizations. The special roles of public administrators, educators, investors, and technology providers in defining opportunities, challenges, and constraints for education and training firms. Approaches to strategy formation, product development, and operations. Visiting managers and other experts. (SSPEP/APA)
2-4 units (Kirst) not given 1999-2000

325X. Approaches to Qualitative Research in Education—Students familiarize themselves with the diverse pertaining to qualitative research in education and think critically about how they frame educational problems and the role that qualitative methods have in understanding them.
3 units, Spr (Staff)

327A,B,C. The Conduct of Qualitative Inquiry—Integrated, three quarters for doctoral students ready to engage in serious pursuit of research that anticipates, is a pilot study for, or in some significant way feeds into their dissertations. It is not necessary that students have written and received approval for their dissertation study. The experience mirrors most of what any research project entails, and is about the actual conduct of research. All students engage in common research processes from September to June including developing interview questions; interviewing; coding/analyzing, interpreting data; theorizing; and writing up results. Participant-observation as needed. Students should consider this a sequence, with the division into quarters as arbitrary. Preference to students who intend to enroll for all three quarters.
327A. 4 units, Aut (Peshkin)
327B. 4 units, Win (Peshkin)
327C. 4 units, Spr (Peshkin)

331A,B. Administration and Policy Analysis Research Seminar—Limited to first-year APA doctoral students. Introduces the rudiments of problem statements, conceptual frameworks, research design, and critical reviews of literature. (SSPEP/APA)
331A. 1-2 units, Win (Copland, Antonio)
331B. 1-2 units, Spr (Copland, Antonio)

333A. Advanced Seminar in LDT: Analyzing Functions and Needs in Learning Environments—Introduction to theoretical approaches to learning used to analyze learning environments and develop goals for designing resources and activities to support more effective learning practices.
3 units, Sum (Greene)

333B. Advanced Seminar in Learning Design and Technology: Organizations—How organizational resources, structures, constraints, and possibilities are taken into account in research-based designs for learning in schools and work places. Presentations and discussions by researchers from the Institute for Research on Learning offer an overview of current research and development efforts for improving learning in schools and workplaces.
3 units, Win (Staff)

333C. Advanced Seminar in Learning Design and Technology: Social and Ethical Issues—Readings/discussions, case studies, and internships on the ethical and social issues related to learning and technology. Prerequisite: enrollment in LDT, or consent of instructor.
3 units (Kamil) not given 1999-2000

335X. Language Policy and Planning: National and International Perspectives—For graduate students and undergraduates, with consent of instructor. International study of the social, political, and educational
tensions that shape language policy. Emphasis is on language education that affects immigrants, guest workers, and indigenous linguistic minority populations; policies that determine foreign language instruction, and U.S. language policies in a comparative approach. (SSPEP/LLP)

338A, B, C. Practicum in Counseling and Health Psychology—For Counseling Psychology majors only. Intensive supervised field experience in local schools or social agencies. (PSE)

338A 1-6 units, Aut (Thoresen)
338B 1-6 units, Win (Thoresen)
338C 1-6 units, Spr (Krumholtz)

339X. Family Therapy: Systemic Approach to Assessment and Treatment—Doctoral seminar examines the assumptions underlying the family-systems paradigm, viewed as an expansion of and alternative to the individual model. The development of a conceptual framework for family and couples assessment provides the basis for comparing influential models of family therapy. The conceptual, observational, and technical skills needed for family interviewing, the formulation of therapeutic goals, and clinical intervention. Clinical and research applications in larger systems (education, health care, business). (PSE)

1 unit, Spr (Rait)

340X. Psychology and American Indian Health—Western medicine tends to define health by first defining sickness, disease, or pathology, and then defining health as the absence of these diseases. Native American cultures understood health to mean the balance or beauty of all things physical, spiritual, emotional, and social. Sickness was something out of balance, the absence of harmony. Representative topics in American Indian psychology and health acquaint students with issues that characterize the field, its methods, goals, and findings. Prerequisite: experience working with American Indian communities. (PSE)

3 units (LaFromboise) not given 1999-2000

341. Educational Applications of Sociolinguistics—For students interested in the broad applications of linguistic research in educational contexts. Formal integration of sociolinguistics and applied linguistic research is examined in relation to a range of international case studies among students and teachers in socially stratified speech communities worldwide. Theoretical concepts from linguistics are introduced as they relate to practical educational problems in socially stratified speech communities. Recommended: background in linguistic science for students who seek an introduction to applied linguistic research. (SSPEP/LLP)

3 units (Baugh) not given 1999-2000

343X. Achievement Motivation in School-Aged Children—Surveys developments in the study of achievement motivation in children and adolescents over the past 50 years. The historical and theoretical approaches to understanding the quality, intensity, and direction of children's achievement-related behavior. Clinical life-span theories, cognitive theories, and social-cognitive theories of achievement motivation. Differences among mechanistic, organismic, and developmental-contextual metamodels of motivation, qualitative vs. quantitative conceptualizations of "motivation," and the differential emphasis placed upon organismic needs, cognition, volition, and emotion in theories concerned with understanding achievement behavior. (PSE)

4 units, Win (Roese)

344X. Child Development and Schooling—School represents a major context of development during childhood in the U.S. How the practices and activities of schooling influence the social, emotional, and cognitive development of children. Meta-theoretical approaches (e.g., mechanistic, organismic, developmental contextualist metamodels) and methods of conducting research on schooling and development (experimental, survey, ethnographic, intervention, etc.). Topics: how different teaching practices influence cognitive growth in academic domains, how the organizational structures of schools (grade related transitions, class organizations, etc.) fit (or fail to fit) developmental needs, how friendship groups create contexts for learning and can lead to different trajectories of development, and how grading and other evaluative practices influence motivational orientations. Focuses on the elementary school years (see also 345X). (PSE)

3 units, Spr (Valdés)

345X. Adolescent Development and Schooling—School represents a major context of development during adolescence in the U.S. How the context of school and its relationship to other major contexts development (family, peer group, and neighborhood) influence the social, emotional, and cognitive development of secondary school-aged youths. Meta-theoretical approaches (e.g., mechanistic, organismic, developmental contextualist metamodels) and methods of conducting research on schooling and development (laboratory, survey, ethnographic, intervention, etc.). Topics: school transitions during adolescence, the role of school functioning in broader patterns of competence or distress, and how the organization of academic tasks, classrooms, and school environments as a whole can influence different aspects of adolescent development. Focuses on the middle and high school years (see also 344X).

(PSE)

3 units (Roese) not given 1999-2000

346. Research Seminar in Higher Education—Required for higher education students. Overview of higher education in the U.S. and an introduction to the major issues that have emerged in the research about higher education. The current structural features of the system and the historical context that shaped it, informed by a range of theoretical frameworks. The purposes of higher education in light of different interest groups: students, faculty, administrators, and external constituents. Diversity, stratification, decentralization, and change that cut across each of these groups. (SSPEP/APA)

4 units, Win (Antonio)

350A. Psychological Studies in Education—Required of first-year doctoral students in Psychological Studies; others by consent of instructor. Introduction to the doctoral program in Psychological Studies in Education and to faculty and student research. (PSE)

1 unit, Aut (Padilla, Thoresen)

350B, C, D. Research Practicum in Psychological Studies in Education—Three-quarter sequence provides students in PSE an opportunity to engage in all facets of the research process. Individual projects in a group context are designed to provide extensive opportunities for training and feedback concerning specific projects and the general enterprise of psychological research in education. 350B and C are required of first-year students in PSE; 350D is required of second-year students in PSE. Others by consent of instructor. (PSE)

350B. 3 units, Win (Greeno, Krumboltz)
350C. 3 units, Spr (Rogosa)
350D. 1 unit, Aut, Win, Spr (Haertel, Roese)

351. Design and Analysis of Longitudinal Research—The analysis of longitudinal data is central to empirical research on learning and development. Topics: growth models, measurement of change, repeated measures design, quasi-experiments, structural regression models, reciprocal effects, analysis of durations including survival analysis. See http://www.stanford.edu/class/ed351/. Prerequisite: statistical training at the level of 257. (PSE)

3 units, Spr (Rogosa)

353A. Problems in Measurement: Item Response Theory—Survey of the alternative mathematical models used in test construction, analysis, and equating. Emphasis is on applications of item response theory
limited to those students. (CTE)

361. The Economics of Gender in Education and Employment—Research project. (CTE)

pants analyze action research reports and engage in a small-scale action—Introduction to the theory and

360X. Action Research in Education—Introduction to the theory and practice of action research. Basic concepts and methods. The historical and ideological influences on this form of inquiry by teachers. Participants analyze action research reports and engage in a small-scale action-research project. (CTE)

3 units, Spr (Atkin)

361. The Economics of Gender in Education and Employment—Policy issues concerning higher education, employment, earnings, discrimination, occupational segregation, housework, childcare, affirmative action, comparable worth, and feminist economics. (SSSEP)

3 units (Staff) not given 1999-2000

364X. Reading in a Second Language—Examination of the theories and research related to learning to read in a second language in child and adult learning contexts. The similarities and differences between first- and second-language theories and research on learning to read. Applications of research findings to pedagogy. (SSPEP/ LLP)

3 units, Spr (Kamil)

366X. Trends and Issues in Reading—Current trends and issues in literacy and literacy instruction, providing a framework for work in reading and literacy. Research, theory, and implications for practice in classroom organization, compensatory instruction, comprehension instruction, reading and writing assessment, second language reading, whole language emergent literacy, adult literacy, and technology. (SSPEP/ LLP)

3 units (Kamil, Padilla) not given 1999-2000

367X. Reading Research Syntheses, Policy and Practice—Examines the national syntheses of reading research beginning with "The Great Debate" (1967) and concluding with the National Reading Panel (2000). These reports are often the basis of recommendations for parents, administrators, and teachers and have been the foundation of policy for curricular reform. Students engage in a critical examination of these reports, interpretations, and commentaries, comparing the conclusions and recommendations with those derived from the original research upon which they were based.

3 units, Aut (Kamil)

372X. Social Processes in Learning and Development—Doctoral seminar on how children’s learning and development are influenced by social interactions with parents, peers, teachers, and the larger cultural context. Emphasis is on research that illuminates social/cognitive processes thought to influence the development of individual thinking. These processes include observation and imitation of models, co-construction of meaning and achievement of intersubjectivity, providing and receiving explanations, and socio-cognitive conflict. How the larger social culture influences the behavior of individuals in interaction and on how forms of school culture influence children’s individual thinking and thinking in collaboration with others. (PSE)

3 units (Barron) not given 1999-2000

373. Education as a Social Science—Enrollment limited to and required of all first-year Ph.D. students in SSPEP. Students meet with faculty on the area committee, oriented to the range of intellectual and research strategies represented by the social sciences faculty, and interview faculty and plan with them the topic of discussion of their course session. Assists students in course planning. Opportunity to develop sessions to meet orientation and adjustment needs, as they arise. (SSPEP)

1 unit, Aut (Staff)

375A. Seminar on Organization theory—(Same as Sociology 363A.) For doctoral-level students or equivalent. Provides a thorough grounding in the social science literature on organizations. Readings are organized historically, and introduce the major theoretical perspectives and debates.

5 units, Win (Powell, Scott)

375B. Seminar on Organizations: Theory and Application—(Same as Sociology 363B.) Continuation of Sociology 363A. Focus is on contemporary applications of organization theory in the examination of political, educational, and business organizations.

5 units, Spr (Powell, Scott)

376. Education and Theories of the State—Examines the relationship between political system structures and educational change by analyzing theories and interpretations of how political systems function, and the implications of these theories for understanding education. Classical and Marxist interpretations. (SSPEP/ICE)

5 units (Carnoy) not given 1999-2000

378X. Topics in Organizational Adaptation—Research seminar focuses on theoretical ideas about decision making and learning in organizations.

2-5 units, Win (March)

380. Supervised Internship

1-15 units, any quarter (Staff)
381. Multicultural Issues in Higher Education—Reviews the primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 1980s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

4 units, Spr (Antonio)

382. Student Development and the Study of College Impact—Introduces the philosophies, theories, and methods that undergird the bulk of the research in higher education: how college affects students. Student development theories and models of college impact; issues surrounding data collection, national databases, and secondary data analysis.

4 units (Antonio) not given 1999-2000


2 units (Antonio) not given 1999-2000

384. Advanced Topics in Higher Education—Preference given to higher education graduate students. In-depth analysis of selected topics in the study of higher education. Topics vary each year among faculty: development, legal issues, curricular change, knowledge production, professional socialization, management of organizational decline, leadership and innovation, authority and power, diversity and equity, interactions with government and industry. Prerequisites: 346, consent of instructor.

4 units (Gumport) given 2000-2001

385. The American College Student: Implications for Research and Practice—Open to juniors and seniors with consent of instructor. The nature, culture, and development of the American college student. The American college student from a contemporary perspective, focusing on the question of: who goes to college, what kinds of experiences do students have in college and how are students affected by their experiences in college?

4 units, Spr (White)

386X. The American College Student: Implications for Research and Practice—For students who wish to gain a greater insight regarding the management of colleges and universities and the issues faced by those who hold major leadership roles within these institutions. Definitions of leadership and leadership roles within colleges and universities. Leadership models and organizational concepts useful in understanding institutions of higher education through case study analysis of the problems and challenges facing today’s higher education administrators.

4 units, Win (White)

387A,B,C. Workshop: Comparative Studies of Educational and Political Systems—(Same as Sociology 311A,B,C.) Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor. (SSPEP/ICE)

387A. 2-5 units, Aut (Ramirez, Meyer)
387B. 2-5 units, Win (Ramirez, Meyer)
387C. 2-5 units, Spr (Ramirez, Meyer)

388A,B. Bilingual Education—Research issues of policy and practice, particularly in the U.S., in programs for language minority students. Topics: the history of policy and legislation in bilingual education, theories of second language learning and first language maintenance, research on the effectiveness of bilingual education, and comparative experiences in other societal settings. (SSPEP/LLP, STEP)

388A.—Prepares STEP students for CLAD certification.
3-4 units, Spr (Hakata)
388B.—For SSPEP/LLP students.
3 units, Win (Hakata)

390. Advanced Seminar in Bilingual Education—For doctoral students specializing in bilingual education. Topical treatment of current research and policy issues in bilingual education. Prerequisites: 388B or consent of instructor. (SSPEP/LLP)

1-3 units (Hakata) not given 1999-2000

400X. Writing Seminar for Doctoral Students—For doctoral students to improve scholarly writing; an experience in the process of revision. Topics: the power of lead sentences, strong verbs, telling titles, organization, proper conclusions, and as needed, the quotidians of spelling, grammar, and hypenation. Students submit a fully revised version of their paper as a final product.

2 units (Peshkin) not given 1999-2000

401. Mini Courses in Methodology—For doctoral students. Particular issues during designated quarters. Enrollment limited. Prerequisite: consent of instructor.

2 units (Staff)

405. Education and Political Change—Introductory analysis of the relations between education and social and political change from a comparative perspective. Topics: different theoretical approaches to the study of education and politics, questions of legitimacy in educational policy, international factors in educational development, the politics of educational planning and reform, processes and conditions of political learning, and the politics of curriculum and pedagogy. (SSPEP/ICE)

4-5 units (Mundy) not given 1999-2000

406X. Topics in Comparative Educational Research—Primarily for doctoral students. Possible topics: from substantive foci (e.g., gender issues, childhood socialization, numeracy) to a systematic treatment of a major educational theorist (e.g., Bernstein, Bourdieu). (SSPEP/ICE)

1-3 units (Ramirez) not given 1999-2000

407X. Aid and Education: The Africa Case—Advanced seminar on international educational aid, primarily for doctoral students. Focuses primarily on educational aid in sub-Saharan Africa, the region most often considered in contemporary debates about the failure of aid, and the “impasse in development theory.” (SSPEP/ICE)

4 units (Mundy) not given 1999-2000

408. Research Workshop in International and Comparative Education—Limited to advanced doctoral students in ICE and SSPEP. Research workshop for the review of key issues in the methodology and epistemology of social research in education, research proposals, and findings by students and faculty. Prerequisites: 306A,B,C,D or equivalent. (SSPEP/ICE)

2-5 units, Win (Carnoy)

410. Topics in Symbolic Systems in Education—For students in all areas. Topics in the interdisciplinary study of intelligence, information, meaning, and learning, emphasizing research relevant to educational practice. Research perspectives from anthropology, artificial intelligence, linguistics, philosophy, and psychology. (PSE)

1 unit, Aut, Win, Spr (Staff)

416. Seminar on Aptitude—Limited to doctoral students in education and psychology. The study of individual differences in learning, cognitive, connotative, and affective processes related to education. The design and evaluation of instruction with respect to individual differences. Prerequisites: 255 or equivalent, and consent of instructor. (PSE)

3 units (Staff) not given 1999-2000

418. Foundations of Field Research in Higher Education—For higher education/APA graduate students, and appropriate for doctoral students working on qualifying papers or dissertations. Advanced seminar examines the rationales for doing interpretive social science research in higher education settings. Students acquire methodological training in fieldwork through hands-on opportunities to collect, analyze, and critique...
444X. Research in Progress: Curriculum and Teacher Education—Required of first- and second-year doctoral students in CTE. Introduction to current research in the Curriculum and Teacher Education area. Presentations of research planned, under way, or ready to be reported on some aspect of curriculum and teacher education. Weekly presentations by SUSE faculty, SUSE masters’ or doctoral candidates, and faculty from elsewhere in the University or Bay Area. Questions and discussion of conceptual and methodological issues. (CTE)
1 unit, Aut (Shavelson, Boaler)
Win (Eisner, Ross)
Spr (Peshkin, Carter)

453. Doctoral Dissertation—(All Areas)
1-15 units, any quarter (Staff)

460. Advanced Seminar in Evaluation Design—Three quarters; for A.M. Policy Analysis and Evaluation students in the evaluation track. Discussion about evaluation issues, including the significance of multidisciplinary teamwork, design issues, negotiation, interpersonal skills, and ethics. (SSPEP/APA)
1 unit, Aut, Spr (Fetterman)

461X. Schooling and Mental Health Issues—Between 12-30% of all school-aged children experience moderate to severe emotional/behavioral difficulties. Many never receive services either within or outside of school to redress these difficulties. Untreated emotional/behavioral problems often undermine the affected children’s ability to learn, and their teachers’ ability to effectively teach. The theoretical/empirical, practical, and methodological goals.
4 unit, Spr (Roesser)

480. Directed Reading—For advanced graduate students. (All Areas)
1-15 units, any quarter (Staff)

493A. Seminar on Methodological Problems in Educational Research—Discussion of topics of current methodological interest. Practicum in consulting on actual projects being carried out by faculty and students.
1-3 units, Win (Olkin)

493B. Statistical Methods for Meta-Analysis—(Same as Health Research and Policy 206, Statistics 211.) Meta-analysis is a quantitative method for combining the results of independent studies, and enables researchers to synthesize the results of related studies so that the combined weight of evidence can be considered and applied. Examples from the medical, behavioral, and social sciences. Topics: literature search, publication and selection bias, statistical methods (contingency tables, cumulative methods, sensitivity analyses, non-parametric methods). Project. Prerequisite: basic sequence in statistics. (All Areas)
3 units, Win (Olkin)
School of Engineering

Dean: James D. Plummer
Senior Associate Deans: John C. Bravman (Student Affairs), Anthony J. DiPaolo (SCPD), Anne R. Hannigan (Administration), Jeffrey R. Koseff (Faculty Affairs), Laura L. Breyfogle (External Relations)
Associate Dean: Noé P. Lozano (Diversity Programs)
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Emeriti: (Professor) Gene Franklin
Associate Professors: Fu-Kuo Chang, Per K. Enge, David L. Freyberg, Kosuke Ishii, Sanjiva Lele, Bruce B. Lusignan, Reginald E. Mitchell, Mark G. Mungal, Stephen M. Rock
Assistant Professors: Christopher F. Edwards, Jonathan How, Claire J. Tomlin
Professor (Research): Butrus T. Khuri-Yakub
Professors (Teaching): Gilbert M. Masters, Eric S. Roberts
Associate Professor (Teaching): Thomas H. Byers
Senior Lecturer: David Lougee
Lecturers: Gerald Cain, Patrick Young
Acting Assistant Professor: Justin Wing-Lok Wan
Consulting Professor: Anoop Gupta

The School of Engineering offers undergraduate programs leading to the degree of Bachelor of Science (B.S.), programs leading to both B.S. and Master of Science (M.S.) degrees, other programs leading to a B.S. with a Bachelor of Arts (A.B.) in a field of the humanities or social sciences, dual-degree programs with certain other colleges, and graduate curricula leading to the degrees of M.S., Engineer, and Ph.D.

The school has nine academic departments: Aeronautics and Astronautics, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Engineering-Economic Systems and Operations Research, Industrial Engineering and Engineering Management, Materials Science and Engineering, and Mechanical Engineering. These departments and one interdisciplinary program, Scientific Computing and Computational Mathematics, are responsible for graduate curricula, research activities, and the departmental components of the undergraduate curricula. In research, where faculty interest and competence embrace both engineering and the supporting sciences, there are numerous programs within the school as well as several interschool activities, including the Alliance for Innovative Manufacturing at Stanford, Center for Integrated Systems, Center for Materials Research, Center on Polymer Interfaces and Macromolecular Assemblies, Center for Space Science and Astrophysics, Joint Institute for Aeronautics, Microwave Laboratory, the NIH Biotechnology Graduate Training Grant in Chemical Engineering, a program in Product Design, and the Radio Astronomy Institute. Petroleum Engineering is offered through the School of Earth Sciences.

Instruction in engineering is offered primarily during the Autumn, Winter, and Spring Quarters of the regular academic year. During the Summer Quarter, a small number of undergraduate and graduate courses are offered.

UNDERGRADUATE PROGRAMS

The principal goals of the undergraduate engineering curriculum are to provide opportunities for intellectual growth in the context of an engineering discipline, for the attainment of professional competence, and for the development of a sense of the social context of technology. The curriculum is sufficiently flexible that a number of decisions on individual courses are left to the student and the adviser. For a student with well-defined educational goals, there is often a great deal of latitude.

In addition to the special requirements for engineering majors described below, all undergraduate engineering students are subject to the University general education, writing, and foreign language requirements outlined in the first pages of this bulletin. Depending on the program chosen, students have the equivalent of from one to three quarters of free electives to bring the total number of units to 180.

The School of Engineering's Handbook for Undergraduate Engineering Programs is available online at http://ughb.stanford.edu and provides detailed descriptions of all undergraduate programs in the school, as well as additional information about extracurricular programs and services. A hard copy version is also available from the Office of Student Affairs in Terman Engineering Center, room 208. Because it is published in the summer, and updates are made to the website on a continuing basis, the handbook reflects the most up-to-date information for the academic year and is the definitive reference for all undergraduate engineering programs.

Accreditation—The Accreditation Board for Engineering and Technology (ABET) accredits college engineering programs nationwide using criteria and standards developed and accepted by U.S. engineering communities. At Stanford, the following undergraduate programs are accredited: Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. In ABET-accredited programs, students must meet specific requirements for engineering science, engineering design, mathematics, and science course work. Students are urged to consult the School of Engineering undergraduate handbook and their adviser.

Accreditation is important in many areas of the engineering profession; students wishing more information about accreditation should consult their department office or the office of the Senior Associate Dean for Student Affairs in Terman 208.

Policy on Satisfactory/No Credit Grading and Minimum Grade Point Average—All courses taken to satisfy major requirements (including the requirements for mathematics, science, engineering fundamentals, Technology in Society, and engineering depth) for all engineering students (including both department and School of Engineering majors) must be taken for a letter grade if the instructor offers that option.

For departmental majors, the minimum GPA (grade point average) for all courses taken in fulfillment of the Engineering Fundamentals requirement and the Engineering Depth requirement is 2.0. For School of Engineering majors, the minimum GPA on all engineering courses taken in fulfillment of the major requirements is 2.0.

ADMISSION

Students admitted to the University may declare a major in the School of Engineering if they elect to do so; no additional courses or examinations are required for admission to the school.

RECOMMENDED PREPARATION

FRESHMEN

Students who plan to enter Stanford as freshmen and intend to major in engineering should take the highest level of mathematics offered in high school. (See the "Mathematics" section of this bulletin for information on advanced placement in mathematics.) High school courses in physics and chemistry are strongly recommended, but not required. Additional elective course work in the humanities and social sciences is also recommended.

TRANSFER STUDENTS

Students who do the early part of their college work elsewhere and then transfer to Stanford to complete their engineering programs should follow an engineering or pre-engineering program at the first school, selecting insofar as possible courses applicable to the requirements of the School of Engineering, that is, courses comparable to those described below under "Undergraduate Programs." In addition, students should
work toward completing the equivalent of Stanford's foreign language requirement and as many of the University's General Education Requirements (GERs) as possible before transferring. Some transfer students may require more than four years (in total) to obtain the B.S. degree. However, Stanford affords great flexibility in planning and scheduling individual programs which makes it possible for transfer students, who have wide variations in preparation, to plan full programs for each quarter and to progress toward graduation without undue delay.

Transfer credit is given for courses taken elsewhere whenever the courses are equivalent or substantially similar to Stanford courses in scope and rigor. The policy of the School of Engineering is to study each transfer student's preparation and make a reasonable evaluation of the courses taken prior to transfer. Inquiries may be addressed to the Senior Associate Dean for Student Affairs in the School of Engineering at Stanford. For more information, please see the transfer credit section of the School of Engineering Undergraduate Handbook website at http://ugb斯坦福.edu.

DEGREE PROGRAM OPTIONS

3/2 DEGREE PROGRAMS

The 3/2 engineering program at Stanford is a special opportunity that allows a student to complete three years at a liberal arts college followed by two years at Stanford. After completing the five-year program, the student is awarded two degrees, a B.S. in Engineering from Stanford and an A.B. from the liberal arts college.

Candidates for this special dual-degree program are considered as regular transfer applicants and are expected to meet the same admissions standards as all other transfer candidates. This distinguishes the Stanford 3/2 program from those of most other institutions that "guarantee" admission to students who meet certain grade and course requirements and are recommended by the 3/2 coordinator of the liberal arts college.

All 3/2 transfer applicants are required to submit the transfer application forms, a final secondary school transcript, official transcripts from each college attended, and the official results of either the College Board Scholastic Aptitude Test (SAT) or the American College Test (ACT). All materials must be submitted by the regular transfer deadline.

In addition to the above mentioned documents, dual-degree candidates are required to have a letter of recommendation sent from the liberal arts college 3/2 program coordinator. Also required is a letter from the appropriate academic dean indicating the intention of the liberal arts college to award the A.B. degree, not the B.S. degree, upon completion of the required number of course credits. Applications are only accepted from students attending a liberal arts college that does not offer a degree in engineering.

In addition to the above mentioned documents, dual-degree candidates are required to have a letter of recommendation sent from the liberal arts college 3/2 program coordinator. Also required is a letter from the appropriate academic dean indicating the intention of the liberal arts college to award the A.B. degree, not the B.S. degree, upon completion of the required number of course credits. Applications are only accepted from students attending a liberal arts college that does not offer a degree in engineering.

In addition to the above mentioned documents, dual-degree candidates are required to have a letter of recommendation sent from the liberal arts college 3/2 program coordinator. Also required is a letter from the appropriate academic dean indicating the intention of the liberal arts college to award the A.B. degree, not the B.S. degree, upon completion of the required number of course credits. Applications are only accepted from students attending a liberal arts college that does not offer a degree in engineering.

BACHELOR OF ARTS AND SCIENCE (B.A.S.)

This degree is available to students who complete both the requirements for a B.A. degree in engineering and the requirements for a major or program ordinarily leading to the A.B. degree. For more information, see the "Graduate Degrees" section of this bulletin.

DUAL AND COTERMINAL DEGREE PROGRAMS

A Stanford undergraduate may work simultaneously toward two bachelor's degrees or toward a bachelor's and a master's degree, that is, A.B. and M.S., B.S. and M.S., or B.S. and A.M. The degrees may be granted simultaneously or at the conclusion of different quarters. Usually five years are needed for a combined program.

Dual A.B. and B.S. Degree Program—To qualify for both degrees, a student must (1) complete the stated University and department requirements for each degree, (2) complete 15 full-time quarters, or three full-time quarters after completing 180 units, and (3) complete a total of 225 units (180 units for the first bachelor's degree plus 45 units for the second bachelor's degree).

Coterminal Bachelor's and Master's Degree Program—A Stanford undergraduate may be admitted to graduate study for the purpose of working simultaneously toward a bachelor's degree and a master's degree. To qualify for both degrees, a student must (1) complete three full-time quarters (or the equivalent) after completing 180 units, (2) complete, in addition to the 180 units required for the bachelor's degree, the number of units required by the graduate department for the master's degree (not fewer than the University minimum of 36 units), (3) complete the requirements for the bachelor's degree (department, school, and University) and apply for the degree at the appropriate time at the Office of the Registrar, and (4) complete the department and University requirements for the master's degree and apply for the degree at Degree Progress in the Registrar's Office.

Admission to the coterminal program requires admission to graduate status by the pertinent department. Admission criteria vary from department to department.

Procedure for Applying for Admission to Coterminal Degree Programs—A Stanford undergraduate may apply (using the University coterminal application form) for admission to the coterminal bachelor's and master's degree program after the beginning of the eighth quarter of undergraduate work and no later than the end of the 11th quarter of undergraduate work, and at least four quarters in advance of the anticipated date of conferment of the master's degree. Students seeking a graduate degree in engineering must apply to the pertinent department.

BACHELOR OF SCIENCE

Departments within the School of Engineering offer programs leading to the B.S. degree in the following fields: Chemical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Industrial Engineering, Materials Science and Engineering, and Mechanical Engineering. The School of Engineering itself offers interdisciplinary programs leading to the B.S. degree in Engineering with specializations in Aeronautics and Astronautics, Computer Systems Engineering, and Product Design. In addition, students may elect an Individually Designed Major leading to the B.S. in Engineering.

Petroleum Engineering—Petroleum Engineering is offered by the School of Earth Sciences. Consult the "Petroleum Engineering" section of this bulletin for requirements.

School of Engineering majors who anticipate summer jobs or career positions associated with the oil industry may wish to consider enrollment in Engineering 120, Fundamentals of Petroleum Engineering.

Programs in Manufacturing—Programs in manufacturing are available at the undergraduate, M.S., and Ph.D. levels. The undergraduate programs of the departments of Civil and Environmental Engineering, Industrial Engineering and Engineering Management, and Mechanical Engineering provide general preparation for any student interested in manufacturing. More specific interests can be accommodated through Individually Designed Majors (IDMs).

SCHOOL OF ENGINEERING MAJORS

The School of Engineering offers the degree of Bachelor of Science in Engineering. School of Engineering programs must be approved by the Undergraduate Council of the school. There are two types of programs: majors that have been proposed by cognizant faculty groups and have been preapproved by the council, and Individually Designed Majors. At present, there are three preapproved majors: Aeronautics and Astronautics, Computer Systems Engineering, and Product Design. Total units required for these majors must be at least 90 and not more than 107. These majors are not accredited by ABET.

AERONAUTICS AND ASTRONAUTICS (AA)

Mathematics: (21 units)
- Math. 53 or 130, or Mech. Engr. 100. Differential Equations 3-5 (See Basic Requirement 1)
- Math electives 9

Science: (18 units)
- Physics 41. Mechanics 3
- Physics 43 or 23. Electricity 3
- One further physics course 3

Science electives (see Basic Requirement 2) 9

Engineering Fundamentals: (five courses)
- Engr. 30. Engineering Thermodynamics 3
- Engr. 70A or 70X. Programming 5
- Engr. 15. Dynamics 5
- Two Fundamental courses (see Basic Requirement 3)

98
Technology in Society: (3-5 units)

Engineering Depth: (39 units)

- AA 100: Introduction to Aeronautics and Astronautics
- AA 190: Directed Research in Aeronautics and Astronautics
- Civil & Envir. Engr. 180A: Introduction to Structural Analysis
- or Mech. Engr. 111: Stress, Strain, and Strength
- Engr. 104: Dynamic Behavior
- or Mech. Engr. 161: Dynamic Systems
- or Phys. 1: Intermediate Mechanics
- Mech. Engr. 33: Introduction to Fluids Engineering
- Depth Area I*
- Depth Area II*
- Electives to be approved by the adviser, and might be from the Depth area lists, or courses such as AA 201A, 210B, 256; Engr. 206, 209; or other upper-division engineering courses.

- Engineering Electives†

Total units: 100-106

Mathematics: (23 units)

- Math. 41, 42, 51: Calculus
- Math. 52 or 53: Multivariable Math
- Math. 103 or 113: Linear Algebra

Science: (13 units)

- Phys. 41: Mechanics
- Phys. 43: Electricity
- Phys. 45: Magnetism
- Phys. 47: Light and Heat

Engineering Fundamentals: (10 units)

- Engr. 40: Electronics
- Engr. 70X: Programming Methodology and Abstractions
- or Comp. Sci. 106A and B

Technology in Society: (3-5 units)

Writing in the Major (one course)

- Comp. Sci. 191W, 194, and 201 fulfill this requirement

Depth: (55 units)

- Comp. Sci. 107: Programming Paradigms
- Comp. Sci. 108: Object-Oriented Systems Design
- Comp. Sci. 109: Introduction to Computer Science
- or Comp. Sci. 103X: Discrete Math for Computer Science
- Comp. Sci. 140: Operating Systems
- or Comp. Sci. 143: Compilers
- Comp. Sci. 150 Introduction to Computer Theory for Non-CS Majors
- Elect. Engr. 101: Circuits
- Elect. Engr. 111, 112: Electronics
- Elect. Engr. 121: Digital Design Laboratory
- Elect. Engr. 182: Computer Organization
- Elect. Engr. 183: Advanced Logic Laboratory
- Elect. Engr. 271: Introduction to VLSI Systems
- Electives
- Senior Project (Comp. Sci. 191, 191W, or 194)†

Total units: 104-106

Mathematics: 20 units minimum

- Recommended: one course in Statistics.

Science: 17 units minimum

- Recommended: one year of Physics
- Psych. 1: Introduction to Psychology (required)
- Psych. 161: Cultural Psychology (required)*

Mathematics and Science: minimum combined total of 45 units

Engineering Fundamentals: 18 units minimum

Engr. 14, 40, 70 required plus remainder of coursework from:
- Engr. 10, 15, 20, 25, 30, 50, 60; Indust. Engr. 100, 133
- Technology in Society: one course (See Basic Requirement 4)
- Mech. Engr. 120: History of Philosophy of Design (required)
- Engineering Depth: 45 units
- Art & Art Hist. 60: Basic Design

PRODUCT DESIGN

Mathematics: 20 units minimum

- Recommended: one course in Statistics.

Science: 17 units minimum

- Recommended: one year of Physics
- Psych. 1: Introduction to Psychology (required)
- Psych. 161: Cultural Psychology (required)*

Mathematics and Science: minimum combined total of 45 units

Engineering Fundamentals: 18 units minimum

Engr. 14, 40, 70 required plus remainder of coursework from:
- Engr. 15, 20, 25, 30, 50, 60; Indust. Engr. 100, 133
- Technology in Society: one course (See Basic Requirement 4)
- Mech. Engr. 120: History of Philosophy of Design (required)
- Engineering Depth: 45 units
- Art & Art Hist. 60: Basic Design

INDIVIDUALLY DESIGNED MAJORS (IDMs)

IDMs are intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the preapproved School of Engineering majors. IDM curricula are designed by students with the assistance of two faculty advisers of their choice and are submitted to the Undergraduate Council’s Subcommittee on Individually Designed Majors. The degree conferred is “Bachelor of Science in Engineering: (approved title).”

Students must submit written proposals to the IDM Subcommittee detailing their course of study. Programs must meet the following requirements: mathematics (21 units minimum, see Basic Requirement 1 below), science (17 units minimum, see Basic Requirement 2 below), Technology in Society (one approved course, see Basic Requirement 4 below), engineering (40 units minimum), and sufficient relevant additional coursework to bring the total number of units to at least 90 and at most 107. (Students may take additional courses pertinent to their IDM major, but the IDM proposal itself may not exceed 107 units.) The student’s curriculum must include at least three “Engineering Fundamentals” courses (Engr. 10, 14, 15, 20, 25, 30, 40, 50, 60, 70A, and 70X). Students are responsible for completing the prerequisites for all courses included in their majors.

Each proposal should begin with a statement describing the proposed major. In the statement, the student should make clear the motivation for and goal of the major, and indicate how it relates to her or his projected career plans. The statement should also specify how the various courses to be taken relate to and move the student toward realizing the major’s goal. A proposed title for the major should be included. The title approved by the IDM Subcommittee will be listed on the student’s official University transcript.

The proposal statement should be followed by a completed Program Sheet listing all the courses comprising the student’s IDM curriculum, organized by the five categories printed on the sheet (mathematics, science, Technology in Society, additional courses, and engineering depth). Normally, the courses selected should comprise a well-coordinated sequence or sequences that provide mastery of important principles and techniques in a well-defined field. In some circumstances, especially if the proposal indicates that the goal of the major is to prepare the student for graduate work outside of engineering, a more general engineering program may be appropriate. A four-year study plan, showing which courses will be taken each quarter should also be included in the student’s IDM proposal.

The proposal must be signed by two faculty members whose signatures certify that they endorse the major as described in the proposal and that they agree to serve as the student’s permanent advisers. One of the faculty members, who must be from the School of Engineering, acts as the student’s primary adviser. The proposal must be accompanied by a statement from that person giving her or his appraisal of the academic value and viability of the proposed major.

Students proposing IDMs must have at least four quarters of undergraduate work remaining at Stanford after the quarter in which their pro-
CHEMICAL ENGINEERING

Course No. and Subject  

Mathematics: 
- Math. 41, 42, 51, 52, Calculus* 20
- Math. 53. Ordinary Differential Equations or Engr. 155A. Mathematical and Computational Methods for Engineers 4-5

Science: 
- Chem. 31. Chemical Principles 4
- Chem. 33. Structure and Reactivity 4
- Chem. 35. Organic Monofunctional Compounds 4
- Chem. 36. Chemical Separations 3
- Chem. 131. Organic Polynuclear Compounds 3
- Chem. 171. Physical Chemistry: Chemical Thermodynamics 3
- Phys. 41. Mechanics 3
- Phys. 43. Electricity 3
- Phys. 45. Magnetism 3
- Bio. 52. Biochemistry, Molecular Biology, and Cell Biology 5

Engineering Fundamentals: 
- Five courses (Engr. 20 excluded) 19-22

Technology in Society (one course):  
(See Basic Requirement 4)

Chemical Engineering Depth 
- Chem. 130. Theory and Practice of Identification 4
- Chem. 175. Physical Chemistry: Kinetics and Statistical Mechanics 3
- Chem. Engr. 100. Chemical Process Modeling, Dynamics, and Control 3
- Chem. Engr. 110. Equilibrium Thermodynamics 3
- Chem. Engr. 120A. Fluid Mechanics 4
- Chem. Engr. 120B. Energy and Mass Transport 4
- Chem. Engr. 130. Separation Processes 3
- Chem. Engr. 140. Microelectronics Processing Technology 3
- Chem. Engr. 150. Biomedical Engineering 3
- Chem. Engr. 160. Polymer Science and Engineering 3

Chem. Engr. 185A,B. Chemical Engineering Laboratory 6
Engr. 20. Introduction to Chemical Engineering 3

Total 51

CIVIL ENGINEERING [CEE]

Mathematics and Science: 
- 45 units minimum* (See Basic Requirements 1 and 2)

Technology in Society (one course):  
(See Basic Requirement 4)

Engineering Fundamentals: 
- Five courses** (see Basic Requirement 3) 17-19

Engineering Depth 
- CEE 70. Environmental Science and Technology 3
- CEE 100. Managing Civil Engineering Projects 4
- CEE 101A. Structural Systems 4
- CEE 101B. Mechanics of Fluids 4
- CEE 101C. Geotechnical Engineering 4
- CEE 101E. Analytical and Numerical Methods for the Environment 4

Specialty courses in either Environmental and Water Studies†, or Structures and Construction** 30-32

Total for Engineering Fundamentals plus Depth 68

* Fundamentals must include Engr. 14 and 60. In addition, students selecting the Environmental and Water Studies option must take Engr. 30; those in Structures and Construction must take Engr. 50.

COMPUTER SCIENCE [CS]

Mathematics: (25 units) 
- CS 105X. Discrete Structures (Accelerated) or CS 109. Introduction to Computer Science 4
- Math. 41, 42. Calculus* 10

Plus any two of the following:
- CS 157. (or Phy. 160A) Logic 4
- CS 205. Math for Robotics and Vision 3
- Math. 51. Calculus 5
- Math. 103 or 113. Linear Algebra 3

Science: (12 units) 
- Phys. 41. Mechanics 3
- Phys. 43. Electricity 3
- Phys. 45. Magnetism 3
- Science Elective† 3

Engineering Fundamentals: (10 units) 
- CS 106X. Programming Methodology and Abstractions (Accelerated) or CS 106A and 106B 5
- Engr. 40. Electronics 5

Technology in Society (one course, 3-5 units):  
See list in the School of Engineering Handbook (http://ughb.stanford.edu)

Writing in the Major (one course) 
- CS 191W, 194, and 201 fulfill this requirement

Computer Science depth: (46 units) 
- Programming (two courses):
  - CS 107. Programming Paradigms 5
  - CS 108. Object-Oriented Systems Design 4
- Theory (two courses):
  - CS 154. Introduction to Automata and Complexity Theory 4
  - CS 161. Design and Analysis of Algorithms 4
- Systems (three courses):
  - Elect. Engr. 182. Computer Organization 4
  - Two systems electives** 7-8

Applications (two courses):
- CS 121 or 221. Introduction to Artificial Intelligence 3

One applications elective† 3-4

Project (one course): 
- CS 191, 191W, or 194*** 3

Restricted Electives (three courses)†† 9-12

* Math. 19, 20, and 21 may be taken instead of Math. 41 and 42 at least as long as 25 math units are taken.
† The science elective may be any course of 3 or more units from the School of Engineering lists plus Psych. 30.
** The two systems courses must be chosen from the following set: CS 140, 143, 242, and 244A. The systems electives must include a course with a large software project, currently satisfied by either CS 140 or 143.
†† The applications elective must be chosen from the following set: CS 145, 147, 148, 223A, 223B, or 248.
*** Independent study projects (CS 191 or 191W) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS program adviser (E. Roberts). A signed approval form, along with a brief description of the proposed project, should be submitted to the Office of the Senior Associate Dean for Student Affairs, Terman 208.

DEPARTMENTAL MAJORS

Curricula for majors offered by the departments of Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering have the following components: 40-47 units of mathematics and science (see Basic Requirements 1 and 2 at the end of this section); engineering fundamentals (five course minimum, see Basic Requirement 3); Technology in Society (TIS) (one course minimum, see Basic Requirement 4); and engineering depth (courses such that the total of units for Engineering Fundamentals and Engineering Depth is between 60 and 75). Included within the courses taken to fulfill the Basic Requirement 3; Technology in Society (TIS) (one course minimum, see Basic Requirement 4); and engineering depth (courses such that the total of units for Engineering Fundamentals and Engineering Depth is between 60 and 75). Included within the courses taken to fulfill the preceding curriculum components is a requirement for a minimum of 8 units of experimentation (see below). Curricular requirements for departmental majors were being revised at the time of publication. Please consult the 1999-2000 Handbook for Undergraduate Engineering Programs online at http://ughb.stanford.edu for the most up-to-date listing of curricular requirements.

The curriculum for the major offered by the Department of Computer Science has separate requirements as described below.

Experimentation—Departmental major programs other than Computer Science must include 8 units of experimentation. Lab courses taken in the sciences as well as experimental work taken in courses within the School of Engineering can be used in fulfillment of this requirement. By careful planning, the experimentation requirement should not necessitate additional course work beyond that required to meet the other components of an engineering major. A list of courses and their experimentation content (in units) can be found online at http://ughb.stanford.edu in the 1999-2000 Handbook for Undergraduate Engineering Programs.

Students must be enrolled in at least 14 units to count as full time. Full time students must take a minimum of 40 units to graduate within four years. The applications elective must be chosen from the following set: CS 145, 147, 148, 223 A, 223 B, or 248. The systems electives must include a course with a large software project, currently satisfied by either CS 140 or 143. The applications elective must be chosen from the following set: CS 145, 147, 148, 223A, 223B, or 248.

**Engineering Fundamentals**

Mathematics: 21 units minimum*(See Basic Requirement 1)

Science: 20 units minimum† (See Basic Requirement 2)

Technology in Society: one course (See Basic Requirement 4)

**Engineering Depth:**

Mathematics: 24 units minimum*

Science: 20 units minimum†

Engineering Fundamentals**: (See Basic Requirement 3)

Technology in Society: one course (See Basic Requirement 4)

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**Electrical Engineering (EE)**

Total Core Units:

- Circuits and Systems: EE 101, 102, 103
- Electronics: EE 111, 112, 113
- Laboratory: EE 121, 122
- Technical Writing: Engr. 102E
- Fields and Waves: EE 141
- Total Core Units: 33

Specialty courses†

One course in Design***

Electrical Engineering electives

Total: 52

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**Industrial Engineering (IE)**

Mathematics: 22 units minimum* (See Basic Requirement 1)

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**Mechanical Engineering (ME)**

Mathematics: 24 units minimum* (See Basic Requirement 1)

Science: 18 units minimum* (See Basic Requirement 2)

Engineering Fundamentals (five courses): (See Basic Requirement 3)

Technology in Society (one course): (See Basic Requirement 4)

Electro-Mechanical Engineering (ME)

Total Specialty Units 9-12 units

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Basic Requirements

**Basic Requirement 1 (Mathematics)**—Engineering students need a solid foundation in the calculus of continuous functions including differential equations, an introduction to discrete mathematics, and an understanding of statistics and probability theory. The minimum preparation should normally include calculus to the level of Mathematics 43. Knowledge of ordinary differential equations and matrices is important in many areas of engineering, and students are encouraged to select additional courses in these topics. To meet ABET accreditation criteria, a student’s program must include the study of differential equations.

Courses that satisfy the mathematics requirement are listed online at http://uengineer.stanford.edu in the Handbook for Undergraduate Engineering Programs.

**Basic Requirement 2 (Science)**—A strong background in the basic concepts and principles of natural science in such fields as physics, chemistry, geology, and biology is essential for engineering. Most students include the study of physics and chemistry in their programs. To meet ABET accreditation criteria, a student’s program must include study of both chemistry and physics, with at least one year’s study in one of them.

Courses that satisfy the science requirement are listed online at http://uengineer.stanford.edu in the Handbook for Undergraduate Engineering Programs.

**Basic Requirement 3 (Engineering Fundamentals)**—The Engineering Fundamentals requirement is satisfied by a nucleus of technically
rigorous introductory courses chosen from the various engineering disciplines. It is intended to serve several purposes. First, it provides students with a breadth of knowledge concerning the major fields of endeavors or within engineering. Second, it allows the incoming engineering student an opportunity to explore a number of courses before embarking on a specific academic major. Third, the individual classes each offer a reasonably deep insight into a contemporary technological subject for the interested non-engineer.

The requirement is met by taking five courses from the following list:

- Engr. 10. Introduction to Engineering Analysis
- Engr. 20. Introduction to Chemical Engineering
- Engr. 25. Biotechnology
- Engr. 30. Engineering Thermodynamics
- Engr. 40. Introductory Electronics
- Engr. 50. Introductory Science of Materials
- Engr. 60. Engineering Economics
- or Engr. 61. Introduction to Optimization
- Engr. 70A or 70X. Introduction to Software Engineering

* Engr. 40 and 50 may be taken on video at some of Stanford's Overseas Centers.

**Basic Requirement 4 (Technology in Society)** — It is important for the student to obtain a broad understanding of engineering as a social activity. To foster this aspect of intellectual and professional development, all engineering majors must take one course devoted to exploring issues arising from the interplay of engineering, technology, and society. Courses that fulfill this requirement are listed online at [http://ahub.stanford.edu](http://ahub.stanford.edu) in the Handbook for Undergraduate Engineering Programs.

**MINORS**

An undergraduate minor in Engineering may be pursued by interested students in many of the school’s departments; consult with a department’s undergraduate program representative, or the Office of Student Affairs, Terman Engineering Center, room 208. General requirements and policies for a minor in the School of Engineering are: (1) a set of courses totaling not less than 18 and not more than 36 units, with a minimum of six courses of at least 3 units each; (2) the set of courses should be sufficiently coherent as to present a body of knowledge within a discipline or subdiscipline; (3) prerequisite mathematics, statistics, or science courses, such as those normally used to satisfy the school’s requirements for a department major, may not be used to satisfy the requirements of the minor; conversely, engineering courses that serve as prerequisites for subsequent courses must be included in the unit total of the minor; (4) departmentally based minor programs are structured at the discretion of the sponsoring department, subject only to requirements 1, 2, and 3 above. Interdisciplinary minor programs may be submitted to the Undergraduate Council for approval and sponsorship. A “General Engineering” minor is not offered.

**AERONAUTICS AND ASTRONAUTICS (AA)**

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems and their many spinoff technologies. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are described in detail below. Courses cannot be double-counted within a major and a minor, or within multiple minors; if necessary, the Aero/Astro advisor can help select substitute courses to fulfill the AA minor core.

The following core courses fulfill the minor requirements:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA 100. Introduction to Aeronautics and Astronautics</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 14. Statics</td>
<td>5</td>
</tr>
<tr>
<td>Engr. 15. Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 30. Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Mech. Engr. 33. Introductory Fluids</td>
<td>4</td>
</tr>
<tr>
<td>Mech. Engr. 131A. Heat Transfer</td>
<td>5</td>
</tr>
<tr>
<td>Core Total</td>
<td>12-25</td>
</tr>
</tbody>
</table>

* Engr. 14, 15, or 30 are waived as minor requirements if already taken as part of the major.

The following courses are upper-division electives:

- Two courses from one of the elective areas below
- One course from a second area
- Program Total

**CHEMICAL ENGINEERING (CHEM. ENGR.)**

The following courses fulfill the minor requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. Engr. 100. Chemical Process Modeling, Dynamics, and Control</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 110. Equilibrium Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 120A. Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Chem. Engr. 120B. Energy and Mass Transport</td>
<td>4</td>
</tr>
<tr>
<td>Chem. Engr. 140. Microlithography Technology</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 150. Biochemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 160. Polymer Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 185A. Chemical Engineering Lab</td>
<td>3</td>
</tr>
<tr>
<td>Chem. Engr. 185B. Chemical Engineering Lab</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 171. Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 20. Introduction to Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

**CIVIL ENGINEERING (CE)**

The Civil Engineering minor is intended to give students an in-depth introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Environmental Water Studies, Construction Engineering and Management, and Structural Engineering. The necessary prerequisites for a civil and environmental engineering minor are Physics 41 and Mathematics 141, 42, and 43. Students should recognize that a minor in Civil Engineering is not an ABET-accredited degree program.

Since civil engineering is a very broad field and undergraduates having widely varying backgrounds may be interested in obtaining a civil and environmental engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below; this list must be officially approved by the CE undergraduate minor adviser. Additional information on preparing a minor program, including “example” programs focusing on each of the areas of expertise listed above is available in the CEE office (Terman M-42). While each example program focuses on a different area of expertise within the department, other combinations of courses are also possible.

General guidelines are:

1. A CE minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes.
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another.
3. Professor Street (Terman M-17; phone: 3-4969; e-mail street@ce) is the CE undergraduate minor adviser, and provides guidance and advice. Students must consult with Professor Street in developing their minor program, and obtain approval of the finalized study list from him.

**COMPUTER SCIENCE (CS)**

The following courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through Math. 51.

**Introductory Programming**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 106A-B. Programming Method/Abstractions</td>
<td>10</td>
</tr>
<tr>
<td>or CS 106X. Programming Method/Abstractions (Accelerated)</td>
<td>5</td>
</tr>
</tbody>
</table>

(AP Credit may be used to fulfill this requirement)
MATERIALS SCIENCE AND ENGINEERING (MSE)

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements.

Fundamentals:
- Engr. 50. Introductory Science of Materials
- MSE 151. Microstructure and Mechanical Properties
- MSE 152. Electronic Materials Engineering

Electives: four courses from the MSE Core (16 units)
- MSE 191. Mathematical and Computational Methods in Materials Science
- MSE 192. Solid State Thermodynamics
- MSE 193. Atomic Arrangements in Solids
- MSE 194. Phase Equilibria
- MSE 195. Waves and Diffraction in Solids
- MSE 196. Imperfections in Crystalline Solids
- MSE 197. Rate Processes in Materials
- MSE 198. Mechanical Properties of Materials
- MSE 199. Electrical and Magnetic Properties of Solids
THE HONORS COOPERATIVE PROGRAM

A number of industrial firms, government laboratories, and other organizations participate in the Honors Cooperative Program (HCP), a program that permits qualified professional employees of member companies to register for Stanford courses and obtain a graduate degree on a part-time basis.

The courses are offered by the School of Engineering on campus or through the Stanford Instructional Television Network (SITN). SITN broadcasts approximately 200 courses a year over a five-channel system to 250 corporate sites in the San Francisco and Silicon Valley area. This program enables students to receive live courses and interact by means of a telephone talkback system from their corporate location. Students outside the local broadcast range may pursue their graduate degree by participating in SITN's Tutored Videotape Instruction (TVI) Program. SITN offers additional programs to member companies such as Non-Credit Option (NCO), Audit Option, several certificate programs, short courses, and course licensing. For a full description of educational services provided by SITN, telephone (650) 725-3000; fax (650) 725-2868; write 401 Durand Bldg., Stanford, CA 94305-4036; or send electronic mail to na.itv@forsythe.stanford.edu.

ENGINEERING BIOLOGY AND MEDICINE

Stanford does not have a formal department of bioengineering; however, there are several faculty in the School of Engineering whose primary research activities are in this general area. There are many opportunities in the medical and biological sciences for collaboration. Individually designed B.S. majors in bioengineering can be arranged. The faculty working in bioengineering are in various departments of the School of Engineering; a list of their names, together with a summary of their research interests, is available from the committee chair.

Students interested in pursuing graduate study in bioengineering apply for admission and financial aid to the appropriate department on the grounds of their previous training and future interests. Their applications are judged on substantially the same ground as other applicants to the department.

In addition to the standard engineering department degrees, the degree of MSE: Biomedical Engineering is offered. Details on this program and subsequent Ph.D. studies can be obtained from the Biomedical Engineering Division, Department of Mechanical Engineering.

The research being conducted in the field of bioengineering within the various departments reflects the technological emphasis of those departments. For instance, research on immobilized microbial cell function and physiology in compact bioreactors, protein absorption from sheared suspensions onto polymer films, protein conformation at fluid/polymer interfaces, and factors that influence growth and product formation in genetically engineered mammalian cells is pursued in the Department of Chemical Engineering. Faculty in Mechanical Engineering are doing research on aids for the disabled, bone mechanics, the mechanics of hearing, neuromuscular dynamics, orthopedic biomechanics, and rehabilitation engineering. Cardiovascular dynamics and hemodynamics are being studied in Computer Science. In Electrical Engineering, advanced analysis techniques are applied to signal processing EKG, EEG, and x-ray image. Many research projects are carried out in collaboration with faculty of the Medical School or members of the local medical community.

Both the master's and the Ph.D. degree are ordinarily awarded by a particular department, and the candidate must meet the degree requirements of that department. The student's adviser assists in constructing a program of study incorporating appropriate courses in biology and medicine that also satisfy the degree requirements of the department in which the student is registered.

A student wishing to earn the M.S. in Engineering while pursuing the M.D. degree must apply separately for admission to the M.D. program and an engineering department. If the student is admitted to both, each school will encourage his or her pursuit of the other degree.

In addition to the financial support available through the departments in the form of fellowships, research assistantships, and teaching assistantships, there are externally administered fellowship programs for the support of graduate study in health-related fields. In particular, both the National Institutes of Health and the National Science Foundation offer such fellowships based on national competition.

MANUFACTURING

Programs in manufacturing are available at the undergraduate, master's, and Ph.D. level. Master's programs are offered by the departments of Civil and Environmental Engineering, Industrial Engineering and Engineering Management (IEEM), and Mechanical Engineering. The Manufacturing Systems Engineering (MSE) program is jointly offered by IEEM and Mechanical Engineering. The M.B.A./MSE Dual Degree program is offered by the School of Engineering and Graduate School of Business in partnership. The Construction Engineering and Management program, offered by the Department of Civil and Environmental Engineering, is also a "manufacturing" program for students interested in facility and public works manufacturing. All of these programs take advantage of modern computer technology.

Doctoral programs related to manufacturing are available in a number of departments and involve research projects ranging from machine tool design to the integration of databases into production software.

The Future Professors of Manufacturing (FPM) program prepares graduates for university faculty careers with an emphasis on manufacturing. Candidates are first admitted to a Ph.D. program in a department of the School of Engineering or the Graduate School of Business, and then interested students may be nominated for the FPM program by the department.

For detailed information about the master's and Ph.D. programs, see the sections of this bulletin pertaining to industrial, mechanical, and civil and environmental engineering. For more information on the MSE program, contact the Design Division of Mechanical Engineering. For information on the M.B.A./MSE Dual Degree program and on the FPM Ph.D. program, contact the Alliance for Innovative Manufacturing at Stanford (AIM). Inquiries by email may be addressed to sima-info@simahai.stanford.edu. For more information on manufacturing research and education in engineering, browse the AIM Web pages at http://www-sima.stanford.edu/ and the Web pages for departments.

CURRICULA

For further details about the following programs, see the department sections in this bulletin.

Related aspects of particular areas of graduate study are commonly covered in the offerings of several departments and divisions. Graduate students are encouraged, with the approval of their department advisers, to select courses in departments other than their own to achieve a broader appreciation of their field of study. For example, most departments in the school offer courses concerned with properties of materials, and a student interested in an aspect of materials engineering can often gain appreciable benefit from the related courses given by departments other than her or his own.

Departments and divisions of the school offer graduate curricula as follows.

AERONAUTICS AND ASTRAONAUTICS

The current research and teaching activities cover a number of advanced fields, with special emphasis on:

- Active Noise Control
- Aerodynamic Noise
- Aerocclusion
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Biomedical Mechanics
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Structures/Materials Systems Optimization
- Direct and Large Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hypersonic and Supersonic Flow
Inertial Instruments
Multidisciplinary Design Optimization
Navigation Systems (especially GPS)
Optical Diagnostics in Fluid Dynamics
Optimal Control, Estimation, System Identification
Physical Gas Dynamics
Robust Control of Flexible Spacecraft
Spacecraft Design and Satellite Engineering
Shock Tube Studies of Vortex Interactions
Turbulent Flow and Combustion

CHEMICAL ENGINEERING
Applied Statistical Mechanics
Biocatalysis
Biochemical Engineering and Biophysics
Computational Materials Science
Colloid Science
Dynamics of Complex Fluids
Hydrodynamic Stability
Kinetics and Catalysis
Newtonian and Non-Newtonian Fluid Mechanics
Polymer Physics
Protein Biotechnology
Semiconductor Processing
Surface and Interface Science

CIVIL AND ENVIRONMENTAL ENGINEERING
Construction Engineering and Management
Design/Construction Integration Design/Construction Integration
Environmental and Water Studies
Environmental Engineering and Science
Environmental Fluid Mechanics and Hydrology
Structural Engineering and Geomechanics
Geomechanics
Structural Engineering

COMPUTER SCIENCE
Analysis of Algorithms
Artificial Intelligence
Automated Deduction
Autonomous Agents
Complexity Theory
Computational Geometry
Computer Architecture
Computer Graphics
Computer Security
Computer Vision
Database Systems
Design Automation
Digital Libraries
Distributed and Parallel Computation
Formal Verifications
Haptic Display of Virtual Environments
Human-Computer Interaction
Image Processing
Knowledge-Based and Expert Systems
Knowledge Representation and Logic
Mathematical Theory of Computation
Multi-Agent Systems
Networks and Distributed Systems
Operating Systems
Programming Systems/Languages
Reasoning under Uncertainty
Robotics
Scientific Computing and Numerical Analysis
Software Engineering

ELECTRICAL ENGINEERING
Computer Hardware
Computer Software Systems
Control and Systems Engineering
Communication Systems
Electronic Circuits
Electronic Devices, Sensors, and Technology
Fields, Waves, and Radioscience
Lasers, Optoelectronics, and Quantum Electronics
Network Systems
Image Systems
Signal Processing
Solid State Materials and Devices
VLSI Design

ENGINEERING
Interdepartmental Programs
Interdisciplinary Programs

ENGINEERING IN BIOLOGY AND MEDICINE
Biostatistics
Design for Medical Applications
Information Processing in and for Biomedical Systems
Mechanics of Hearing
Medical Imaging
Neuromuscular Biomechanics
Orthopedic Biomechanics
Rehabilitation Engineering
Transport Phenomena in Biological Systems

ENGINEERING-ECONOMIC SYSTEMS AND OPERATIONS RESEARCH
Business and Technology
Complementarity Problems and Equilibrium Programming
Decision Analysis
Dynamic Programming
Energy, Natural Resources, and the Environment
Intelligent Systems
Inventory Management
Investment
Lattice Programming
Management of Projects
Medical Policy
National Security Policy
Network Optimization, Design, and Equilibria
Numerical Optimization
Organizational Analysis
Performance Evaluation
Simulation Methodology
Stochastic Optimization
Stochastic Modeling and Queueing Analysis
Systems Economics
Telecommunications and Information Policy
Transportation Systems
Underground Mining

INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT
Financial Decisions
Inventory Control
Manufacturing Systems
Organizational Design and Control
Production and Operating Systems
Quality Assurance
Risk Analysis
Technology Management
The M.S. degree is conferred on graduate students in engineering according to the University regulations stated in the “Graduate Degrees” section of this bulletin, and is described in the various department listings. A minimum of 45 units is usually required in M.S. programs in the School of Engineering. However, the presentation of a thesis is not a requirement.

The M.S. degree is awarded at the completion of a comprehensive two-year program of graduate study. It is intended for students who desire more graduate training than can be obtained in an M.S. program. The program of study must satisfy the student’s department and usually includes 90 units beyond the B.S. degree, of which at least 60 must be devoted to advanced or graduate study in the major subject or closely related subjects. The presentation of a thesis is required. The University regulations for the Engineer degree are stated in the “Graduate Degrees” section of this bulletin, and further information is found in the individual departmental sections of this bulletin.

DOCTOR OF PHILOSOPHY

Programs leading to the Ph.D. degree are offered in each of the departments of the school. Special Ph.D. programs, which may be interdisciplinary in nature (for example, Bioengineering), can be arranged. University regulations for the Ph.D. are given in the “Graduate Degrees” section of this bulletin. Further information is found in departmental listings.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

The following “Engineering” courses deal with subject areas within engineering that are, in their essential nature, broader than the confines of any particular branch of engineering. These courses are taught by professors from several departments of the School of Engineering, under the supervision of those listed below.

Of the courses described in this section, many are of general interest to both engineering and nonengineering students. In addition, certain departmental courses are of general interest and without prerequisites.

Students interested in the interactions between technology and society should also consult the “Science, Technology, and Society” section of this bulletin.

PRIMARILY FOR UNDERGRADUATES


3 units, Aut (Freyberg)

10. Introduction to Engineering Analysis—Integrated approach to the fundamental scientific principles that are the cornerstones of engineering analysis: conservation of mass, atomic species, charge, momentum, angular momentum, energy, production of entropy expressed in the form of balance equations on carefully defined systems, and incorporating simple physical models. Emphasis is on setting up analysis problems arising in engineering. Topics: simple analytical solutions, numerical
solutions of linear algebraic, and laboratory experiences. Provides the foundation and tools for subsequent engineering courses.

4 units, Spr (Staff)

11. Engineering Mechanics Online I—First of a two-part sequence offered on TV. Newton/Euler principles of mechanics and their application to problems of practical interest. Vector operations; introduction to the symbol manipulation computer program AUTOLEV; bound vectors; moments, couples, torques; zero sets of bound vectors; centroids and mass centers; forces and equilibrium; differentiation of vectors in reference frames; kinematics of rigid bodies and particles. Extensive opportunities for one-on-one interaction with the instructor during office hours and by means of e-mail. Prerequisite: Mathematics 23 or 43. 3 units, Win (Kane)

12. Engineering Mechanics Online II—Second two-part sequence offered on TV. Newton/Euler principles of mechanics and their application to problems of practical interest. Kinematics of rigid bodies and particles, dyadics, inertial properties of rigid bodies and sets of particles, inertia forces and inertia torques, Newtonian reference frames, motion of a particle and of a rigid body in the vicinity of an Earth-fixed point, constrained particles and rigid bodies, multidof system. Extensive opportunities for one-on-one interaction with the instructor during office hours and by means of e-mail. Prerequisite: 11. 3 units, Spr (Kane)

14. Applied Mechanics: Statics and Deformables—Introduction to engineering mechanics (freebody diagrams, equilibrium, trusses, frames, cables, internal forces, shear and bending moment, stress and strain, Hooke's law, Mohr's circle, Poisson's ratio, and torsion of circular sections). Alternates between concepts of statics and solid mechanics, explaining where static and elastic assumptions are valid, and emphasizing the modeling of physical systems and design of simple members and structures in two dimensions. Problem sessions. Prerequisite: Physics 41. GER:2b (DR:6) 5 units, Aut (F. Chang) Spr (Staff)

15. Dynamics—Application of Newton's Laws to solve static and dynamic problems, particle and rigid body dynamics, freebody diagrams, writing equations of motion. 2-D and 3-D cases including gyroscopes, spacecraft, rotating machinery. Solution of equations of motion and dynamic response of simple mechanical systems. Problem sessions. Prerequisites: Mathematics 23 or 43, Physics 41. GER:2b (DR:6) 5 units, Aut (Rock)

20. Introduction to Chemical Engineering—Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, production of chemicals, materials processing, and purification. Prerequisite: Chemistry 31. GER:2b (DR:6) 3 units, Spr (Robertson)

25. Biotechnology—The interplay between applied recombinant DNA technologies and engineering principles in designing, developing, manufacturing, and formulating novel drugs for therapeutic purposes. Emphasis is on understanding the role of engineering in modern biotechnology. Case study perspective. A drug is identified and tracked from the initial phases of drug discovery to sequencing, cloning, scale-up in cell culture, purification and separation, and formulation. Regulatory issues in manufacturing and in clinical trials. Project-oriented. Recommended: some prior exposure to chemistry and biology. GER:2b (DR:6) 3 units, Aut (Robertson)

30. Engineering Thermodynamics—Introduction to the concepts of energy and entropy from elementary considerations of the microscopic nature of matter. Use of basic thermodynamics concepts in the solution of engineering problems. Methods and problems in the socially responsible economic generation and utilization of energy in central power stations, solar systems, gas turbine engines, refrigeration devices, automobile engines, etc. Prerequisites: Mathematics 19, 20, 21 or 41, 42 and Physics 41 or equivalent. GER:2b (DR:6) 3 units, Aut (Mungall) Win (Edwards)

40. Introductory Electronics—Overview of electronic engineering. Electrical quantities, and their measurement, including the operation of the oscilloscope. The basic function of electronic components including ideal diodes and transistors. Digital logic circuits and their functions including the elementary microprocessor. Analog circuits including the operational amplifier and tuned circuits. Lab assignments complement lecture. Enrollment limited to 200. Lab. Prerequisites: 43, 45. GER:2b (DR:6) 5 units, Aut (Pease) Spr (Khuri-Yakub)

50. Introductory Science of Materials—Crystaline structure and the microstructures that determine the important physical properties of engineering materials. Introduction to phase diagrams and their use in predicting phase changes in materials. Elementary treatment of diffusion and of the kinetics of reactions in solids. Discussion of methods for controlling the properties of engineering materials by controlling internal structure. May be taken on video at some of Stanford's Overseas Centers; see "Overseas Studies." GER:2b (DR:6) 4 units, Win (Braverman) Spr (Sinclair)

60. Engineering Economy—May be taken by freshmen, but recommended for second year or higher students Economic analysis for choice among alternatives. Use of compound interest calculations. Selection of appropriate minimum attractive rates of return. Effects of depreciation, sources of funds, and income tax. Analysis of decisions under uncertainty. Prerequisite: Mathematics 41 or equivalent. Recommended: previous knowledge of elementary probability. 3 units, Aut, Win (Jucker) Sum (Bhimjee)

62. Introduction to Optimization—Theory and computation of optimal selection of decisions under certainty. Linear programming, network optimization models, dynamic programming, non-linear programming, integer programming. Applications from a variety of areas, emphasizing high-level problems frequently faced by industrial engineers and management scientists. Prerequisite: Mathematics 43 or consent of instructor. GER:2b (DR:6) 4 units, Aut, Spr (Staff)

63Q. Stanford Introductory Seminar: Engineering Applications in Medicine—Preference to sophomores. Introduction to the application of engineering to problems in medicine and health care. Topics: applications of engineering mathematics, systems analysis, and decision analysis to health policy problems; assessment of medical technologies; risk analysis applications in medicine; computer science applications in medicine (e.g., decision support systems); applications of biochemical engineering; design and engineering for medical instrumentation; mechanical and electrical engineering applications in medicine (e.g., advanced prostheses, mechanical ears, implantable defibrillators, electrical nerve replacements); and aerospace medicine. 3 units (Brandeau, Owens) given 2000-01

70A. Programming Methodology—(Enroll in Computer Science 106A.) 5 units, Aut (Roberts) Win (Zelenkski) Spr (Staff)
100. Teaching Public Speaking—The theory and practice of teaching public speaking and presentation development. Lectures/discussions on developing an instructional plan, using audiovisual equipment for instruction, devising tutoring techniques, and teaching delivery, organization, audience analysis, visual aids, and unique speaking situations. Weekly practice speaking. Students serve as apprentice speech tutors. Those completing course may become paid speech instructors in the Technical Communications Program. Prerequisite: consent of instructor. 5 units, Aut, Win, Spr (Lougee, Staff)

102E. Technical/Professional Writing for Electrical Engineers—Required of Electrical Engineering majors. Examines the process of writing technical/professional documents. Lectures, writing assignments, individual conferences. Pre- or corequisite: Electrical Engineering 121, or consent of instructor. (WIM) 1 unit, Win, Spr (Lougee)

102M. Technical/Professional Writing for Mechanical Engineers—Required of Mechanical Engineering majors. The process of writing technical/professional documents. Lecture, writing assignments, individual conferences. Pre- or corequisite: Mechanical Engineering 103, or consent of instructor. (WIM) 1 unit, Aut, Win (Lougee)

102S. Writing: Special Projects—Structured writing instruction for students working on non-course related materials (theses, dissertations, journal articles). Weekly individual conferences. 1-5 units, Aut, Win, Spr (Staff)

102W. Technical and Professional Writing—Explores, systematically, the process of writing technical and professional documents. Lectures/discussions on analyzing audiences; defining purpose; generating and selecting appropriate report materials; structuring and designing clear and convincing reports; drafting effective reports; and editing reports that are clear, concise, emphatic, and mechanically and grammatically "clean." Weekly writing assignments and individual conferences. 3 units, Aut, Win, Spr (Lougee)

103. Public Speaking/Presentation Development—Priority given to Engineering students. Introduction to the full range of speaking activities, from impromptu talks to carefully rehearsed formal professional presentations. How to organize and write speeches for a variety of occasions, analyze audiences, create and use appropriate visual aids, combat nervousness, and deliver informative and persuasive speeches effectively. Students become confident speakers through weekly practice in class, rehearsals in one-on-one tutorials, and videotaped feedback. Enrollment limited. 3 units, Aut, Win, Spr (Staff)


105. Feedback Control Design—Design of linear feedback control systems for command-following error, stability, and dynamic response specifications. Root-locus and frequency response design techniques. Examples from a variety of fields. Some use of computer aided design with MATLAB. Prerequisite: 104, Electrical Engineering 102, or Mechanical Engineering 161. 3 units, Aut (Enge) Win (Franklin)

120. Fundamentals of Petroleum Engineering—(Same as Petroleum Engineering 120.) Lectures, problems. Basic engineering topics in petroleum discovery and recovery; and the origin, discovery, and development of oil and gas. The chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single- and multiphase flow through porous media. 3 units, Aut (Hewett)

130. Science, Technology, and Contemporary Society—(Same as Science, Technology, and Society 101.) Analysis of the interplay of science, technology, and society in the contemporary U.S. Topics: the key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as socio-technical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management of contemporary science and technology. Optional section for extra unit. GER:3b (DR:9) 4-5 units, Aut (McGinn)

131. Ethical Issues in Engineering—(Same as Science, Technology, and Society 115.) Ethical issues in contemporary engineering practice. Topics: the moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; the ethics of whistle blowing; ethical conflicts of engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations; ethical issues arising from engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Use of real-life case studies, guest practitioners, and field research. Limited enrollment. 4 units (McGinn) not given 1999-2000

140A. Management of Technology Ventures—First of three-part sequence only for students selected to the Mayfield Fellows Program. Functional management and leadership within high technology startups, focusing on entrepreneurial skills related to product and market strategy, venture financing and cash flow management, team recruiting and building strategies, and the challenges of managing growth and handling adversity in emerging ventures. Other engineering faculty, start-up founders, and venture capitalists participate as appropriate. No auditors. Recommended: accounting or finance course (Industrial Engineering 133, Economics 90, or Engineering 60). 4 units, Spr (Byers)

140B. Management of Technology Ventures—Open to Mayfield Fellows only; taken during the summer work tour at a technology startup. Students meet to exchange experiences and continue the formal learning process, and keep a journal of activities. Credit given following quarter. No auditors. 1 unit, Aut (Byers)

140C. Management of Technology Ventures—Open to Mayfield Fellows only. Allows students, faculty, employers, and venture capitalists to share and compare recent co-op experiences and analytical
frameworks. Students develop “living” case studies and integrative project reports. No auditors.

145. Introduction to High Technology Entrepreneurship—Primarily for undergraduates in engineering; preference to seniors. High-level overview of the entrepreneurial process, enterprise, and individual. For those who would like to form or grow a technology company, and those with a general interest in the field. Weekly assignments, case studies, lectures, and projects. No auditors.

3 units, Win (Byers)

151. French Media and Communications—(Enroll in French 127.) Note: the first of the Technological and Scientific French series is French 126. See the “French and Italian” section in this bulletin.

3-4 units, Win (Giraud)

152. Technocritique—(Enroll in French 128.)

3-5 units (Dupuy) not given 1999-2000


4 units, Aut (Fierziger) Spr (Lele)


4 units, Win (Moin)

159Q. Stanford Introductory Seminar: Research in Japanese Companies—Preference to sophomores. The home-campus equivalent of the Kyoto course. Knowledge from this research, and company visits, is evaluated in a seminar/discussion setting. Lecture/discussion on the structure of a Japanese company from the point-of-view of Japanese society. Visiting researchers from Japanese companies, with brief presentations and extensive question and answer periods, explore the Japanese research ethic.

3 units, Spr (Sinclair)

199. Special Studies in Engineering—Special studies, lab work, or reading under the direction of a faculty member. Often research opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the section number corresponding to the particular faculty member. Prerequisite: consent of instructor.

1 or more units, any quarter (Staff)

PRIMARILY FOR GRADUATE STUDENTS

205. Introduction to Control Design Techniques—Review of root-locus and frequency response techniques for control system and analysis, and synthesis. Introduction to: digital control design and the z-transform; state-space techniques modeling, full-state feedback regulator design, pole placement, and observer design. Combined observer and regulator design. Lab experiments on computers connected to mechanical systems. Prerequisites: 105; Mathematics 103, 113. Recommended: knowledge of Matlab.

3 units, Aut (Tomlin)


4 units, Win (Tomlin)

207A. Modern Control Design I—Design and analysis of digital controllers using classical and state space techniques. Discretization of continuous systems, z-transforms, and digital design. Pole placement and optimal quadratic regulators for single-input/single-output and multiple-input/multiple-output discrete systems. Discrete observers and optimal estimators. Simple lab experiments on mechanical systems. Prerequisites: 205; Mathematics 103 or Mechanical Engineering 200A.

3 units, Win (Rock)

207B. Modern Control Design II—Design of optimal controllers and estimators for systems with stochastic disturbances. Basic probability theory, identification techniques, recursive filtering, duality, and properties of optimal regulators. Sensitivity, robustness, and design trade-offs. Extensions to other cost functions. Lab experiments on computers connected to mechanical systems. Prerequisite: 207A. Recommended: Electrical Engineering 278 or Statistics 116.

3 units, Spr (Tomlin)


3 units, Win (Tomlin)


3 units, Win (How) alternate years, not given 2000-01


3 units, Aut (How) alternate years, not given 2000-01


220A. 3 units, Aut (T. P. Liu)

220B. 3 units, Win (T. P. Liu)

220C. 3 units, Spr (Chou)
235A.B. Space Systems Engineering—40-50 students, mostly from engineering and science, but also from business and political science, form a team to prepare a preliminary design study of a space system. Recently, international engineers have joined the team to define an initiative to put humans on Mars by 2010. Continued studies with Japan, Russia, and Europe define space vehicles for the missions. About 20 invited speakers from government and industry give the necessary background information. At the end of the second quarter, the class gives a verbal briefing to government and industry representatives and publishes a final report on the system. Prerequisite: senior or graduate standing in Engineering or Physics, or consent of instructor.

235A. 3 units, Win (Lusignan)
235B. 3 units, Spr (Lusignan)

290. Graduate Environment of Support—Discussion by guest faculty, advanced graduate students, specialists from industry and government, and dean’s office. Topics and information related to adapting graduate study to the environment in terms of psychosocial, financial, and career issues. How these relate to diversity, affirmative action and minority services, resources, policies, and procedures. Readings and observation participation sessions. (AU)

1 unit, Aut (Lozano, Mitchell, Mungal)

297A,B,C. Ethics of Development in a Global Environment (EDGE)—(Same as Cultural and Social Anthropology 133A,B,C.) Wednesday evening seminars on world affairs mostly on issues affecting poor nations. Autumn Quarter treats war and peace: the background of current nations. Autumn Quarter treats war and peace: the background of current wars and peace negotiations, the UN peace keeping efforts, war and religion, arms trade. Winter Quarter treats international resources and commerce: the debt crisis, environmental protection, resource depletion, Japan in the world economy, aid and monetary institutions. Spring Quarter treats "poverty and prejudice": development models, comparative national health, AIDS, control of wealth, India-China-Africa-S. America today. Speakers from Stanford and other institutions are experts who directly deal with world policy makers through research and advisory activities. One unit credit for attendance of the speaker series; 3 units additional credit for optional workshops treating selected issues in more depth. (Sequential registration not required.)

1-4 units, Aut, Win, Spr (Lusignan, Gupta)

298. Seminar in Fluid Mechanics—Interdepartmental seminar on problems in all branches of fluid mechanics, with talks by visitors, faculty, and students. Graduate students may register for 1 unit, without letter grade; a letter grade is given for talks.

1 unit, Aut (Homsy)
Win (Jameson)
Spr (Cantwell)

299. Special Studies in Engineering—Special studies, lab work, or reading under the direction of a faculty member. Students enroll in the section number corresponding to the particular faculty member. Prerequisite: consent of the instructor.

1 or more units, any quarter (Staff)

310A. Tools for Team-Based Design—(Same as Mechanical Engineering 310A.) For graduate students; open to limited SITN/global enrollment. Project-based, exposing students to the tools and methodologies useful for forming and managing an effective engineering design team in a business environment, including product development teams that may be spatial across the world. Topics: personality profiles for creating teams with balanced diversity; computational tools for project coordination and management; real time electronic documentation as a critical design process variable; and methods for refining project requirements to ensure that the team addresses the right problem with the right solution. Computer-aided tools are employed for supporting geographically distributed teams. The final project analyzes a set of industry-sponsored design projects for consideration in 310B.C. The investigation includes benchmarking and meetings with industrial clients. The deliverable is a detailed document with specifications for the project and the optimal design team that should work on the project in subsequent quarters. Limited enrollment, consent of instructor for off-campus (global) registrants.

4 units, Aut (Cutkosky)

310B,C. Design Development Experience with Corporate Partners—(Same as Mechanical Engineering 310B,C.) Two-quarter project for graduate students who already have some design experience and want in-depth involvement in an entrepreneurial design team with real world industrial partners. The products developed are part of the student’s portfolio. For some projects, 217 and 218 may be prerequisites or corequisites (see http://me310.stanford.edu for admission guidelines). Each team functions like a small start-up company, working closely with a technical advisory board, consisting of the instructional staff and a coach. Teams use computer-aided tools for project management, communication, and documentation, and are provided a budget for direct expenses including hiring technical assistants and conducting tests. Teams interact with corporate liaisons weekly via site visits, video conferencing, email, fax, and phone. Hardware demonstrations, peer reviews, scheduled documentation releases, and an intense team environment provide the mechanisms and culture for design information sharing. Enrollment by consent of instructor and depends on the results of a pre-enrollment survey in December and the recommendations made by project definition teams in 310A.

4-5 units Win, Spr (Cutkosky)

610. Manufacturing Systems Analysis—(Same as Business T610.) Causal models of material flow in manufacturing systems. Topics: capacity and capacity utilization; functions of inventory; the manufacturing enterprise as a linear economic system; product structure and requirements planning; models of manufacturing response time; product portfolios and manufacturing flexibility. Emphasis is on descriptive modeling.

4 units (Harrison)

611. Understanding Manufacturing Processes—(Same as Business T611.) Provides a framework for understanding the technology of modern manufacturing processes, focusing on the key factors in developing an understanding of any manufacturing process. Topics: underlying microscopic physical and analytical theories; steps that control the performance, quality, and cost of the product; the history of the process; and the potential for improvement through research. Examples of fabrication processes (e.g., semiconductor devices, precision machining).

4 units (Cutkosky, Wood) not given 1999-2000

612. Manufacturing Organization—(Same as Business T612.) Overview of organization theory, research, and research methods relevant to the study of manufacturing systems. Conceptual domains include selection, socialization, promotion systems, reward systems, job design, creativity, innovation, social networks, group problem-solving, and the relationship between technology and social structure. Research focuses on papers that used organizational theory and methods to understand behavior of, and in, manufacturing settings.

4 units (Staff) given 2000-2001

613. Design for Manufacturability—(Same as Business T613.) Structured methodologies of the DFM process, emphasizing the pivotal role of design in manufacturing effectiveness. Topics: the initial stages of the concurrent engineering process including functional analysis, benchmarking, quality function deployment, value analysis, cost drivers, design for assembly and serviceability, design for process, and advanced research issues on these topics. Projects involve independent study of the design and manufacture of a product currently in production leading to a new product definition offering improved competitive advantage.

4 units (Ishii) not given 1999-2000

614. Manufacturing Performance Measurement—(Same as Business T614.) Managerial accounting as a discipline is devoted to modeling
manufacturing processes and representing physical events in economic terms: fundamental issues in measurement theory, cost-volume-profit analysis, activity-based costing, variance analysis, and the costs and benefits of flexibility. Finance functions: capital investment in technology, interactions with the financial markets, capital structure, and taxation. Quality, where modeling of economic effects is a relatively recent phenomenon: statistical process control, cost of quality measures, ISO 9000, the Baldrige Award process, and environmental protection.

615. Manufacturing Information and Coordination—(Same as Business T615.) Systems for sharing information, coordinating activities, and aligning different objectives in a manufacturing organization. Cross-functional coordination, goal conflicts among agents, design of incentives, resource allocation. The information systems that support coordination activities through a value delivery chain (systems for order entry, master scheduling, requirements planning, product scheduling, and material flow control).

4 units (Patell)

616. Proseminar in Manufacturing Education—(Same as Business T616.) Primarily for the Future Professors of Manufacturing, but open to others with consent of the instructor. Students are exposed to manufacturing topics not covered in traditional courses and which are needed to help them prepare for academic careers in manufacturing. Topics are chosen by the students, who develop many of the presentations and lead many of the discussions. Guest speakers from government, industry, and academia.

1 unit, Aut, Win, Spr (Reis)

OVERSEAS STUDIES

These courses are approved for the School of Engineering and taught overseas at the campus indicated. Students should discuss with their major department adviser which courses would best meet individual needs. Descriptions are in the "Overseas Studies" section of this bulletin or at the Overseas Studies office, 126 Sweet Hall. Students overseas are also encouraged to participate in an internship as part of their international experience.

BERLIN
40B. Introductory Electronics
5 units, Aut, Win, Spr (Masters)

50B. Introductory Science of Materials
4 units, Aut, Win, Spr (Bravman)

FLORENCE
50F. Introductory Science of Materials
4 units, Aut, Win (Bravman)

KYOTO
40K. Introductory Electronics
5 units, Spr (Masters)

50K. Introductory Science of Materials
4 units, Spr (Bravman)

PARIS
50P. Introductory Science of Materials
4 units, Aut, Win (Bravman)
INSTRUCTION AND RESEARCH FACILITIES

The work of the department is centered in the William F. Durand Building for Space Engineering and Science. This 120,000 square foot building houses advanced research and teaching facilities and concentrates in one complex the Department of Aeronautics and Astronautics as well as the activities of other engineering organizations allied in space exploration and aerospace technology.

The Global Positioning System (GPS) Laboratory is engaged in research on precise aircraft, spacecraft, and ground vehicle navigation. The laboratory has extensive equipment including approximately 30 carrier phase receivers and has built approximately 20 pseudolites for centimeter level positioning research both inside and outside buildings. A nationwide network of reference stations has been installed for evaluation of the Wide Area Differential GPS concept. The laboratory has performed extensive flight testing in a twin engine aircraft at local airports.

The ARL computing facilities include a dozen Sun workstations for control system design, analysis, and simulation; for real-time software development; for mechanical and electrical CAD; and for documentation. The workstations are complemented by a collection of real-time control computers networked by the labwide LAN. These microprocessors-based, single-board computers are used in multiprocessor configurations for implementing and testing control algorithms on experimental hardware.

The Guidance and Control Laboratories include a wide spectrum of specialized facilities for making and testing novel instruments of extremely high precision. In addition, students work in laboratories associated with interdepartmental science experiments such as Gravity Probe-B (a gyro test of general relativity), a Space Test of the Equivalence Principle, and an advanced Laser Interferometer Gravity-wave Observatory. Clean facilities, ultra-precision machining, and advanced electronics design and fabrication support the guidance, control, and instrumentation experiments and research in precision machining, for example, quiet hydraulics for actuation and metrology on machines expected to operate with 30 nm precision. Cryogenic gyro test facilities are available in the nearby Varian Physics Building, and Electrical Engineering’s Integrated Circuit Fabrication Facility is adjacent.

The spacecraft design program is a total life-cycle space mission program. The Satellite Systems Development Laboratory (SSDL) provides the opportunity for building, testing, and operating low earth-orbiting microsatellites. Students at the master’s degree level participate in mission planning, project management, spacecraft design, fabrication, testing, launch integration, and mission operations. Students in the engineering and doctoral programs are involved with multyear satellite programs for more complex missions. These programs involve direct interaction with payload customers and industry in both design and operations.

The Aircraft Aerodynamics and Design Group is involved with research in applied aerodynamics and aircraft design. Their work ranges from the development of computational and experimental methods for aerodynamic analysis to studies of unconventional aircraft concepts and new architectures for multidisciplinary design optimization.

The Flows Physics and Computation Division (FPC) is a joint laboratory between the departments of Aeronautics and Astronautics, and Mechanical Engineering. The FPC offers courses in acoustics, aerodynamics, applied mathematics, compressible flow, computational fluid mechanics, numerical analysis, and propulsion.

The goal of the FPC is to carry out basic research leading to the development of improved computational tools and physical models for accurate engineering design, analysis, and control of complex flows. Problems of interest include aerodynamics, electronics cooling, materials processing, planetary entry, power systems, propulsion, and semiconductor manufacturing. Research is conducted in a variety of disciplines including acoustics, chemical reactions, combustion, data display, environmental fluid mechanics, flow control, flow interactions with electromagnetic waves, numerical analysis, plasmas and processing, and scientific computing.

The computational facilities of the FPC include powerful workstations, color displays and reproduction facilities, and direct access to the major national computing facilities of the nearby NASA-Ames Research Center which includes CRAY-C90s and massively parallel supercomputers. The Center for Turbulence Research (CTR), a research consortium between Stanford and NASA, is affiliated with this group. The intellectual atmosphere of the Flow Physics and Computation Division is greatly enhanced from interactions with CTR’s large staff of postdoctoral researchers and distinguished visiting scientists.

Experimental fluid mechanics research is carried out using the facilities of the Aero-Fluid Mechanics Laboratories (AFML). Facilities include several laser sources and flow measuring systems; a high pressure shock tube; a flow visualization water channel; and a temperature stabilized subsonic wind tunnel equipped with a unique free-to-roll, free-to-yaw high angle-of-attack model support system. Collaborative projects with NASA Ames provide Stanford faculty and graduate students access to a variety of large-scale experimental flow facilities. Research is directed at using experimentation to enhance a basic understanding of fluid flow phenomena with application to aeronautical systems including the aerodynamics of high lift systems, new propulsion concepts, and advanced aerodynamic measurement techniques.

The Structures and Composites Laboratories include facilities for studying and testing the behavior of small-scale structures of metal and fiber reinforced composites. Equipment is also available to fabricate structural elements made of composite material using an autoclave, resin transfer molding, and hot press.

The department has over 100 computers in the Durand Building for use in the academic and research programs. Two clusters of Macintoshes and PCs are available for student use, and each research group is equipped with advanced workstations, Macintoshes, and/or PCs. In addition, computer clusters throughout the campus provide access to electronic mail, the WorldWide Web, and time-shared computation via the campus academic computer network. They are available to all students at no cost for their course work or unsponsored research.

The Durand Building also houses faculty and staff offices and several conference rooms. Attached to the building is a modern classroom building equipped for televising lectures; it contains a lecture auditorium.

Through the consortium arrangement between Stanford and the nearby NASA-Ames Research Center, students and faculty have access to one of the best and most extensive collections of experimental aeronautical research facilities in the world, as well as the latest generation of super-computers.

INSTITUTES AND RESEARCH PROGRAMS

At the master’s level, a program in Computational Fluid Dynamics (CFD) is an option within the general structure of the master’s requirements. Students intending to seek a Ph.D. degree with an emphasis on CFD should take the CFD series AA 214A,B,C during their master’s year. Choice of math courses, theoretical and experimental dynamics courses, and electives most suitable for the CFD program should be done in consultation with the student’s advisor. Research topics in CFD are supervised by a number of faculty members in both the Department of Mechanical Engineering and the Department of Aeronautics and Astronautics. Students undertaking theses in CFD generally utilize the large
The Joint Institute for Aeronautics and Acoustics (JIAA) is co-sponsored by Stanford University and NASA-Ames Research Center. The overall purpose of the JIAA is to prepare students for leadership in the nation’s aeronautics enterprise. The institute provides the environment necessary for long-term cooperative research and graduate education in specialized areas of aeronautics and acoustics. Stanford faculty, staff, and students collaborate with center staff on research topics motivated by problems facing the aeronautics industry. Current topics include active flow control, jet noise, aerodynamics and acoustics of high lift systems and application of luminescent paint to aerodynamic measurement.

The Center for Turbulence Research (CTR) is a research consortium for fundamental study of turbulent flows, jointly operated by Stanford and NASA-Ames Research Center. Its principal objective is to stimulate significant advances in the physical understanding of turbulence, leading to improved capabilities for control of turbulence and turbulence modeling for engineering analysis. Emphasis is placed on probing turbulent flow fields, developed by direct numerical simulations and/or laboratory experiments using new diagnostic techniques and mathematical methods, and on concepts for turbulence control and modeling. Although the role of the CTR is to advance the understanding of turbulent flows for aerospace applications, it is an interdisciplinary program; researchers with interest in turbulence are sought from aeronautics, mathematics, meteorology, oceanography, physics, and other areas.

GENERAL INFORMATION

Further information about the facilities and programs of the Department of Aeronautics and Astronautics is available on the World Wide Web (at http://aa.stanford.edu/) or by request from the department’s Student Services Office.

The department has a very active student branch of the American Institute of Aeronautics and Astronautics, which sponsors films covering aerospace topics and monthly socials. It also conducts visits to nearby research, government, and industrial facilities, and sponsors a Young Astronauts Program in the local schools.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

Although primarily a graduate-level department, Aeronautics and Astronautics offers an interdisciplinary program in Aeronautics and Astronautics (AA) leading to the B.S. degree in Engineering. For further information, see the “School of Engineering” section of this bulletin and the Undergraduate Handbook, available from the Office of the Dean of Engineering.

Undergraduates interested in aerospace may also elect a minor in Aeronautics and Astronautics. For information about an AA undergraduate minor, see the “School of Engineering” section of this bulletin.

COTERMINAL PROGRAM

This special program allows Stanford undergraduates an opportunity to work simultaneously toward a B.S. in another field and an M.S. in Aeronautics and Astronautics. General requirements for this program and admissions procedures are described in the “School of Engineering” section of this bulletin. Admission is granted or denied through the departmental faculty Admissions and Awards Committee. A coterminal student must meet the course and scholarship requirements detailed for the M.S. below.

GRADUATE PROGRAMS

Admission—To be eligible to apply for admission to the department, a student must have a bachelor’s degree in engineering, physical science, mathematics, or an acceptable equivalent. Students who have not yet received a master’s degree in a closely allied discipline will be admitted to the master’s program; eligibility for the Ph.D. program is considered after the master’s year (see “Doctor of Philosophy” below). Applications for all degree programs are accepted throughout the year, although applications for fellowship aid must be received and completed by January 15 for the next Autumn Quarter.

Information about admission to the Honors Cooperative Program is included in the “School of Engineering” section of this bulletin.

Further information and application forms may be obtained from Graduate Admissions, the Registrar’s Office (http://www.stanford.edu/dept/registrar/admissions/).

Waivers and Transfer Credits—Students may receive departmental waivers of required courses for the M.S. degree in Aeronautics and Astronautics by virtue of substantially equivalent and satisfactorily performed course work at other institutions. A waiver petition (signed by the course instructor and advisor) should be submitted to the Student Services office indicating (1) the Stanford University course number and title, and (2) the institution, number(s), and title(s) of the course(s) wherein substantially equivalent material was treated. If a waiver is granted, the student may take an additional technical elective in place of the required course. The total 45-unit requirement for the master’s degree is not reduced by course waivers.

A similar procedure should be followed for transfer credits. However, transfer credit is allowed only for courses taken as a graduate student, after receiving a bachelor’s degree, in which equivalence to Stanford courses is established and for which a grade of ‘B’ or better has been awarded. Transfer credits, if approved, will reduce the total number of Stanford units required for a degree. The number of transfer credits accepted for each degree (M.S., Engineer, and Ph.D.) is delineated in the “Graduate Degrees” section of this bulletin.

Fellowships and Assistantships—Fellowships and course or research assistantships are available to qualified graduate students. Fellowships sponsored by Gift Funds, Stanford University, and Industrial Affiliates of Stanford University in Aeronautics and Astronautics provide grants to first-year students for the nine-month academic year to cover tuition and living expenses. Stanford Graduate Fellowships, sponsored by the University, provide grants for three full years of study and research; each year, the department is invited to nominate several outstanding doctoral or predoctoral students for these prestigious awards. Students who have excelled in their master’s-level course work are eligible for course assistantships in the department; those who have demonstrated research capability are eligible for research assistantships from individual faculty members. A half-time course or research assistantship provides a semimonthly living stipend and a 9-unit tuition grant per quarter. Research assistants may be given the opportunity of full-time summer employment at twice the half-time rate. They may use their work as the basis for a dissertation or Engineer’s thesis.

MAJOR OF SCIENCE

The University’s basic requirements for the master’s degree are outlined in the “Graduate Degrees” section of this bulletin. Students with an aeronautical engineering background should be able to qualify for the master’s degree in three quarters of work at Stanford. Students with a bachelor’s degree in physical science, mathematics, or other areas of engineering may find it necessary to take certain prerequisite courses, which would lengthen the time required to obtain the master’s degree. The following are departmental requirements.

SCHOLARSHIP REQUIREMENTS

A minimum grade point average (GPA) of 2.75 is required to fulfill the department’s M.S. degree requirements and a 3.0 is the minimum required for eligibility to attempt the Ph.D. qualifying examination. It is incumbent upon both M.S. and potential Ph.D. candidates to request letter grades in all courses except those that do not offer a letter grade option and those that fall into the categories of colloquia and seminars (for example, AA 293, 297, and 298). Insufficient grade points on which to base the GPA may delay expected degree conferral or result in refusal of permission to take the qualifying examinations. Candidates with GPAs of 3.0 through 3.2 must request the permission of the Candidacy Committee to attempt the qualifying examinations.
The master's program (45 quarter units) in Aeronautics and Astronautics (AA) is designed to provide a solid grounding in the basic disciplines and a foundation for systems engineering. All candidates for this degree are expected to meet the basic course requirements in experimentation in aeronautics and astronautics, fluid mechanics, guidance and control, propulsion, and structural mechanics (Category A below), in addition to work in applied mathematics (Category B) and technical electives (Category C).

A. Basic Courses—Candidates select eight courses as follows:
1. Five courses in the basic areas of Aeronautics and Astronautics (one each):
   a) Experimentation: 236A or 290; or Engr. 205, 206, or 207A
   b) Fluids: 210A or 200A or 200B
   c) Guidance and Control: Engr. 105
   d) Propulsion: 280 or 283
   e) Structures: 240A
2. Three courses, one each from the areas below:
   a) Fluids: 200A or 200B (if 210A was taken or waived in item 1); or 210A (if 200A or 200B was taken or waived in item 1)
   b) Structures: 240B or 256
   c) Guidance and Control: 271A or 279
   d) Aero Astro elective: AA course numbered 200 and above, excluding seminars and independent research.

Candidates who believe they have satisfied a Basic Courses requirement in previous study may request a waiver of one or more courses (see “Waivers and Transfer Credits” above). If a requirement in fluids, guidance and control, or structures in item 1 is waived, it is expected that a course in the same category from item 2 will be substituted.

B. Mathematics Courses—During graduate study, each candidate is expected to develop a competence in the applied mathematics pertinent to his or her major field. This requirement can be met by matriculating in a minimum of 6 units in either (1) applied mathematics (for example, complex variables, linear algebra, partial differential equations, probability), or (2) technical electives that strongly emphasize applied mathematics. A list of courses approved for the mathematics requirement is available in the departmental Student Services office. (Calculus, ordinary differential equations, and vector analysis are fundamental mathematics prerequisites, and will not satisfy the master's mathematics requirement.) Students planning to continue to the Ph.D. should note that 25 percent of the major-field Ph.D. qualifying examination is devoted to pertinent mathematics.

C. Technical Electives—Candidates, in consultation with their advisors, select at least four courses in their major field from among the graduate-level courses offered by the departments of the School of Engineering and related science departments. This requirement increases by one course, taken in either the major or peripheral fields, for each basic course that is waived. Normally, one course (3 units) in this category may be directed research. Courses taken in satisfaction of the other master's requirements (categories A, B, and D) may not also be counted as technical electives.

D. Other Electives—It is recommended that all candidates enroll in at least one humanities or social science course. Language classes qualify in this category, but practicing courses in, for example, art, music, and physical education do not qualify.

When planning their programs, candidates should check course descriptions carefully to ensure that all prerequisites have been satisfied. A course that is taken to satisfy a prerequisite for courses in Category A (Basic Courses) or B (Mathematics) cannot be counted as a technical elective, but can count toward the M.S. degree in Category D (Other Electives).

ENGINEERING
Students whose career objectives require a more interdepartmental or narrowly focused program than is possible in the M.S. program in Aeronautics and Astronautics (AA) may pursue a program for an M.S. degree in Engineering (45 quarter units). This program is described in the School of Engineering “Graduate Programs of Study” section of this bulletin.

Sponsorship by the Department of Aeronautics and Astronautics in this more general program requires that the student file a proposal before completing 18 units of the proposed graduate program. The proposal must be accompanied by a statement explaining the objectives of the program and how the program is coherent, contains depth, and fulfills a well-defined career objective. The proposed program must include at least 12 units of graduate-level work in the department and meet rigorous standards of technical breadth and depth comparable to the regular AA Master of Science program. The grade and unit requirements are the same as for the M.S. degree in Aeronautics and Astronautics.
least 12 units must be from graduate-level courses in mathematics or applied mathematics (a list of approved courses is available from the department Student Services office). University requirements for continuous registration do apply to doctoral students for the duration of the degree, including registration for each quarter in which the student requires department consultation to complete dissertation work.

University Oral and Dissertation—The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four selected faculty members, plus a chair from another department). The University oral normally occurs toward the end of the fourth doctoral year. Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. The dissertation reading committee is selected, in consultation with the adviser and subject to the approval of the department chair, during the second year of doctoral study. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the department Student Services office at least three weeks prior to the date of the oral for departmental review and approval.

Ph.D. MINOR

A student who wishes to obtain a Ph.D. minor in Aeronautics and Astronautics should consult the department office for designation of a minor adviser. A minor in Aeronautics and Astronautics may be obtained by completing 20 units of graduate-level courses in the Department of Aeronautics and Astronautics, following a program (and performance) approved by the department’s candidacy chair.

The student’s Ph.D. reading committee and University oral committee must each include at least one faculty member from Aeronautics and Astronautics.

COURSES

(WIM) indicates that the course meets the undergraduate Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations for undergraduates (8 units maximum).

100. Introduction to Aeronautics and Astronautics—The principles of fluid flow, flight, and propulsion; the creation of lift and drag, aerodynamic performance including take-off, climb, range, and landing performance, structural concepts, propulsion systems, trajectories, and orbits. Remarks on the history of aeronautics and astronautics. Prerequisites: Mathematics 41, 42; elementary physics.

3 units, Aut (Alonso)

104. Dynamic Behavior—(Enroll in Engineering 104.)

105. Feedback Control Design—(Enroll in Engineering 105.)

190. Directed Research in Aeronautics and Astronautics—Experimental or theoretical work for undergraduate students, under faculty direction, and emphasizing development of research and communication skills. Written report(s) and letter grade required; if this is not appropriate, enroll in 199. Consult faculty in area of interest for appropriate topics, involving one of the graduate research groups or other special projects. Prerequisite: consent of adviser and instructor. (WIM)

3-5 units, any quarter (Staff)

199. Independent Study in Aeronautics and Astronautics—Directed reading, lab, or theoretical work for undergraduate students. Consult faculty in area of interest for appropriate topics involving one of the graduate research groups or other special projects. Prerequisite: consent of instructor.

1-5 units, any quarter (Staff)

200A. Applied Aerodynamics—Review of the fundamental equations of fluid dynamics and the physical assumptions on which they are based; overview of appropriate methods for solving these equations including nonlinear CFD, conformal mapping, linear panel and vortex methods; estimation of pressure distributions and resultant airloads on 2-D airfoils, finite wings, slender bodies, and lifting systems; compressibility effects; boundary layer analysis and prediction of drag, separation, and displacement effects. Application to airfoil and wing design. Prerequisite: undergraduate aeronautics course. Recommended: 210A.

3 units, Win (MacCormack)

200B. Applied Aerodynamics II—Analytical and numerical techniques for the aerodynamic analysis of aircraft, focusing on finite wing theory, far-field and Trefftz-plane analysis, two-dimensional laminar and turbulent boundary layers in airfoil analysis, similarity rules, aerodynamic stability derivatives. Bi-weekly assignments require MATLAB or a suitable programming language. Prerequisite: 200A or equivalent. Recommended: 210A.

3 units, Spr (Alonso)

201A. Fundamentals of Acoustics—Acoustic equations for a stationary homogeneous fluid; wave equation; plane, spherical, and cylindrical waves; harmonic (monochromatic) waves; simple sound radiators; reflection and transmission of sound at interfaces between different media; multipole analysis of sound radiation; Kirchhoff integral representation; scattering and diffraction of sound; propagation through ducts (dispersion, attenuation, group velocity); sound in enclosed regions (reverberation, absorption, and dispersion); radiation from moving sources; propagation in the atmosphere and underwater. Prerequisite: first-year graduate standing in engineering, mathematics, sciences; or consent of instructor.

3 units (Lele) alternate years, given 2000-01

201B. Topics in Aeroacoustics—Acoustic equations for moving medium, simple sources, Kirchhoff formula, and multipole representation; radiation from moving sources; acoustic analogy approach to sound generation in compact flows; theories of Lighthill, Powell, and Mohring; acoustic radiation from moving surfaces; theories of Curi, Ffowcs Williams, and Hawkings; application of acoustic theories to the noise from propulsive jets, airframe noise and rotor noise; computational methods for acoustics. Prerequisite: 201A or consent of instructor.

3 units (Lele) not given 1999-2000


3 units (Kroo) alternate years, given 2000-01

210A. Fundamentals of Compressible Flow—Introduction to compressible flow. Topics: development of the three-dimensional, non-steady, field equations for describing the motion of a viscous, compressible fluid, differential and integral forms of the equations, constitutive equations for a compressible fluid, the entropy equation, compressible Couette flow, compressible boundary layers, the recovery factor, area-averaged equations for one-dimensional steady flow, shock waves, channel flow with heat addition and friction, flow in nozzles and inlets, oblique shock waves, Prandtl-Meyer expansion, unsteady one-dimensional flow, the shock tube, small disturbance theory, acoustics in one-dimension, steady flow in two-dimensions, potential flow, linearized potential flow, lift and drag of thin airfoils, similarity rules for subsonic
and supersonic flow, conical flow. Prerequisite: Mechanical Engineering 131B or equivalent.
  3 units, Aut (Cantwell)

210B. Fundamentals of Compressible Flow—Continuation of 210A with emphasis on more general flow geometry. Use of exact solutions to explore the hypersonic limit. Identification of similarity parameters. Solution methods for the linearized potential equation with applications to wings and bodies in steady flow; their relation to physical acoustics and wave motion in nonsteady flow. Nonlinear solutions for nonsteady constant area flow and introduction to Riemann invariants. Elements of the theory of characteristics; nozzle design; extension to nonsentropic flow. Real gas effects in compressible flow. Flows in various gas dynamic testing facilities. Prerequisite: 210A.
  3 units, Win (Alonso) alternate years, not given 2000-01

211A. Physical Gas Dynamics—(Enroll in Mechanical Engineering 262A.)

213. Atmospheric Entry—High-speed atmospheric entry subjects vehicles to intense heating, decelerations, and structural loads. These are formulated and their intensity determined for a variety of flight paths. Trajectories range from nonlifting (ballistic) to constant lift and variable dynamic testing facilities. Prerequisite: 210A.
  3 units, Spr (Tauber)

214A. Numerical Methods in Fluid Mechanics—The basic principles underlying the Navier-Stokes equations. Relations between time-accurate and relaxation methods. Implicit and explicit methods combined with flux splitting and space factorization. Considerations of accuracy, stability of numerical methods, and programming complexity. Prerequisites: knowledge of linear algebra and Mechanical Engineering 200A, 200B, or equivalent approved by instructor.
  3 units, Aut (Pulliam)

  3 units, Win (MacCormack)

  3 units, Spr (MacCormack)

215A,B. Advanced Computational Fluid Dynamics—High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.
  3 units each, Win, Spr (Jameson)

217A,B,C. Mathematical and Computational Methods in Engineering—(Enroll in Mechanical Engineering 200A,B,C.)

218. Introduction to Symmetry Analysis—The methods of symmetry analysis and their use in the reduction and simplification of physical problems. Topics: dimensional analysis, phase-plane analysis of autonomous systems of ordinary differential equations, use of Lie groups to reduce the order of nonlinear ODEs and to generate integrating factors, use of Lie groups to reduce the dimension of partial differential equations and to generate similarity variables, the relation between symmetries and conservation laws, generalized symmetries, recursion operators, exact solutions of nonlinear PDEs generated from non-local groups, Backlund transformations, group origins of solitary wave solutions. The invariant groups of many of the classical equations of mathematical physics. Examples from boundary layers, nonlinear heat conduction, shallow water waves, viscous jets and vortex rings, similarity rules for turbulent shear flows. Software for finding invariant groups of ODEs and PDEs. Prerequisite: Mechanical Engineering 200A or equivalent.
  3 units, Win (Cantwell)


220. Parallel Methods in Numerical Analysis—(Enroll in Computer Science 238.)

225. Stochastic Processes in Aeronautics—Applications of probability theory to problems in aeronautics, emphasizing random behavior in fluid, thermodynamic, chemical, structural, and control systems of aerospace interest. The random walk model introduces basic concepts and connects the topics. Time evolution of probability distributions, linking problems in chemical kinetics, rarefied gas flows, thermodynamic nonequilibrium, and finite difference methods in fluid mechanics. Statistical variables: power spectra, correlation functions, transform techniques, the response of a linear system to a random forcing function, and the statistical theory of turbulence. Stochastic models on microcomputers.
  3 units (Staff) not given 1999-2000

230. Rotorcraft Aerodynamics—The fundamental aerodynamics of rotorcraft, including general momentum theory, blade-element theory, and physical concepts of blade motions in hover and forward flight. Topics: dynamics stall, blade-vortex interactions, and active blade controls. Prerequisite: undergraduate aerodynamics.
  3 units, Win (Yu)

235A,B. Space Systems Engineering—(Enroll in Engineering 235 A,B.)

236A. Spacecraft Design—The design of unmanned spacecraft and spacecraft subsystems concentrating on identification of design drivers and current design methods. Topics: spacecraft configuration design, mechanical design, structure and thermal system design, attitude control, electric power, command and telemetry, and design integration and operations.
  3 units, Win (Twiggs)

236B,C.D. Spacecraft Design—Continuation of 236A.

240A. Analysis of Structures—Elements of two-dimensional elasticity theory. Boundary value problems; energy methods; analyses of solid and thin walled section beams, trusses, frames, rings, monocoque and semi-
monocoque structures. Prerequisite: Engineering 14 or equivalent.


3 units, Win (F. Chang)

241A B. Introduction to Aircraft Design, Synthesis, and Analysis—The total development of new aircraft systems, emphasizing commercial aircraft; the underlying economic and technological factors that create markets for new aircraft from rational and historical viewpoints; determining market demands and system mission performance requirements; optimizing configurations to comply with requirements, emphasizing the interaction of various disciplines (aerodynamics, structures, propulsion, guidance, payload, and ground support; parametric studies); applied aerodynamic and design concepts for use in configuration analysis (airplane layout, wing design, high lift systems, drag, stability and control requirements, and tail sizing). Application to an individually chosen aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance and installation; engine types; environmental problems (noise and smoke); performance estimation (takeoff, climb, cruise, and landing). Direct/indirect operating costs prediction and interpretation. Aircraft functional systems (hydraulic, electrical, environmental control); avionics; importance and achievement of aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

241A 3 units, Win (Kroo)
241B 3 units, Spr (Kroo)

243A B. Dynamics—(Enroll in Mechanical Engineering 231A, B.)

244A. Free and Forced Motion of Structures—Vibrations and forced response of linear systems with a finite number of degrees of freedom. Vibrations and forced response of continuous structures, developed in a framework of analytical dynamics; rods, beams, membranes, and other elastic systems. Approximate methods for analyzing nonuniform and built-up structures. Finite-element methods in a dynamic context. Introduction to random responses and to nonlinear systems, as time permits. Prerequisites: 240A, Engineering 15 or equivalent.

3 units, Win (Ashley)

244B. Structural Dynamics and Aeroelasticity—Continuation of the 244A treatments of finite-element methods and vibration of continuous, two-dimensional structures. Introduction to aeroelasticity from a unified viewpoint applicable to flight vehicles, rotating machinery, and other elastic systems. Aeroelastic operators and unsteady aerodynamics in two dimensions. Forced response, static and dynamic eigenvalues of a simplified system. Aeroelastic analysis of representative one- and two-dimensional systems. Computational problems covering aeroelastic analysis of simple systems. Prerequisites: 244A or equivalent, familiarity with MATLAB or a programming language.

3 units, alternate years, given 2000-01

245A. Continuum Mechanics: An Introduction—(Enroll in Mechanical Engineering 238A.)

245B. Analysis of Continuum Mechanics—(Enroll in Mechanical Engineering 238B.)

246A. Theory of Plates—(Enroll in Mechanical Engineering 241A.)

246B. Theory of Shells—(Enroll in Mechanical Engineering 241B.)

246D. Vibration and Stability of Plates and Shells: Biomechanical Applications—(Enroll in Mechanical Engineering 241D.)


3 units, not given 1999-2000

252. Techniques of Failure Analysis—Introduction to the field of failure analysis, including fire and explosion analysis, large scale catastrophe projects, traffic accident reconstruction, aircraft accident investigation, human factors, biomechanics and accidents, design defect cases, materials failures and metallurgical procedures, and structural failures. Product liability, failure modes and effects analysis, failure prevention, engineering ethics, and the engineer as expert witness.

2 units, Spr (Ross)


3 units, Win (Springer)


3 units, Spr (F. Chang)

261A. Statistical Theory and Modeling for Turbulent Flow—(Enroll in Mechanical Engineering 261A.)

268. Digital Image Processing—(Enroll in Electrical Engineering 368.)

269. Optical Methods in Engineering Science—(Enroll in Electrical Engineering 347.)

270. Introduction to Modern Optics—(Enroll in Electrical Engineering 268.)

271A. Dynamics and Control of Aircraft and Spacecraft—The dynamic behavior of aircraft and spacecraft, and the design of automatic control systems for them. For aircraft: non-linear and linearized longitudinal, lateral and lateral dynamics; linearized aerodynamics; natural modes of motion; autopilot design to enhance stability, control the flight path, and perform automatic landings. GPS based navigation and attitude determination. For spacecraft in orbit: natural longitudinal and lateral dynamic behavior and the design of attitude control systems. Prerequisites: 200A or 208; Engineering 15 or equivalent, Engineering 105, and experience with Matlab.

3 units, Spr (How)

272C. Global Positioning System—The principles of satellite navigation using GPS. Positioning techniques using code tracking, single and dual frequency, carrier aiding, and use of differential GPS for improved accuracy and integrity. Use of differential carrier techniques for attitude determination and precision position determination. Prerequisite: familiarity with matrix algebra.

3 units, Win (Engle)
272. Integrated Navigation Systems—Review of navigation satellites (GPS, GLONASS), GPS receivers, principles of inertial navigation for ships, aircraft, and spacecraft. Kalman Filters to integrate GPS and inertial sensors. Radio navigation aids (VOR, DME, LORAN, ILS). Doppler navigation systems. Prerequisites: 272C; Engineering 15, 105. Recommended: Engineering 205. 3 units, Spr (Enge) alternate years, not given 2000-01

273A. Modern Control Design I—(Enroll in Engineering 207A.)

273B. Modern Control Design II—(Enroll in Engineering 207B.)

274A. Robust Control Analysis and Synthesis—(Enroll in Engineering 210A.)

275. Introduction to Control Design Techniques—(Enroll in Engineering 205.)

276. Control System Design and Simulation—(Enroll in Engineering 206.)

277. Analysis and Control of Nonlinear Systems—(Enroll in Engineering 209.)

278A. Optimal Control and Hybrid Systems—Models for continuous-time and discrete-event dynamic systems. Modeling techniques for hybrid systems. Optimization problems for continuous and discrete dynamic systems. Dynamic programming and the Hamilton-Jacobi equation. Differential games. Automatic verification and controller synthesis for hybrid systems. Hybrid systems simulation. Driving examples from flight management system logic, and automated air traffic systems. Prerequisites: Electrical Engineering 263, Engineering 209. 3 units, Spr (Tomlin)

279. Space Mechanics—Orbits of near-earth satellites and interplanetary probes; transfer and rendezvous; decay of satellite orbits; influence of earth’s oblateness; sun and moon effects on earth satellites. Prerequisite: Engineering 15 or equivalent. 3 units, Aut (Staff)

283. Aircraft and Rocket Propulsion—Introduction to the design and performance of airbreathing and rocket engines. Topics: the physical parameters used to characterize propulsion system performance, gaseodynamics of nozzles and inlets, cycle analysis of ramjets, turbojet, turbofans, and turboprops, effect of afterburning, design of supersonic inlets and nozzles, component matching and the compressor map, combustors, introduction to liquid and solid propellant rockets, multistage rockets, heat transfer in nozzles, hybrid rockets, elements of electric propulsion, thrust from light, space sailing. Prerequisite: 210A or equivalent. 3 units, Spr (Cantwell)

291. Practical Training—Educational opportunities in high-technology research and development labs in aerospace and related industries. Students may work in any field of special interest. 1-3 units, any quarter (Staff)

297. Seminar in Guidance, Navigation, and Control—For graduate students with an interest in automatic control applications in flight mechanics, guidance, navigation, and mechanical design of control systems; others invited. Problems in all branches of vehicle control, guidance, and instrumentation presented by researchers on and off campus. Registration for credit optional; letter grade given for students who make presentations. May be repeated for credit. (AU) 1 unit, Aut, Win, Spr (Twiggs)

298. Seminar in Fluid Mechanics—(Enroll in Engineering 298.) May be repeated for credit. (AU)

300. Thesis—Thesis for degree of Engineer. 1-15 units, any quarter (Staff)

301. Ph.D. Thesis—Dissertation for degree of Doctor of Philosophy. 1-15 units, any quarter (Staff)

308. Spectral Methods in Computational Physics—(Enroll in Mechanical Engineering 308.)

311. System Identification—(Enroll in Engineering 211.)

351A,B,C. Advanced Fluid Mechanics—(Enroll in Mechanical Engineering 351A,B,C.)

366. Introduction to Fourier Optics—(Enroll in Electrical Engineering 366.)

370. Advanced Modern Optics—(Enroll in Electrical Engineering 349.)

CHEMICAL ENGINEERING

Emeriti: (Professors) Andreas Acrivos, Michel Boudart
Chair: Gerald G. Fuller
Professors: Curtis W. Frank, Gerald G. Fuller, Alice P. Gast, George M. Homsky, Robert J. Madix, Channing R. Robertson, Eric S. G. Shaqfeh, James R. Swartz
Associate Professor: Chaitan Khosla
Assistant Professors: Stacey F. Bent, Christopher A. Klug, Charles B. Musgrave
Courtesy Professors: Franklin M. Orr, Jr., John Ross, Robert M. Waymouth
Lecturers: Kay Kanazawa, Anthony Pavone
Consulting Professors: Jaan Noolandi, Conrad Schadt, Robert Schwaar, John Sinfelt
Visiting Professor: Wolfgang Knoll
Visiting Associate Professor: Jürgen Rühe

UNDERGRADUATE PROGRAM

BACHELOR OF SCIENCE

The Chemical Engineering depth sequence required for the B.S. degree (see the "School of Engineering" section of this bulletin) provides training in applied chemical kinetics, engineering thermodynamics, plant design, process analysis and control, separation processes, biochemical engineering, polymers, electronic materials, and transport phenomena.
The B.S. program in Chemical Engineering additionally requires basic courses in chemistry, engineering, mathematics, biology and physics. There is no set B.S. program for Chemical Engineering students to follow. A sample program is available from the department's advisers; the Dean's Office, School of Engineering; or may be found in the Handbook for Undergraduate Engineering Programs. It is recommended that the student discuss the prospective program with his or her adviser especially if transferring from chemistry, physics, biology, or another field in engineering. With some advanced planning, the student can usually arrange to attend one of the overseas campuses.

For information about a Chemical Engineering minor, see the "School of Engineering" section of this bulletin.

GRADUATE PROGRAMS

The University's requirements for the M.S., Engineer, and Ph.D. degrees are outlined in the "Graduate Degrees" section of this bulletin.

MASTER OF SCIENCE

An M.S. program comprising an academic year of appropriate course work is available to accommodate students wishing to pursue a professional chemical engineering career after receiving the B.S. degree. The M.S. degree is awarded, without requiring a formal thesis, after a minimum of three quarters of broad study subject to the specifications stated below.

Unit and Course Requirements—For students terminating their graduate work with the M.S. degree in Chemical Engineering, a program consisting of 42 units of academic work is required, including at least four lecture courses selected from the Chemical Engineering 200 to 400 lecture series. The remaining courses comprise all science or engineering graduate courses and by petition to the Chair of the Department of Chemical Engineering, upper-division undergraduate courses in science and engineering. Credit toward the M.S. degree is not given for Chemical Engineering Special Topics courses numbered 500 to 511, or for the colloquium, 699. However, students must register for 699 and attend the colloquia.

Students wishing to obtain research experience should choose a research adviser and enroll in Chemical Engineering 600; up to 6 units may count toward the 42-unit requirement. Chemical Engineering 600, however, may not be substituted for any of the required four lecture courses in the Chemical Engineering 200 to 400 lecture series. A written report describing the results of this research must be submitted to and approved by the research adviser.

To ensure that an appropriately balanced program is taken by all M.S. candidates, the student's program must be approved by the graduate adviser, and a program proposal for the M.S. degree should be developed by the student and adviser at their first meeting of the academic year.

Residency Requirement—See General Requirements in the "Graduate Degrees" section of this bulletin.

Minimum Grade Requirement—All courses intended to satisfy the 42-unit M.S. degree requirement must be taken for letter grades, if offered, and a grade point average (GPA) of 3.0 must be maintained.

ENGINEER

The degree of Engineer is awarded after completion of six quarters of study beyond the B.S degree, plus the requirements listed below. This degree is not required to enter the Ph.D. program.

Unit and Course Requirements—A minimum of 72 total units (including research) and 42 units of course work is required for the Engineer degree, including the following Chemical Engineering courses: 300, 310A, 310B, 340, 345, 350, 355, and one quarter of 370. The remaining courses, to total 42 units, may be chosen from the basic sciences and engineering according to the guidelines given in the Master of Science section above and with the consent of the graduate adviser. Students seeking the Engineer degree may apply for the M.S. degree once the requirements for that degree have been fulfilled (see above Master of Science section).

Residency Requirement—See General Requirements in the "Graduate Degrees" section of this bulletin.

Minimum Grade Requirement—All courses intended to satisfy the degree requirements must be taken for letter grades, if offered, and a grade point average (GPA) of 3.0 must be maintained.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is awarded after completion of a minimum of nine quarters of study plus the requirements listed below.

Unit and Course Requirements—A minimum of 72 total units (including research) and 42 units of course work is required for the Ph.D. degree, including the following Chemical Engineering courses: 300, 310A, 310B, 340, 345, 350, 355, and one quarter of 370. In addition, two courses must be taken from one of the areas of concentration in the 440, 450, or 460 series. The remaining courses, to total 42 units, may be chosen from the basic sciences and engineering according to the guidelines given in the above Master of Science section and consent of the graduate adviser. Students seeking the Ph.D. degree may apply for the M.S. degree once the requirements for that degree have been fulfilled (see above Master of Science section).

Residency Requirement—See General Requirements in the Graduate Degrees section of this bulletin.

Minimum Grade Requirement—All courses intended to satisfy the degree requirements must be taken for letter grades, if offered, and a grade point average (GPA) of 3.0 must be maintained.

Teaching Requirement—All Ph.D. candidates, regardless of the source of their financial support, are required to gain teaching experience as an integral part of graduate training in the Department of Chemical Engineering.

Qualifying Examination—To be advanced to candidacy for the Ph.D. degree, the student must pass a preliminary qualifying examination. First-year students are asked to present orally and defend a critical review of a published paper before the faculty at the beginning of the Spring Quarter. This examination is used to decide whether or not these students will be allowed to choose research advisers and begin thesis research in the Spring Quarter of their first year. Failing this examination leads to termination of the student's study towards the Ph.D. degree. It also precludes financial aid beyond that already promised. Under these circumstances, the student may apply for the M.S. degree once the requirements for that degree have been fulfilled (see above Master of Science section). Students passing this preliminary examination take a qualifying examination consisting of an oral defense of their research work before the faculty early in the Autumn Quarter of their second year.

Dissertation Requirement—A dissertation based on a successful investigation of a fundamental problem in chemical engineering is required; the student enrolls in Chemical Engineering 600 during the course of this research. In four to five calendar years after enrolling in the department, the student is expected to have fulfilled all the requirements for the Ph.D. including submission of a completed dissertation that has already been approved by his or her research adviser to the reading committee. No sooner than four weeks after this date, the student's University oral examination is scheduled. This exam, based on the candidate's dissertation research, is in the form of a public seminar followed by private questioning by an examining faculty committee. After satisfactory performance in the examination and submission of the dissertation to the Degree Progress Office of the Registrar's Office, the Ph.D. degree is awarded.
RESEARCH ACTIVITIES

Research investigations are currently being carried out in the following fields: applied statistical mechanics, biocatalysis, bioengineering, colloid science, computational materials science, electronic materials, hydrodynamic stability, kinetics and catalysis, Newtonian and non-Newtonian fluid mechanics, polymer science, rheo-optics of polymeric systems, and surface and interface science. Additional information may be found at the Department of Chemical Engineering website http://chemeng.stanford.edu.

FELLOWSHIPS AND ASSISTANTSHIPS

A number of fellowships and assistantships are awarded each year to incoming students. Application forms may be obtained from the department. The completed application must be received no later than January 15 preceding the start of the academic year for which the award is to be made.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirement.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

PRIMARILY FOR UNDERGRADUATES

20. Introduction to Chemical Engineering—(Enroll in Engineering 20.)

3 units, Spr (Robertson)

50Q. Stanford Introductory Seminar: Drug Delivery in the 21st Century—In the near future, medication will be delivered with highly engineered, controlled delivery systems. Such systems, currently available for motion sickness, heart pain, and high blood pressure, are developed by joining chemistry, biology, medicine, materials science, and engineering to design novel drug delivery devices. Students visit local companies where such devices are made. Guest scientists and engineers describe products on the market and in the pipeline. One of the most sophisticated drug delivery systems, the cigarette, is studied, learning about a technology that has created more harm than good; however, what we learn from it someday might form the basis for a therapeutic delivery system. Recommended: prior exposure to chemistry, physics, biology, mathematics, physiology.

3 units, Aut (Robertson)

25. Biotechnology—(Enroll in Engineering 25.)

3 units, Aut (Robertson)

100. Chemical Process Modeling, Dynamics, and Control—Mathematical methods are applied to engineering problems, using chemical engineering examples. Development of mathematical models to describe chemical process dynamic behavior. Analytical and computer simulation techniques for the solution of ordinary differential equations. Dynamic behavior of linear first- and second-order systems. Introduction to process control. Dynamics and stability of controlled systems. Prerequisites: Math. 53 or 130, or Engineering 155A, or equivalent, Engineering 20

3 units, Aut (Homsy)

110. Equilibrium Thermodynamics—Thermodynamic properties, equations of state, properties of non-ideal systems including mixtures, and phase and chemical equilibria. Prerequisite: Chemistry 171.

3 units, Win (Madix)

120A. Fluid Mechanics—(Formerly 140.) The flow of isothermal fluids from a momentum transport viewpoint. Continuum hypothesis, scalar fields, fluid statics, deformation of continuous media, non-Newtonian fluids, the equations of motion, creeping and potential flow, boundary layer theory, turbulence, free-surface phenomena, porous media flows. Prerequisites: junior standing in chemical engineering or consent of instructor, 100 and Mathematics 53 or Mathematics 130 or Engineering 155A, or equivalent.

4 units, Win (Shagfeh)

120B. Energy and Mass Transport—(Formerly 150.) The transport of energy and mass in solid and fluid continua. Fourier's law, heat transfer in solids, laminar flow, forced and free convection, boundary-layer heat transfer, natural convection with application to geophysical flows, energy transport by radiation, Fick's Law, binary diffusion, the equation of convective diffusion, mass transfer with chemical reaction, transport in turbulent flows, heat and mass transfer analogies. Prerequisite: 120A or equivalent.

4 units, Spr (Fuller)

130. Separation Processes—(Formerly 120.) Analysis and design of equilibrium and non-equilibrium separation processes. Possible examples: distillation, liquid-liquid extraction, electrophoresis, centrifugation, chromatography, and reaction-assisted separation processes.

3 units, Spr (Musgrave)

140. Microelectronics Processing Technology—The chemistry and transport of microelectronics device fabrication. Introduction to solid state materials and electronic devices. Chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, metallization, and plasma processing with emphasis on chemical, kinetic and transport considerations.

3 units, Spr (Bent)

150. Biochemical Engineering—(Formerly 175.) The general principles used in the biological production of fine biochemicals, with an emphasis on biopharmaceuticals. Basic and applied principles in: enzyme kinetics, microbial physiology, recombinant DNA technology, metabolic engineering, fermentation media design, fermentor design, aseptic processing, fermentation process control and scale-up, product isolation, protein purification, protein folding, regulatory issues, and biochemical process cost modeling.

3 units, Aut (Swartz)

160. Polymer Science and Engineering—(Formerly 170.) Introduction to polymer science, including free-radical and condensation polymerization, morphology of amorphous and semicrystalline polymers, linear viscoelasticity and rheology. Selected applications of polymers in information technology.

3 units, Win (Frank)

170. Kinetics and Reactor Design—(Formerly 130.) Chemical kinetics, elementary steps, mechanisms, rate-limiting steps, and quasi-steady state approximations. Ideal isothermal and non-isothermal reactors; design principles. Multiplicity, ignition, and extinction in stirred tank reactors; limitations of thermodynamic equilibrium. Catalysis and catalytic reaction mechanisms. Chemical reactor models of animal digestion. Prerequisites: 110, 120A, 120B; Chemistry 171, 173.

3 units, Aut (Gast)

180. Chemical Engineering Plant Design—(Formerly 160.) Open to seniors in chemical engineering or by consent of instructor. Application of chemical engineering principles to the design of practical plants for manufacture of chemicals and related materials. Topics: flow-sheet development from a conceptual design, equipment design for distillation, chemical reactions, heat transfer, pumping, and compression; estimation of capital expenditures and production costs; plant construction.

3 units, Spr (Pavone)

185A,B. Chemical Engineering Laboratory—(Formerly 180A,B.) Investigation of the experimental aspects of chemical engineering science, emphasizing development of communications skills. Experiments
illustrating lecture subjects are conducted by groups of students. Lab.
(WIM)
185A. 3 units, Aut (Frank)
185B. 3 units, Win (Klug)

190. Undergraduate Research in Chemical Engineering—Lab or theoretical work for undergraduate students under the direct supervision of a faculty member. Research in one of the graduate research groups or other special projects in the undergraduate chemical engineering lab. Students should consult advisers for information on available projects. (Staff)

PRIMARILY FOR GRADUATE STUDENTS
240. Microelectronic Processing Technology—See 140.
3 units, Spr (Bent)

250. Biochemical Engineering—See 150.
3 units, Spr (Swartz)

3 units, Win (Frank)

300. Applied Mathematics in Chemical Engineering—(Formerly 220.) Mathematical problems in transport phenomena, fluid mechanics, reactor design, quantum chemistry, and polymer science. Applications of tensor calculus, ordinary differential equations, linear eigenvalue problems, perturbation theory (regular and singular), topics in partial differential equations, Fourier transforms. Prerequisites: Mathematics 53, 113, 130; or Engineering 155A, Mathematics 131 or Engineering 155B, or equivalent.
3 units, Aut (Klug)

310A. Microscale Transport in Chemical Engineering—(Formerly 221.) Introduction to transport on small scales where macroscopic or bulk convective processes are unimportant. The basic equations of mass, momentum, and energy are derived for incompressible fluids. Local analysis based on the flow kinematics. Simplifications of these equations in the Stokes or creeping flow regime; solution techniques for these reduced sets of equations. Topics: Green’s function or boundary integral solution methods, point particle solutions, rigid particulate motion in suspension, drop and bubble flows including thermocapillary motion, lubrication theory and the effective properties of composite media and suspensions; and time permitting, slender body theory and Brownian motion. Prerequisites: 120A, 120B, 300, or equivalent.
3 units, Win (Fuller)

310B. Connective Transport and Reaction Engineering—(Formerly 222.) Continuation of 310A. Macroscale or convective transport of mass, momentum, and energy including chemical reaction from a fundamental perspective. Topics: inviscid flow theory and its coupling to mass, momentum, and energy boundary layers including free jets and wakes; boundary layers adjoining regions of constant circulation (e.g., drop flows) including Prandtl-Batchelor layers; convective mass transport with and without reaction, including Taylor-dispersion and generalized Gruetz problems; the fundamentals for mass, momentum, and energy transport correlations. The concepts are applied to basic reaction engineering. Prerequisite: 310A or consent of the instructor.
3 units, Spr (Homsy)

3 units (Klug) not given 1999-2000

345. Spectroscopy and Applications of Quantum Mechanics—(Formerly 231.) Development of theoretical approaches to spectroscopy, including spectroscopic transitions, transition probabilities, and selection rules. Topics: infrared, electron energy loss and Raman vibrational spectroscopies; Auger, x-ray and ultraviolet photoelectron spectroscopies; synchrotron-based spectroscopies including near edge x-ray absorption fine structure; basic nuclear magnetic resonance. Possible topics: solid state and computational methods. Prerequisite: Chemistry 271 or quantum mechanics.
3 units, Win (Bent)

350. Principles of Cellular Systems—Introduction to biological systems for engineering students. Emphasis is on viewing the cell as an integrated network of processes. Topics: what is the genome and how it is interpreted, how are cells organized spatially and energetically, protein catalysis, regulation of protein expression and other cellular processes, and new techniques in functional genomics. Biological Sciences 52 may be substituted.
3 unit, Win (Robertson, Swartz)

355. Advanced Biochemical Engineering—The technological tools for exploiting the power offered by modern biology. How a cell interacts with and influences its environment, how a production organism is optimized, what technology is used for large scale production, how products are isolated and purified, how proteins can be made without living cells, how a biopharmaceutical is formulated and delivered, and what the regulatory requirements are for drug approval and sale. Prerequisite: 350 or Biological Sciences 52, or equivalent
3 units, Spr (Swartz)

370A,B,C,D. Introduction to Chemical Engineering Research—(Formerly 281.) One-quarter research projects (laboratory, library, or theoretical research) under the guidance of a faculty member. Findings are reported in a poster session for the entire department at the end of the quarter, with a written report to adviser.
3 units, Aut, Win, Spr, Sum (Staff)

3 units, Spr (Gast)

442. Structure and Reactivity of Solid Surfaces—The structure of solid surfaces including a description of experimental methods for determining the structures of single crystal surfaces. The adsorption of molecules on these surfaces, e.g., the thermodynamics of adsorption processes, surface diffusion, and the molecular structure of the adsortbates. Surface mediated reactions, i.e., heterogeneous catalysis, including descriptions of catalytic mechanisms and surface kinetics.
3 units, Win (Madix)

444A. Quantum Simulations of Molecules and Materials—Molecules and surfaces: quantum atomic simulations of molecules and surfaces to predict atomic structure, properties, reaction mechanisms, and kinetics. Review of quantum mechanics. Electronic structure calculations: Hartree-Fock, configuration interaction, many body perturbation theory, and density functional theory. Property calculations: energy, forces, structure and electronic and vibrational spectra. Applications to semiconductor processing, surface science, biochemistry, catalysis, polymers, environmental chemistry and combustion. Prerequisite: undergraduate level quantum mechanics.
3 units, Win (Musgrave)
444B. Quantum Simulations: Materials Micro Mechanics—(Enroll in Mechanical Engineering 249B.)
3 units, Spr (Cho)

450. Introduction to Biotechnology—(Formerly 237; same as Biochemistry 237, Civil and Environmental Engineering 237, Developmental Biology 237, Structural Biology 237.) Faculty from the departments of Biochemistry, Biological Sciences, Chemical Engineering, Civil and Environmental Engineering, Developmental Biology, Structural Biology, and invited industrial speakers review the interrelated elements of modern biotechnology. Topics: protein structure and dynamics, protein engineering, biocatalysis, gene expression, cellular metabolism and metabolic engineering, fermentation technology, and purification of biomolecules. Prerequisite: graduate student or upper-division undergraduate in the sciences or engineering.
3 units, Spr (Shaqfeh)

452. Protein Science and Engineering—(Formerly 232; same as Chemistry 232.) The physio-chemical interactions that govern the structure and function of proteins. Topics: protein function and structure, techniques for probing protein structure and function, mechanisms of protein function, design of proteins with novel properties. Examples from the literature on enzymes. Recommended: background in physical and organic chemistry.
3 units, Win (Khosla)

454. Metabolic Engineering Methods and Applications—The optimization of industrial organisms for maximal benefit. In the context of actual applications, metabolic pathways and how they are regulated, metabolic flux analysis, and traditional and rDNA methods for genetic engineering. Examples in the areas of: metabolite production, DNA protein production by bacteria and mammalian cells, petroleum biosulfurization, bioremediation, and cell-free protein synthesis. Prerequisites: 250, 355 or equivalent
3 units (Swartz) alternate years, given 2000-01

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.
1 unit, Aut, Win, Spr (Staff)

500-511. Special Topics in Chemical Engineering—(Formerly 268, 269, 271, 280.) Discussion of recent developments and current research in specialized fields. Units by arrangement. Prerequisite: consent of instructor.
Aut, Win, Spr

500A,B,C. Protein Biotechnology
(Swartz)

501A,B,C. Semiconductor Processing
(Benti)

502A,B,C. Computational Materials Science
(Musgrave)

503A,B,C. Biocatalysis
(Khosla)

504A,B,C. Bioengineering
(Robertson)

505A,B,C. Microrheology
(Fuller)

506A,B,C. Surface and Interface Science
(Madix)

507A,B,C. Polymer Physics and Molecular Assemblies
(Frank)

508A,B,C. Stability of Fluid Motions
(Homsy)

509A,B,C. Statistical Mechanics of Dispersed Systems
(Gust)

510A,B,C. Transport Mechanics
(Shaqfeh)

511A,B,C. NMR of Solids
(Klug)

560. Graduate Research in Chemical Engineering—(Formerly 290.) Lab and theoretical work for graduate students on chemical engineering problems leading to partial fulfillment of requirements for an advanced degree. Credit is given after the student has satisfied the specific report or dissertation requirement.

569. Colloquium—(Formerly 300.) Students attend the colloquia of the Department of Chemical Engineering. Must be taken every quarter by candidates for advanced degrees in Chemical Engineering. (AU)
1 unit, Aut, Win, Spr (Staff)

CIVIL AND ENVIRONMENTAL ENGINEERING

Chair: Clyde B. Tatsum
Associate Professors: Raimundo I. Borja, Craig S. Criddle, Gregory G. Deierlein, Martin Fischer, David L. Freyberg, Lynn M. Hildemann
Assistant Professors: Mark Z. Jacobson, Laura N. Lowes, Charles A. Menun, Eduardo Miranda, Alfred M. Spormann
The undergraduate curriculum provides a pre-professional program balancing the fundamentals common to many special fields of civil engineering with specialization in Environmental and Water Studies or construction professionals making major contributions to integrated projects, the Department of Civil and Environmental Engineering at Stanford will offer a Master of Science degree field in Design/Construction Integration, beginning in the 1999-2000 academic year.

The field of Design/Construction Integration requires 45 quarter units, which are normally completed in one academic year. This includes core courses in design/construction integration, structural and geotechnical engineering, and construction engineering and management, along with approved electives.
Stanford's Department of Civil and Environmental Engineering offers three programs related to the design and construction of facilities: Structural Engineering and Geomechanics (S/G), Construction Engineering and Management (CEM), and Design/Construction Integration (DCI).

The S/G program prepares students to launch careers as designers, engineering analysts, specialty consultants, tool developers, or engineering risk managers. It encompasses structural analysis and design, dynamics, earthquake engineering, risk and reliability analysis, modern computational methods, and geomechanics.

The CEM program prepares technically qualified students for responsible management roles in all phases of the development of major constructed facilities. It emphasizes management techniques useful in organizing, planning, and controlling the activities of diverse specialists working within the unique project environment of the construction industry. The program also includes the engineering aspects of heavy, industrial, and building construction.

The DCI program prepares students for multidisciplinary collaborative teamwork in an integrated design and construction process. The program extends a student's design or construction background with core courses in each of these areas and develops the background needed to understand the concerns and expertise of the many project stakeholders. It includes a comprehensive project-based learning experience.

Prospective students should use their intended career path as the primary criterion in selecting between these three programs. S/G best fits students planning to focus on designing facilities; CEM is for students planning to emphasize building facilities or managing teams and operations. Both of these degree options provide background for many different types of careers in design and construction, with some emphasis on preparation for working on projects using the traditional form of contracting and organization that characterizes public works. Students planning careers with design or construction firms that emphasize design-build, EPC, or turnkey projects should consider DCI. All three of the degree options include substantial flexibility for students to tailor their program of study to career interests.

ENVIRONMENTAL AND WATER STUDIES

This program covers a broad spectrum of specialties, including environmental engineering and science, environmental fluid mechanics, environmental planning, and hydrology. Course offerings are scheduled to permit either intensive study in a single area or interrelated study between areas. Seminars provide a broad coverage of environmental problems. The programs are kept flexible to foster interaction among students and to encourage the development of individual programs suitable for a broad range of engineering and science backgrounds and career goals. The Stanford laboratories for water quality control and environmental fluid mechanics are well equipped and instrumented for advanced research and instruction.

Students with backgrounds in all areas of engineering and science who are interested in applying their specialized abilities to solving environmental and water problems are welcome. Comprehensive introductory courses in each major area of study are given to provide common understanding among those with dissimilar backgrounds. Courses from many other programs and departments both complement and supplement these course offerings. Some examples include Computer Science (numerical methods), Geological and Environmental Sciences (geostatistics, hydrogeology), Mechanical Engineering (applied math, experimental methods, fluid mechanics, heat transfer), Petroleum Engineering (reservoir engineering, well-test analysis), and Statistics (probability and statistics). The major areas of specialization in the two programs, environmental engineering and science, and environmental fluid mechanics and hydrology, are described below. Admissions to these two programs are handled separately; prospective students should clearly indicate their preference on their application by specifying one or the other area of specialization.

The Environmental Engineering and Science Program emphasizes water quality, but also encompasses other environmental areas and the broader aspects of pollution treatment and control issues. Course offerings include the biological, chemical, and engineering aspects of water supply; the fate and effects of pollutants in surface and groundwater, soil, and the atmosphere; hazardous substance control; and water and air pollution. Companion courses in the Environmental Fluid Mechanics and Hydrology Program include environmental planning and impact assessment, as well as environmental fluid mechanics, hydrology, and transport modeling. Research on hazardous substances is coordinated through the Western Region Hazardous Substance Research Center. The objective of this center, sponsored by the U.S. Environmental Protection Agency, is to promote through fundamental and applied research the development of alternative and advanced physical, chemical, and biological processes for the treatment of hazardous substances in the environment, with emphasis on groundwater contamination.

The Environmental Fluid Mechanics and Hydrology Program focuses on developing an understanding of the physical processes controlling the movement of mass, energy, and momentum in the water environment and the atmosphere. The program also considers environmental and institutional issues involved in planning water resources development projects. Environmental fluid mechanics courses address experimental methods; fluid transport and mixing processes; the fluid mechanics of stratified flows; natural flows in coastal waters, estuaries, lakes, and open channels; and turbulence and its modeling. Hydrology courses consider flow and transport in porous media, stochastic methods in both surface and subsurface hydrology, and watershed hydrology and modeling. Atmosphere-related courses deal with climate, weather, storms and air pollution and the modeling of these. Planning courses emphasize environmental policy implementation and sustainable water resources development.

STRUCTURAL ENGINEERING AND GEOMECHANICS

Structural engineering at Stanford encompasses computational mechanics, computer-aided engineering, risk and reliability analysis, structural analysis and design, and teaching and research programs in earthquake engineering and structural dynamics. The programs are designed to provide a broad knowledge in these fields and to prepare students for industrial or academic careers. Academic programs can be designed to meet the needs of students wishing to launch careers as consultants on large and small projects, designers, and engineering analysts. Students have the opportunity to balance strong engineering fundamentals with modern computational methods.

Course work in earthquake engineering and structural dynamics provides an understanding of the earthquake phenomenon, the resulting ground shaking, and in-depth knowledge on the behavior, analysis, and design of various types of structures under seismic or other dynamic forces. Automated structural control systems and devices, and the utilization of advanced materials for civil infrastructures and seismic retrofits, are part of the ongoing research activities. Advanced analytical and experimental research in earthquake engineering is conducted at the John A. Blume Earthquake Engineering Center, which houses static and dynamic testing equipment including two shaking tables.

Reliability and risk analysis focuses on instruction and research in advanced methods for structural safety evaluation and design, including methods for loss estimation from damage and failures of structures and lifeline systems. Course work combines a strong background in structural analysis and design with probability theory and statistics. Research in this area deals with regional loss and damage evaluation, reliability of marine systems, seismic risk and reliability of large structural systems, and wind hazards.

Courses and research in structural analysis and design focus on the conceptual and detailed design of structural systems and on computational methods for predicting the static and dynamic, linear and non-linear response of structures. Included are courses that emphasize earthquake resistant design and computer-based design concepts. Related course work is available from other departments such as computer science, materials science and engineering, and mechanical engineering. In collaboration with CIFE, issues involving design for constructibility and collaborative engineering are addressed as an integral part of the research.

Computational mechanics emphasizes the application of modern computing methods to structural engineering and geomechanics. It draws
on the disciplines of computer science, mathematics, and mechanics, and encompasses numerical structural and geotechnical analysis, including finite element analysis and boundary element methods. There is collaborative research in bio-engineering with the Medical School and high performance computing with the Scientific Computing and Computational Mathematics Program.

Students with primary interests in the application of the principles of applied mechanics to problems involving geologic materials have the option of enrolling in a degree program in geomechanics. This program focuses on instruction and research in theoretical soil and rock mechanics, computational methods, and analysis and design of foundations and earth structures. In addition to the program’s offerings, related courses are available in construction engineering, earth sciences, structural engineering, and the water resources program.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

Students who major in civil engineering must complete the requirements for the B.S. degree listed under Undergraduate Programs in the “School of Engineering” section of this bulletin. Elective units may be used in any way the student desires, including additional studies in civil and environmental engineering. Because the undergraduate engineering curriculum is designed to ensure breadth of study, students who intend to enter the professional practice of civil engineering should plan to obtain their professional education at the graduate level.

For information about a CE minor, see the “School of Engineering” section of this bulletin.

HONORS PROGRAM

This program leads to a B.S. with Honors in Civil Engineering. It is designed to encourage highly qualified students to undertake a more intensive study of civil and environmental engineering than is required for the normal major, with courses and research work of high distinction.

The program involves an in-depth research study in an area proposed to and agreed to by a Department of Civil and Environmental Engineering (CEE) faculty adviser and completion of a thesis of high quality. A written proposal for the research to be undertaken must be submitted and approved in the fourth quarter prior to graduation. At the time of application, the student must have a grade point average (GPA) of at least 3.5 for course work at Stanford and this grade record must be maintained to graduation. The thesis is supervised by a CEE faculty adviser and must involve input from the School of Engineering Writing Program by means of Engineering 102S or its equivalent. Students are encouraged to present their results in a seminar for faculty and other students. Up to 10 units of CEE 199, Undergraduate Research in Civil and Environmental Engineering, may be taken to support the research and writing (not to duplicate Engineering 102S). These units are beyond the normal Civil and Environmental Engineering program requirements.

GRADUATE PROGRAMS

The University requirements governing the M.S., Engineer, and Ph.D. are described in the “Graduate Degrees” section of this bulletin.

Admission—Applications require submission of the application form, statement of purpose, three letters of recommendation, results of the General Section of the Graduate Record Examination, and transcripts of courses taken at colleges and universities. Policies for each of the department’s programs are available from the Department of Civil and Environmental Engineering. Successful applicants are advised as to the degree and program for which they are admitted. If students wish to shift from one program to another after being accepted, an application for transfer must be filed with the department, and they are advised if the transfer is possible. If, after enrollment at Stanford, students wish to continue toward a degree beyond the one for which they were originally admitted, a written application must be made to the Department of Civil and Environmental Engineering.

Financial Assistance—The department maintains a large and continuing program of financial aid for graduate students. Applications for financial aid and assistantships should be filed by January 1; it is important that Graduate Record Examination scores be available at that time.

Teaching assistantships carry stipends for as much as one-half time work to assist with course offerings during the academic year. Research assistantships also are available. Engineer and Ph.D. candidates may be able to use research results as a basis for the thesis or dissertation. Assistantships and other basic support may be supplemented by fellowship and scholarship awards or loans. Continued support is generally provided for further study toward the Engineer or Ph.D. degree based on the student’s performance, the availability of research funds, and requisite staffing of current projects.

MASTER OF SCIENCE

Programs are available leading to the M.S. degree in Civil and Environmental Engineering with the following special field designation on the diploma: Construction Engineering and Management, Design/Construction Integration, Environmental Engineering and Science, Environmental Fluid Mechanics and Hydrology, Geomechanics, and Structural Engineering. Detailed statements of the requirements for all master’s degrees and the specific designation may be secured from the Department of Civil and Environmental Engineering.

Students admitted to graduate study with a B.S. in Civil Engineering (or its equivalent) from an accredited curriculum can satisfy the requirements for the M.S. degree in Civil and Environmental Engineering by completing a minimum of three quarters of full tuition registration and a minimum of 45 units of study beyond the B.S. At least 36 of the units must be taken at Stanford. A minimum 2.75 grade point average (GPA) is required for candidates to be recommended for the M.S. degree. No thesis is required.

The program of study must be approved by the faculty of the department and should include at least 45 units of courses in engineering, mathematics, science, and related fields unless it can be shown that other work is pertinent to the student’s objectives.

Candidates for the M.S. in Civil and Environmental Engineering who do not have a B.S. in Civil Engineering may, in addition to the above, be required to complete those undergraduate courses deemed important to their graduate programs. In such cases, more than three quarters of residence is often required to obtain the degree.

ENGINEER

A student with an M.S. in Civil Engineering may satisfy the requirements of the degree of Engineer in Civil and Environmental Engineering by completing, in residence, 45 or more units of work (three quarters minimum) including an acceptable thesis (12 to 15 units) and maintaining a "B" GPA average (3.0) or higher. The program of study must be approved by a faculty member in the department.

This degree is recommended for those desiring additional graduate education, especially those planning a career in professional practice. The thesis normally should be started in the first quarter of graduate study after the M.S. degree. Programs are offered in the fields of specialization mentioned for the M.S. degree.

DOCTOR OF PHILOSOPHY

The Ph.D. is offered under the general regulations of the University as set forth in the “Graduate Degrees” section of this bulletin. This degree is recommended for those who expect to engage in a professional career in research, teaching, or technical work of an advanced nature. The Ph.D. program is rigorous and should be undertaken only by students with ability for independent work. It requires a minimum of three years (nine quarters) of graduate study, at least two years of which must be at Stanford. Experience has shown that few students complete the Ph.D. within the minimum residence period. Prospective doctoral students should anticipate the possibility of at least one extra year. All candidates for the Ph.D. degree are required to complete the equivalent of one 50 percent time teaching assistantship for one quarter. Further information
about Ph.D. requirements and regulations is found in the department handbook.

The first year of graduate study can be represented by the M.S. program described above. The second year is devoted partly to additional graduate courses and partly to preliminary work toward a dissertation. The third and subsequent years are applied to further course work and to the completion of an acceptable dissertation.

The program of study is arranged by the prospective candidate at the beginning of the second year with the advice of a faculty committee whose members are nearest in the field of interest to that of the student. The chair of the committee serves as the student’s pro tem adviser until such time as a member of the faculty has agreed to direct the dissertation research. Insofar as possible, the program of study is adapted to the interests and needs of the student within the framework of the requirements of the department and the University. In the second year of graduate study, the student is expected to pass the department’s General Qualifying Examination to be admitted to candidacy. After completing their research, students are required to pass the University oral examination, which is a dissertation defense.

**PH.D. MINOR**

A Ph.D. minor is a program outside a major department. A minor is not a requirement for any degree, but is available when agreed upon by the student and the major and minor departments. Requirements for a minor are established by the minor department. Acceptance of the minor as part of the total Ph.D. program is determined by the major department. Application for candidacy must be approved by both the major and the minor department, and the minor department must be represented at the University oral examination.

A student desiring a Ph.D. minor in Civil and Environmental Engineering (CEE) must have a minor program adviser who is a regular CEE faculty member in the program of the designated subfield. This adviser must be a member of the student’s University oral examination committee and the reading committee for the dissertation.

The program must include at least 20 units of graduate-level course work (that is, courses numbered 200 or above, excluding special studies and thesis) in CEE completed at Stanford University. The list of courses must form a coherent program and must be approved by the minor program adviser and the CEE chair. An average GPA of at least 3.0 must be achieved in these courses.

**COURSES**

(WIM) indicates that the course meets the Writing in the Major requirements.

**UNDERGRADUATE**

45Q. Stanford Introductory Seminar: Issues in Affordable Housing—Preference to sophomores. The complex social, economic, and technical issues that have led to affordable housing crises in places like the San Francisco Bay Area. Students become familiar with affordable housing needs, policies, and resources, learn about people most in need of housing, and examine government and private organizations that work in affordable housing. With assistance from professionals working in this field, they target real problems and perform research on related policy, economic, planning, design, or development issues. GER:3b (DR:9)

3 units, Spr (Paulson, Behrman)

46Q. Stanford Introductory Seminar: Fail Your Way to Success—Preference to sophomores. Examples of risk and failure (primarily engineering failures; historical and social failures are considered depending on student interests). The reasons behind these failures and the application to modern societal and student issues; emphasis is on the people involved in each example and the lessons learned regarding risk willingness and problem solving leadership. The Titanic, Challenger Shuttle, Quebec Bridge, and Hyatt Regency, and case studies from the professor’s 30 years as a construction engineer. At least five construction field trips. Prerequisites: creative thinking and problem solving; willingness to visit chaotic construction sites.

3 units, Spr (Clough)

47Q. Stanford Introductory Seminar: Discovering Micro-Organization Theory for Fast-Paced Project Teams—Preference to sophomores. Students discover micro-organization theory by running “virtual experiments” with the Virtual Design Team (VDT) computer model of project organizations. The issues in developing a theory about the performance of project organizations. Introduces the “information-processing” framework for understanding organizations performing knowledge work, upon which VDT is based. Students work in teams of two to design and execute a series of computational experiments to develop and test hypotheses about the micro-organization theory of fast-paced product development teams. Enrollment limited to 12. Prerequisites: application; curiosity about how organizations work.

4 units, Win (Levitt)

60Q. Stanford Introductory Seminar: Waves of Northern California—Preference to sophomores. Introduction to the physical oceanography of northern California, emphasizing the types of wave motions that are important to shaping the environment in this region. Wind-generated surface waves and how they affect nearby beaches. The tidal motions that influence the functioning of coastal ecosystems like San Francisco Bay. Field trips and lab demonstrations.

3 units, Win (Monismith)

61Q. Stanford Introductory Dialogue: Big Dams, the City Hall, and the Sierra Club—Preference to sophomores. Water and environment policy issues: the beneficial and deleterious effects of large hydraulic structures, such as dams and aqueducts; urban infrastructure and the political process; irrigation and its lobby; flood protection; protected species and the environmentalist lobby. How do we balance the conflicting needs of supplying water and protecting from floods with the desire to maintain a livable environment? Changing public perceptions: the glory and shame of big dams. Emphasis is on discussing where we have been and where we are going in the U.S.

2 units, Aut (Kitanidis)

63. Weather and Storms—Survey of daily and severe weather, and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, global circulation, jet streams, high and low pressure systems, inversions, El Niño, La Niña, atmosphere-ocean interactions, fronts, cyclones, thunderstorms, lightning, tornados, hurricanes, pollutant transport, global climate, and atmospheric optics. GER:2a (DR:5)

3 units, Aut (Jacobson)

64. Air Pollution: From Urban Smog to Global Change—Survey of urban through global-scale air pollution. Topics: the evolution of the earth’s atmosphere, indoor air pollution, urban smog formation, effects of exposure to air pollution, visibility, acid rain, global climate change, stratospheric ozone reduction, Antarctic ozone destruction, air pollution transport across political boundaries, the effects of meteorology on air pollution, and the effects of air pollution and stratospheric ozone on human exposure to ultraviolet radiation. GER:2a (DR:5)

3 units, Spr (Jacobson)

70. Environmental Science and Technology—For science and engineering majors. Introduction to the causes, effects, and methods of controlling environmental degradation associated with air and water pollution. Global climate change, stratospheric ozone depletion, energy issues, regional and urban air pollution; water supply and water quality, solid waste management, and the technical basis for policy.

3 units, Aut (Staff)

76N. Stanford Introductory Seminar: Hydrogen—Fuel of the Future—Preference to freshmen. The role of hydrogen as a large-scale energy source of the future to replace fossil fuels for stationary and transportation applications. Topics: energy consumption of conventional fuels; environmental (global and local) impacts of energy consumption; characteristics of alternate (clean) fuels; and evaluation of hydrogen as a replacement fuel. Factors to be evaluated in the development of a
hydrogen fuel industry: production technologies; means for storage and distribution; (safety; economics for large-scale production; and characteristics for stationary power plants and mobile (e.g., fuel-cell engine) applications. Hydrogen as a zero-emission transportation fuel. Individual student projects or studies.

3 units, Win (Kruger)

100. Managing Civil Engineering Projects—Introduction to the facility life cycle and project delivery process and organization. Techniques for planning, organizing, and executing civil engineering projects from conception to completion. Project objectives (scope, quality, cost, time, and safety) from multiple perspectives throughout the facility life cycle. Time and cost planning and control, including scheduling and cost estimating techniques using information technology. Small team projects, exposure to real world projects, and individual paper. (WIM)

4 units, Aut (Fischer)

101A. Structural Systems—Structural loads in design; structural systems; serviceability and strength criteria; deflections of determinate and indeterminate beams; stress and strain in beams under various loading conditions; plane stress; analysis of column buckling. Lab experiments; case studies of noteworthy structures; design project; possible field trip. Prerequisites: 100, Engineering 14.

4 units, Win (Staff)

101B. Mechanics of Fluids—Physical properties of fluids and their effect on flow behavior; equations of motion for incompressible ideal flow, including the special case of hydrostatics; continuity, energy, and momentum principles; control volume analysis; laminar and turbulent flows; internal and external flows in specific engineering applications including pipes, open channels, wind turbines, airplane wings, and baseballs. Prerequisites: Physics 41, Mathematics 51.

4 units, Spr (Monismith)

101C. Geotechnical Engineering—Introduction to the basic principles of soil mechanics. Soil classification, shear strength and stress-strain behavior of soils, consolidation theory, analysis and design of earth retaining structures, introduction to shallow and deep foundation design, slope stability. Lab projects. Prerequisites: 101A, Engineering 14.

4 units, Aut (Borja)

101D. Seminar on Mathematical Laboratory Applications in Civil and Environmental Engineering—(Graduate students register for 201D.) Preference to juniors majoring in CE. Use of commercial professional software in the design and analysis of civil and environmental engineering systems. MATLAB 5 is applied to relevant problems and issues that students encounter in subsequent courses and in engineering practice. Limited enrollment.

2 units, Win (Kitanidis)

101E. Analytical and Numerical Methods for the Environment—(Graduate students register for 201E.) Develops a working knowledge of the analytical and numerical techniques needed to solve a range of environmental problems. Application of these techniques to specific environmental problems. Governing equations plus appropriate boundary and/or initial conditions are derived from the physical contexts. Application of ordinary differential equation methods. Introduction to: method of characteristics, partial differential equation models of physical phenomena and solution of the models, solution of sets of linear and nonlinear equations, modeling of systems with uncertain inputs and data, role of probability. Prerequisites: 101B, 101D, Engineering 155A, or equivalents.

4 units, Aut (Street)

102. Legal Context of Civil Engineering—Introduction to the U.S. legal system as it applies to civil engineering and construction. Fundamental concepts of contract and tort law, claims, risk management, business formation and licensing, agency, insurance and bonding, and real property.

3 units, Win (London)

111. 3D and 4D Modeling of Civil Engineering Projects—(For undergraduates; same as 211.) Modeling, visualization, and graphical communication of civil engineering artifacts, 3D CAD, 4D modeling, introduction to underlying computer representations, applications of 3D CAD in design and construction, lab exercises, class project.

3-4 units, Spr (Fischer)

114. Symbolic Modeling in Engineering—(For undergraduates; same as 214.) Prerequisite: Computer Science 106A or equivalent.

4 units, Win (Kunz)

122A. Computer Integrated Architecture/Engineering/Construction (A/E/C)—Undergraduates serve as apprentices in 222A. See 222A. Enrollment limited and based on interviews.

2 units, Win (Fruchter)

122B. Computer Integrated Architecture/Engineering/Construction (A/E/C)—Undergraduates serve as apprentices in 222B. See 222B. Enrollment limited and based on interviews.

3 units, Spr (Fruchter)

140. Construction Surveying—Introduction to basic field surveying methods, emphasizing construction related activities. Use of optical level, theodolite, EDM, total station. Field activities: level loops, traverses, construction layout, and as-built measurements. Introduction to advanced measurement and positioning technologies. Lab.

3 units, Spr (Staff)

141. Design and Construction of Concrete Canoe for ASCE Competition—Design, construction, and testing of canoe; structural and hydrodynamic analysis; selection of materials and construction methods; participation in regional canoe race.

1 unit, Aut, Win, Spr (Jacobson)


4 units, Aut (Levitt)

146. Managing Engineering and Construction Companies—(Graduate students register for 246.) See 246.

3-4 units, Spr (Levitt)

147. Cases in Personality, Leadership, and Negotiation—(Graduate students register for 247.) Case discussions regarding the management of projects. Emphasis is on the understanding of personalities, thinking styles, and negotiation skills. Cases are based on the instructor's 30 years of experience in the construction industry. Field trips to local projects augment the cases. Limited enrollment.

3 units, Spr (Clough)

148. Design and Construction of Affordable Housing—Planning, design, engineering, and construction in the development of affordable housing. Topics: the socio-economic context of affordable housing; stages in property development; issues in design; types of structures, methods, and materials used in housing construction; and property management. Students apply what they learn in assignments and a term project. Prerequisites: junior or senior in Civil and Environmental Engineering, Urban Studies, or related fields.

4 units, Win (Paulson)

153. Construction Equipment and Methods—Methods to build projects planned by engineers and architects. Application of engineering fundamentals to the selection and design of equipment and systems to carry out production operations in construction; analysis of production output and
costs; application of engineering economy to equipment and process decision making. Prerequisites: 100; Engineering 14, 60.

3 units, Spr (Paulson)

154. Construction Cost Estimating—(Graduate students register for 254.) Application of specific construction methods using case studies, cost estimating, and field trips. Emphasis is on the fundamental driving forces in the industry through the practice of estimating infrastructure costs. Cases are based on the instructor’s 30 years in the construction business. Five required field trips. Students are graded on competitive cost estimates and presentations based on the field trips. Limited enrollment.

3 units, Aut (Clough)

156. Buildings Systems Design—(Graduate students register for 256.) Design concepts, integration issues, materials of construction, and installation operations for conventional building systems. Lectures and group projects on heating, ventilation, and air conditioning systems. Student groups analyze selected building systems on active projects, and report on existing design, a redesigned portion of a system, materials of construction, and installation.

3 units, Win (Tatum)

160. Mechanics of Fluids Laboratory—Lab experiments/demonstrations illustrate conservation principles and flows of real fluids. Corequisite: 101B.

2 units, Spr (Monismith)

161. Open Channel and Pipe Flows—Steady and unsteady flows in engineered and natural channels and rivers and pipe systems. Basic equations and theory (mass, momentum, and energy equations). Application of theory to design of flood-control and water supply systems. Lab experiments illustrate concepts developed in class. Prerequisites: 101B, 160. Corequisite: 101E.

4 units, Aut (Koseff)

162. Hydrology and Water Resources—Introduction to the movement of water through natural and constructed environments. Storage and fluxes of water through the natural environment. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Emphasis is on measurement, data analysis, modeling, and the role of hydrologic processes in ecosystems. Technological systems associated with human use of water as a resource. Irrigation, hydroelectric power generation, rural and urban water supply systems, stormwater management, flood damage mitigation, water law and institutions. Emphasis is on engineering design and environmental impacts. Required field trips. Prerequisites: 161, Engineering 60.

4 units, Win (Freyberg)

169. Environmental and Water Studies Design—Seniors in Civil Engineering only. The design of environmental and water resources systems. Design as a process. Application of fluid mechanics, hydrology, water resources, environmental sciences, planning, and engineering economy fundamentals to the design of an engineering system addressing a complex problem of water in the natural and constructed environment. Problem changes each year, generally drawn from a challenge confronting the University or a local community. Previous problems included sediment management in Searsville Lake, improved operation of Lagunita, and a remedial design for the Santa Rosa outfall in San Pablo Bay. Student design teams prepare proposals, progress reports, oral presentations, and a final design report. Prerequisite: 162.

5 units, Spr (Freyberg)

171. Environmental Planning Methods—For juniors and seniors. Use of microeconomics and mathematical optimization theory in the design of environmental regulatory programs; tradeoffs between equity and efficiency in designing regulations; techniques for predicting visual, noise, and traffic impacts in environmental impact assessments. Prerequisites: 70, Math. 51.

3 units, Win (Ortolano)

172. Air Quality Management—Quantitative introduction to engineering methods used to study and seek solutions to current air quality problems. Topics: global atmospheric changes, urban sources of air pollution, indoor air quality problems, design and efficiencies of pollution control devices, and engineering strategies for managing air quality. Prerequisites: 70, Mathematics. 51.

3 units, Win (Hildemann)


5 units, Spr (Staff)


4 units, Win (Masters)


4 units, Spr (Masters)

177. Aquatic Chemistry and Biology—Undergraduate-level introduction to the chemical and biological processes in the aqueous environment. Basic aqueous equilibria and redox reactions; the structure, behavior, and fate of major classes of chemicals that dissolve in water; the biogeochemistry of aquatic microbial life; the chemistry of water disinfection; and biogeochemical processes. Prerequisite: Chemistry 31.

4 units, Aut (Cridle)

177L. Water Chemistry Laboratory—(Same as 273A). For undergraduates. Laboratory application of techniques for the analysis of natural waters and wastewaters, emphasizing instrumental techniques.

2 units, Win (Leckie)

180A. Introduction to Structural Analysis—Analysis of simple and compound trusses; shear and bending in beams and frames; analysis of cables and arches: approximate methods for vertical and lateral loads; deflections by integration, moment-area, virtual work, and energy methods; analysis of beams, trusses, and frames by force method. Field trip. Prerequisites: 101A, Engineering 14.

3 units, Spr (Kiremidjian)

180B. Structural Analysis—Analysis of beams, trusses, frames; method of indeterminate analysis by consistent displacement, least work, superposition equations, moment distribution. Introduction to matrix methods and computer methods of structural analysis. Prerequisite: 180A.

4 units, Aut (Lowes)

181. Design of Steel Structures—Concepts of the design of steel structures with a load and resistance factor design (LRFD) approach; types of loading; structural systems; design of tension members, compression members, beams, beam-columns, and connections; and design of trusses and frames. Comprehensive project on the structural design of an industrial building. Prerequisite: 180A.

4 units, Win (Deierlein)

182. Design of Reinforced Concrete Structures—Properties of concrete and reinforcing steel; behavior of structural elements subject to bending moments, shear forces, torsion, axial loads, and combined
actions; design of beams, slabs, columns and footings; strength design and serviceability requirements; design of simple structural systems for buildings. Comprehensive project on the structural design of a reinforced concrete office building. Prerequisite: 180A.

4 units (Krawinkler) not given 1999-2000

195. Structural Geology and Rock Mechanics—(Same as Geological and Environmental Sciences 110.) Observational techniques, analysis methods, and theoretical foundations of structural geology, engineering geology, and rock mechanics. Computer exercises are integrated with field data to understand the role of geologic structures in the evolution of the earth’s crust (folding, faulting, flow, and fracturing of rock) and geologic hazards (earthquakes, landslides, and volcanoes). Topics: structural quantities and dimensional analysis; use of stress, strain, displacement, and velocity fields in structural analysis; the concept and measurement of deformation; mechanical properties of rock (elasticity, viscosity, strength, friction, fracture toughness); case studies of typical geologic structures using continuum mechanics. Computer labs. Prerequisites: Geological and Environmental Sciences 1, calculus, Macintosh skills.

5 units, Aut (Pollard)

196. Engineering Geology Practice—(Same as Geological and Environmental Sciences 115.) The application of geologic fundamentals to the planning and design of civil engineering projects. Emphasis is on development of geologic skills to identify, describe, and map earth materials and geologic structures as a means of determining the impact on site development. Topics: weathering and soil-forming processes, soil and rock mechanics, site investigation techniques, surface and groundwater regimes, stream and coastal processes, quaternary tectonics, depositional and geomorphology, environmental concerns, and geologic and geotechnical hazards. Field/lab exercises and case history studies emphasize the impact of site geology on the safe planning, design, and construction of civil engineering projects such as foundations, transportation facilities, excavations, tunnels and underground storage space, water supply facilities, and marine works. Prerequisite: 195 or consent of instructor.

3 units (Holzer) alternate years, given 2000-01

199. Undergraduate Research in Civil and Environmental Engineering—Participation in a research project in Civil and Environmental Engineering. Written report or oral presentation required. Students must obtain a faculty sponsor.

2-3 units, any quarter (Staff)

PRIMARILY FOR GRADUATE STUDENTS

200A,B,C. Teaching of Civil and Environmental Engineering—Required of all CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship.

200A. 1 unit, Aut (Staff)
200B. 1 unit, Win (Staff)
200C. 1 unit, Spr (Staff)

201D. Seminar on Mathematical Laboratory Applications in Civil and Environmental Engineering—(Undergraduates register in 101D.) See 101D.

2 units, Win (Kitanidis)

201E. Analytical and Numerical Methods for the Environment—(Undergraduates register for 101E.) See 101E.

4 units, Aut (Street)

202. Applied Measurements—Topics related to research or industrial measurements are applied and related to getting valid experimental data. System and instrument specifications, signal conditioning, noise reduction, digital data acquisition, and specific measurements related to motion and acceleration. Recommended: understanding the concept of frequency response.

1 unit, Aut (Schiff)

203. Statistical Models in Civil Engineering—Introduction to probability modeling and statistical analysis within various areas of civil engineering. Emphasis is on the practical issues of model selection, interpretation, and calibration from limited data. Recognition of intrinsic randomness and modeling uncertainty. Introduction to probability event and decision trees. Models of independent events; hazard rate models. Computational methods include Monte-Carlo simulation, and second-moment and full-distribution methods derived from structural reliability theory.

4 units, Aut (Kiremidjian)

204. Structural Reliability—Probability models for loads and resistance, definition of failure events of structural components and systems, sources and estimation of uncertainties, first- and second-order reliability methods, simulation methods in reliability analysis, solution techniques for complex systems, application to structural codes. Prerequisite: 203 or equivalent.

4 units, Spr (Staff)

211. 3D and 4D Modeling of Civil Engineering Projects—(Undergraduates register for 111.) See 111.

3-4 units, Spr (Fischer)

214. Symbolic Modeling in Engineering—(Same as 114.) Issues concerning symbolic model-based reasoning systems in engineering. Lab course to study and create symbolic models using Artificial Intelligence representation and reasoning techniques, and engineering principles and heuristics. Prerequisite: Computer Science 106A or equivalent.

4 units, Win (Kunz)

215. Social Entrepreneurship—(Same as Business 335G.) Social entrepreneurship refers to the efforts of private citizens to create innovative responses to social needs, and innovative solutions to social problems. Objectives: introduce the concept and practice of social entrepreneurship as it is emerging in the U.S. and around the world, help students be more effective in their social entrepreneurial pursuits by building their practical knowledge of the strategies for turning good social ideas into effective ventures, and discuss distinctive challenges of entrepreneurship in the social sector in a global setting.

4 units, Spr (Kessler, Dees)

222A. Computer Integrated Architecture/Engineering/Construction (A/E/C)—Study projects focus on the cross-disciplinary aspects. A history of the building industry. Performance-based design, constructibility, construction planning and management issues. Students learn basic communication technologies and are engaged in team building and mini warm-up team projects.

2 units, Win (Fruchter)

222B. Computer Integrated Architecture/Engineering/Construction (A/E/C)—Continuation of 222A. Multi-disciplinary, collaborative, multi-site teamwork project-centered environment. Round table A/E/C panel discussions, lectures, and labs on collaborative technologies provide a global perspective of the A/E/C industry and cutting edge information technologies. Students exercise the acquired theoretical discipline knowledge and the information technologies in a multi-disciplinary, collaborative context, and engage in hands-on case study projects to redesign parts of existing projects and work on the concept development phase of the comprehensive course project.

3 units, Spr (Fruchter)

222C. Computer Integrated Architecture/Engineering/Construction (A/E/C)—Continuation of 222B. Students focus on the comprehensive team project, including project development and documentation, and final presentation of results. Design and construction alternatives are
subject to rigorous examination by rapid computational prototyping, concurrent multi-disciplinary evaluation, and trade-off analysis. Prerequisite: 222B.

2 units, Spr (Fruchter)

237. Introduction to Biotechnology—(Same as Biochemistry 237, Chemical Engineering 450, Developmental Biology 237, Structural Biology 237.) Faculty from the departments of Biochemistry, Biological Sciences, Chemical Engineering, Civil and Environmental Engineering, Developmental Biology, Structural Biology, and invited industrial speakers review the interrelated elements of modern biotechnology. Topics: protein structure and dynamics, protein engineering, bioanalysis, gene expression, cellular metabolism and metabolic engineering, fermentation technology, and purification of biomolecules. Prerequisite: graduate student or upper-division undergraduate in the sciences or engineering.

3 units, Spr (Robertson)

238. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999–2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

240. Analysis and Design of Construction Operations—Planning and management of construction work at the field operations level. Data collection, analysis, modeling, and design. Emphasis is on work methods development, productivity, safety, and total quality management. Students prepare studies of and reports about local construction projects.

3 units, Aut (Paulson)

240L. Applications of Operations Analysis and Design—Hands-on experience as a construction volunteer at a Bay Area low-cost housing project. Opportunities to apply planning and analysis skills learned in 240, while working with groups of volunteers performing specific field tasks. Corequisite: 240.

1 unit, Aut (Paulson)

241. Techniques of Project Planning and Control—Fundamental concepts of project planning and control; current and future project information technologies; project planning and control systems at the firm and project level. Topics: cost estimating at conceptual, schematic, detailed, and bid stages, measurement and pricing of work; work breakdown structures; planning and scheduling techniques, including CPM, PERT, LOB; resource allocation; project control; supply chain models; treatment of uncertainty; electronic integration of time and cost planning and control, and 4D modeling. Group term project including technical report and presentation.

3-4 units, Win (Fischer)

242. Organization Design for Projects and Companies—Provides an introduction to organizational behavior. In-depth contingency theory of organizational design for engineering and construction projects and firms. Computer-based organizational analysis tools. Case studies on facility design and construction organizations; concepts are applicable to project-focused teams and companies in other industries. Groups of 12 students practice running problem-focused meetings, one case study per week outside class. Prerequisite: 240 or equivalent.

4 units, Aut (Levitt)


2 units, Aut (Tucker, Meyer)

244B. Advanced Construction Accounting, Financial Issues, and Claims—Continuation of 244A. Emphasis is on advanced construction accounting and economic issues, the recovery of project overruns, and the understanding of construction industry financial disclosures. Construction claims, project cost overrun analysis, and cost recovery methods related to labor, equipment, indirect, overhead, cost of capital, and profit claims. Schedule delay analysis in the context of claims.

2 units, Win (Tucker, Meyer)

246. Managing Engineering and Construction Companies—Administration and management of design and construction companies in the architecture-engineering-construction industry. Focus is on management of risks inherent in the A-E-C industry: developing strategies to cope with cyclical demand, alternative contracting approaches, managing receivables and cash flow, administration of human resources, safety, quality, insurance and bonding.

4 units, Spr (Levitt)

247. Cases in Personality, Leadership, and Negotiation—See 147.

3 units, Spr (Clough)

248. Real Estate Development—Overview of the real estate development process, emphasizing critical activities and key participants. Topics: conceptual and feasibility studies, market perspectives, the public role, steps for project approval, project finance, contracting and construction, property management, and sales. Group term projects focus on actual developments now in the planning stage. Prerequisites: 244A or equivalent, Engineering 60.

3 units, Spr (Staff)

249. Labor and Industrial Relations in Construction—The history, laws, institutions, and social and economic forces affecting labor and industrial relations in construction, covering the union and open-shop sectors. Comparative labor relations (other nations), simulated collective bargaining and arbitration exercises; field trip.

3 units, Win (Clark, Walton)

250. International Construction—Prepares construction professionals for international projects, exploring the differences in: construction systems, technology, management, and culture between advanced industrial countries (AIC), newly industrialized countries (NIC), and less developed countries (LDC); privatization of infrastructure, economic drivers of construction projects, risks, and risk management. Material is from a construction market viewpoint and the viewpoint of a single project and firm. Individual research paper, case studies, and class presentation.

3 units (Fischer) not given 1999–2000


3 units, Aut (Clough)

256. Building Systems Analysis—Undergraduates register for 156; see 156. Design concepts, integration issues, materials of construction, and installation for HVAC systems. Student groups analyze a specialized building system on a project.

3 units, Win (Tatum)
257. Development Strategies for High Tech Facilities—The development of complex facilities for biotech and semiconductor firms to satisfy demanding project objectives. Business aspects of the industry segments, basic technology and production processes, projects and typical plants, and major process equipment and systems. Professionals from firms participating in project teams for high tech facilities. Field trips to biotech labs and production facilities, semiconductor tool suppliers, and wafer fabs. Two papers analyze development strategies through case studies of realistic situations.

3 units, Spr (Tatum)

258A,B,C. Donald R. Watson Seminar in Construction Engineering and Management—Weekly discussions of special topics with speakers from industry and government. Normally taken by construction graduate students each quarter for three quarters. Lecture builds on construction graduate courses. (AU)

258A. 1 unit, Aut (Clough)
258B. 1 unit, Win (Paulson)
258C. 1 unit, Spr (Levitt)

259A,B,C. Construction Problems—Analysis of group-selected problems in construction techniques, equipment, or management, followed by preparation of oral and/or written reports. Students consult specialists from the construction industry and make use of University facilities. See 299 for alternative individual studies. Prerequisites: graduate standing in construction and consent of instructor.

259A. 1-3 units, Aut (Staff)
259B. 1-3 units, Win (Staff)
259C. 1-3 units, Spr (Staff)

260A. Physical Hydrogeology—(Same as Geological and Environmental Sciences 230.) Theory of underground water, analysis of field data and pumping tests, geologic groundwater environments, solution of field problems, groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus.

5 units, Aut (Gorelick)


4 units, Aut (Loague) alternate years, not given 2000-01

260C. Contaminant Hydrogeology—(Same as Geological and Environmental Sciences 231.) For earth scientists and engineers interested in environmental and water resource problems involving contaminated groundwater. The processes affecting contaminant migration through porous media, including interactions between dissolved substances and solid media. Conceptual and quantitative treatment of advection-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and optimal aquifer remediation.

Recommended: 260A.

4 units, Spr (Gorelick)

261. Watershed and Wetlands Hydrology—Graduate seminar focusing on the hydrologic processes underlying the functioning, management, and restoration of important ecosystems. Possible topics: the hydrology of tidal salt and freshwater marshes, inland freshwater wetlands, riparian zones, wetland and upland forests, agricultural watersheds, or urban watersheds. Readings from texts and journal literature. Each student prepares a research proposal on the quarter’s topic. Enrollment limited. Prerequisite: consent of instructor. Recommended: 162, 260A, or equivalents.

3 units, Spr (Freyberg)

262A. Environmental Fluid Mechanics—The flow of incompressible viscous fluid; emphasis is on developing an understanding of fluid dynamics that can be applied to environmental flows. Topics: kinematics of fluid flow; equations of mass and momentum conservation (including density variations); some exact solutions to the Navier-Stokes equations; appropriate analysis of fluid flows including Stokes flows, potential flows, and laminar boundary layers; and an introduction to the effects of rotation and stratification through scaling analysis of fluid flows. Prerequisites: 101B or consent of instructor, and some knowledge of vector calculus.

3-4 units, Aut (Monismith)


3-4 units, Win (Staff)

262C. Modeling Environmental Flows—Introduction to turbulence concepts and models, and to basic concepts of numerical simulation and computer modeling of turbulent flows. Application of models to open channel, estuary, and lake/reservoir simulations. Use of computer models for estuarine hydrodynamics, lake/reservoir dynamics, and stream water quality. The effects of rotation and stratification. Prerequisites: 262A and 262B, or consent of instructor.

3-4 units, Spr (Street)

263A. Air Pollution Modeling—Introduction to the numerical modeling of urban, regional, and global air pollution with a focus on gas chemistry, and radiative transfer. Stratospheric, free-tropospheric, and urban chemistry. Methods for solving stiff systems of chemical ordinary differential, including the Multistep Implicit-Explicit method, Gear’s method with sparse-matrix techniques, and the family method. Numerical methods of solving radiative transfer, coagulation, condensation, and chemical equilibrium problems. Project involves the development of a basic chemical ordinary differential equation solver. Prerequisite: Computer Science 106A or equivalent.

3-4 units, Win (Jacobson)

263B. Numerical Weather Prediction—Introduction to numerical weather prediction. The continuity equations for air and water vapor, the thermodynamic energy equation, and the momentum equations are derived for the atmosphere. Numerical methods of solving partial differential equations, including finite-difference, finite-element, semi-Lagrangian, and pseudospectral methods. Time-stepping schemes: the forward-Euler, backward-Euler, Crank-Nicolson, Heun, Matsuno, leapfrog, and Adams-Bashforth schemes. Boundary-layer turbulence parameterizations, soil moisture, and cloud modeling. Project developing a basic mesoscale model. Prerequisite: Computer Science 106A or equivalent.

3-4 units (Jacobson) not given 1999-2000

263S. Climate Theory, Modeling, Applications, and Implications—(Same as Biological Sciences 217.) The history of the coevolution of climate and life. Theories of climate, external and internal climatic forcings, definitions of climate and the climate system, and rationale for climatic modeling. Hierarchy of climatic models; interactions among atmosphere, biosphere, oceans, hydrosphere, and cryosphere. Climatic predictability; implications of predictions and relevance to current controversies. Prerequisites: math through differential equations, or biology core, or consent of instructor.

3 units, Win (Schneider) alternate years, not given 2000-01
264. Sediment Transport Modeling—The physical processes and modeling of sediment transport in estuaries, rivers, and coastal zones. Modeling in one-, two-, and three-space dimensions and time. Hands-on sessions with actual development, modification, and application of analytical models and numerical codes for transport. Prerequisites: 101D, 262A, or equivalents.

3 units, Win (Street)

265. Sustainable Water Resources Development—Alternative criteria for judging the sustainability of projects. Application of criteria to evaluate sustainability of water resources projects in several countries. Case studies illustrate the role of political, social, economic, and environmental factors in decision making. Evaluation of benefit-cost analysis and environmental impact assessment as techniques for enhancing the sustainability of future projects. Limited enrollment. Prerequisite: graduate standing in Environmental and Water Studies, or consent of instructor.

3 units, Win (Ortolano)

266. Environmental Policy Design and Implementation—Regulation, market incentives, the courts, and negotiation as bases for environmental management programs. Case studies involve implementation of air and water pollution control laws, hazardous waste management programs, and environment impact assessment. Limited enrollment. Prerequisite: graduate standing in Environmental and Water Studies Program or consent of instructor.

4 units, Spr (Ortolano)

266S. Urban Policy Design and Implementation—(Same as Law 287.) Open to graduate students. Examination of the interaction between urban redevelopment policies and environmental laws as applied to local land use decisions. The opportunities and obstacles to promoting “smart growth” in existing communities and discouraging sprawl in undeveloped areas. Paper. Enrollment limited. Recommended: prior course work on environmental law.

2 semester units, Aut semester (Hernandez, Hingerty)

267. Interpolation and Inverse Problems—Understanding complex hydrologic processes by using measurements, mathematical models which describe groundwater flow and solute transport, and stochastic analysis of spatial variability and uncertainty. Topics: exploratory data analysis, generalized linear minimum-variance estimation, parameter estimation (or “model calibration”), model validation, accuracy of model predictions, optimal sampling. Emphasis is on linear “geostatistical” methods of estimation. Prerequisite: background in introductory statistics and linear algebra.

3-4 units, Spr (Kitanidis)

268. Groundwater Flow—Study of flow and mass transport in porous media through analytical techniques. Applications of potential field theory to practical groundwater problems: flow to and from wells, rivers, lakes, drainage ditches; flow through and under dams; streamline tracing. Flow-net construction and conformal mapping. Capture zones of wells. Prerequisites: 101B or equivalent, 260A; Mathematics 41, 42, 51, or equivalents.

3-4 units (Kitanidis) not given 1999-2000

269. Water Resources Seminar—Problems in all branches of water resources, with talks by visitors, faculty, and students. (AU)

1 unit, Spr (Kitanidis)

270. Movement, Fate, and Effects of Contaminants in Surface Waters and Groundwater—Transport of chemical constituents in surface and groundwater, including advection, dispersion, sorption, interphase mass transfer, and transformation; water quality requirements for various beneficial uses. Emphasis is on the behavior of hazardous waste contaminants. Prerequisites: undergraduate chemistry and calculus. Recommended: 101B.

3 units, Aut (Cunningham)


3 units, Win (Staff)

271B. Biological Processes—Biological processes for the transformation of environmental contaminants. Unit processes for biological treatment including dispersed growth and fixed-film systems. Aerobic and anaerobic process, microbial ecology, and kinetics, with applications to the treatment of municipal and industrial wastewaters, hazardous chemicals, and groundwater. Recommended: 270, 274A.

3 units, Win (Criddle)

271C. Treatment Process Design—Analysis of specialized water pollution control processes such as adsorption, oxidation, and air stripping. Emphasis is on physical and chemical processes in the treatment of hazardous wastes, especially contaminated groundwater. Definitions of problems and objectives, evaluation of alternatives for example cases, preliminary process design, and cost evaluations. Design-oriented class project and field trips. Prerequisites: 270, 271A.

3 units (Staff) given 2000-01

273. Aquatic Chemistry—(Same as Geological and Environmental Sciences 264.) Chemical principles and application of those principles to the analysis and solution of problems in aqueous geochemistry (temperatures near 25°C and atmospheric pressure). Emphasis is on the analysis of natural water systems and the understanding and solution of specific chemical problems in water purification technology and water pollution control. Prerequisites: Chemistry 31 and 33, or equivalent.

3 units, Aut (Leckie)

273A. Water Chemistry Laboratory—Laboratory application of techniques for the analysis of natural waters and wastewaters, emphasizing instrumental techniques.

2 units, Win (Leckie)


3 units, Aut (Spormann)


3 units, Win (Spormann)

274C. Environmental Microbiology Laboratory—Microbiological, biochemical, and molecular techniques for characterizing microbes: enrichment and isolation of microorganisms, metabolic and phylogenet-
ic characterization of isolates, determination of growth parameters (growth rate, growth yield, fermentation balance), enrichment and isolation of microorganisms degrading pollutants, detection of microorganisms in the environment, water quality parameters. Horizontal gene transfer. Prerequisites: 274A, 274B.

3 units (Spornmann) not given 1999-2000

275A. Water Quality Control Processes I—Lab and pilot plant studies of the physical and chemical processes for the treatment of water and wastewaters. Prerequisites: 271A, 273, 273A.

3 units, Spr (Leckie) alternate years, not given 2000-01


3 units, Cr (Criddle) alternate years, given 2000-01


3 units, Aut (Hildemann)


3 units, Spr (Hildemann)

279. Environmental Engineering Seminar—Current research, practice, and thinking in environmental engineering and science. Attendance at seminars is self-directed, and may be accrued throughout the school year. See instructor.

1 unit, Spr (Hildemann)

280. Advanced Structural Analysis—Theoretical development and computer implementation of direct stiffness method of structural analysis; virtual work principles; computation of element stiffness matrices and load vectors; direct assembly procedures; equation solution techniques. Analysis of two- and three-dimensional truss and frame structures, thermal loads, and substructuring and condensation techniques for large systems. Practical modeling techniques. Introduction to nonlinear analysis concepts. Computer lab. Prerequisites: elementary structural analysis and matrix algebra.

4 units, Aut (Deierlein)

281. Finite Element Structural Analysis—Introduction to the finite element method for analysis of structural systems. Formulation and implementation of frame, plane stress, plane strain, axisymmetric, torsional, solid, plate, and shell elements. Topics: strong and weak forms of the problem, variational principles and the principle of minimum potential energy, the finite element method as an extension of the Rayleigh-Ritz method, shape functions, isoparametric mapping, numerical integration, convergence requirements and error estimation. Techniques for application to modeling structural systems. Prerequisite: 280 or equivalent.

4 units, Win (Lowes)

282. Earthquake Hazard and Risk Analysis—Earthquake phenomena, faulting, ground motion, study of past major earthquakes, effects of earthquakes on man-made structures, response spectra, Fourier spectra, power spectra, random vibration analysis of single and multi-degree of freedom systems, soil effects on ground motion and structural damage, methods for structural damage evaluation, current research in earthquake engineering. Prerequisites: 203, 296A.

3 units, Win (Kiremidjian)

283. Nonlinear Structural Analysis—Introduction to methods of geometric and material nonlinear analysis, emphasizing techniques for modeling framed structures. Applications to stability problems and performance based design. Assignments emphasize computer implementation and use of nonlinear analysis. Prerequisites: 280, 286.

3 units, Spr (Deierlein)

284. Earthquake Resistant Design—Earthquake motions and their engineering interpretations, strong ground motion studies, design spectrum and design earthquake, importance of dynamic analysis of structures, geologic and soil engineering problems, design of structures to minimize earthquake damage, risk analysis, earthquake codes. Prerequisite: 282A or consent of instructor.

3 units, Spr (Lowes)

285. Behavior of Structural Systems for Buildings—Basic design concepts, performance criteria, loading, methods of design, types of structural systems behavior of structural systems under gravity and lateral loads, approximate methods of analysis, preliminary design concepts and implementation, performance assessment, behavior of structural elements. Prerequisites: basic courses in design of steel and reinforced concrete structures.

4 units, Aut (Krawinkler)

286. Advanced Structural Design—Strength, stiffness, and ductility considerations in the design of structural elements and systems made of steel, reinforced concrete, and other materials. Concepts of redistribution (element vs. system behavior). Introduction to performance-based design. Prerequisites: basic courses in design of steel and reinforced concrete structures, 285 or equivalent.

4 units, Win (Krawinkler)

287. Structural Performance and Failures—Basic concepts in the definition of satisfactory structural performance; key elements in structural performance; types of failures, ranging from reduced serviceability to total collapse; failure sources and their root cause allocation, emphasizing design/construction process failures; failure prevention mechanisms; illustration with real life examples.

2 units, Spr (Monecarz)

288. Computer Methods in Structural Engineering—Introduction to basic techniques for the development of structural engineering analysis and design software. Topics: basic data structure; computer representation of engineering systems; implementation of advanced numerical methods and engineering software; automated conformance checking of design codes and standards. Prerequisites: Computer Science 106A or equivalent.

3 units (Law) not given 1999-2000

289. Computational Geomechanics—Steady-state and transient fluid conduction problems in geomechanics; elliptic, parabolic, and hyperbolic systems; variational inequality and free-boundary problems; three-dimensional consolidation theory; soil-structure interaction; wave propagation and radiation damping; coupled finite element-boundary element solutions in elastodynamics; computational techniques for solving systems of nonlinear equations. Computing assignments. Prerequisites: 101C, 281, or equivalents.

3 units, Spr (Borja) alternate years, not given 2000-01
290. Advanced Geomechanics—Theory of particulate media; micromechanics of granular materials; constitutive laws in geomechanics; plasticity; return-mapping algorithms; classical yield models: Mises, Mohr-Coulomb, Drucker-Prager; critical state theory and Cam-clay type models; multi-surface and bounding surface type models; drained and undrained conditions; numerical simulations. Prerequisites: 101C, Mechanical Engineering 238A, or equivalents.
3 units (Borja) alternate years, given 2000-01

291. Foundation Engineering—Types, characteristics, analysis, and design of shallow and deep foundations; rigid and flexible retaining walls; braced excavations; settlement of footings in sands and clays; slope stability analysis by method of slices including search algorithms for the critical slip surface. Special seminars by guest speakers; computer assignment. Prerequisite: 101C or equivalent.
3 units, Win (Borja)

293. Experimental Soil Mechanics—Lab determination of stress-strain parameters for soils under drained and undrained loading conditions. Six lab experiments. Prerequisite: 101C or equivalent.
2 units, Win (Borja)

294. Issues in Geotechnical and Environmental Failures—Causes and consequences of the failure of buildings, earth structures, waste storage, and high hazard facilities in contact with the environment; technical, ethical, economic, legal, and business aspects; failure analysis and forensic problems; prevention, liability, and dispute management. Case history approach based on the instructor’s files including earthquake, flood, and hazardous waste facilities. Student observation, participation in active lawsuits where possible.
3 units, Spr (Meehan)

296A. Structural Dynamics I—Vibrations and dynamic response of simple structures under time dependent loads, dynamic analysis of single and multiple degrees of freedom systems, support motion, response spectra.
4 units, Aut (Law)

296B. Structural Dynamics II—Methods of structural dynamics for discretized and continuous systems in free and forced vibration, modal analysis; numerical methods; introduction to nonlinear dynamics; advanced topics. Prerequisites: 280, 296A.
4 units, Win (Law)

298. Structural Engineering and Geomechanics Seminar—Recommended for all graduate students. Lectures on topics of current interest in professional practice and research. (AU)
1 unit, Win (Staff)

299. Independent Study in Civil Engineering—Directed study for graduate students on subjects of mutual interest to students and faculty. Student must obtain faculty sponsor.
1-3 units, any quarter (Staff)

300. Thesis—Investigation of an engineering problem; required of candidates for degree of Engineer.
Aut, Win, Spr (Staff)

310. Post-Master’s Seminar—For post-master's students to serve as orientation to the selection of a research topic.
1 unit, Aut, Win, Spr (Staff)

320A,B,C. Integrated Facility Engineering—Individual and group presentations on goals, research, and state-of-practice of integrated facility engineering, including objectives for integrated computer systems. (AU)
1 unit, Aut, Win, Spr (Fischer, Kunz, Levitt)

342. Computational Modeling of Organizations—For post-M.S. students interested in formal techniques for organization design. Computer simulation of organizations are used to conduct “virtual experiments” for developing organization theory or to analyze the performance of “virtual organizations” with different structures and decision support/communication technologies. Goals: introduce research on computational modeling and design of real-world organizations. Paper serves as a research proposal. Prerequisite: 242 or equivalent introductory organization design class.
4-5 units, Win (Levitt)

362. Advanced Topics in Subsurface Transport—Mathematical analysis of flow and transport in porous and fractured media. Topics vary each year, including: solution of flow and transport equations, stochastic analysis, homogenization, and estimation methods. Prerequisite: consent of instructor.
3 units, Aut (Cirpka)

3 units, Aut (Fong) alternate years, not given 2000-01

364. Geophysical Fluid Dynamics—Focus is on fluid dynamics in natural systems where the influence of the earth’s rotation is important. The basic processes such as geostrophic and quasi-geostrophic flows, planetary waves, and potential vorticity. Student-led lectures and discussions of current physical oceanographic research problems. Prerequisites: 262A, 363.
2 units, Win (Monismith, Fong)

370A,B,C. Environmental Research—Introductory research experience for first-year graduate students in the Environmental Engineering and Science program pursuing the Ph.D. 15-18 hrs/week on research over a 3-qtr. period. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.
5-6 units, Aut, Win, Spr (Staff)

373. Special Topics in Aquatic Surface Chemistry—Special topics seminar series reviews current research covering significant chemical interactions and reactions in the environment taking place at the solution/solid interface. Mineral surfaces are responsible for the attenuation of contaminant transport in groundwater, have catalytic properties, and can control the bioavailability of contaminants, trace elements, and organic molecules. Similarly, solid organic matter, organic colloids, organic coatings, and even surfaces of microorganisms are involved in reactions with solutes. These surface phenomena are examined from the perspective of understanding the chemical interactions at surfaces extensively employed (explicitly and implicitly) in water/wastewater treatment and environmental remediation strategies. Student presentations on specific topics. Prerequisites: 270, 273, 275A, and post-M.S. status.
2 units (Leckie) alternate years, given 2000-01

379. Environmental Management and Policy Analysis—(Same as Business 312E) Priority given to Environmental and Water Studies graduate students. Environmental considerations are increasingly central to business activity and present business opportunities. Managers need to effectively incorporate these considerations into their decision-making processes. Speakers from industry and nonprofits cover the basics of environmental science and economics, and show how companies are addressing environmental management. Selected public policy issues identify effective policy and show how managers can affect or
anticipate policy changes. Group project (research paper or working with a company or environmental organization). Enrollment limited.
4 units (Bulow) given 2000-01

398. Report on Civil Engineering Training—On-the-job training under the guidance of experienced, on-site supervisors; meets the requirements for Curricular Practical Training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. Prerequisite: written consent of adviser.
1 unit, any quarter (Staff)

399. Advanced Engineering Problems—Individual projects on selected topics. Independent graduate work under the direction of a faculty member on a subject of mutual interest. Student must obtain faculty sponsor. Written report usually required.
1-5 units, any quarter (Staff)

Aut, Win, Spr (Staff)

**COMPUTER SCIENCE**

Chair: Jean-Claude Latombe
Associate Chair for Education: Eric S. Roberts


Associate Professors: David Dill, Michael Genesereth, Oussama Khatib, Monica Lam, Marc Levoy, Rajeev Motwani, Serge A. Plotkin, Mendel Rosenblum, Yoav Shoham, Jennifer Widom

Assistant Professors: Mary G. Baker, Dan Boneh, Christoph Bregler, Dawson Engler, Armando Fox, Daphne Koller, Christopher Manning, Nick McKeown, Balaji Prabhakar, Carlo Tomasi

Professors (Research): Thomas Binford, Richard Fikes, Gio Wiederhold

Professor (Teaching): Eric S. Roberts

Courtesy Professors: Giovanni DeMicheli, Martin Kay, Grigori Mints, Edward A. Shortliffe, Fouad A. Tobagi

Associate Professor: Russell Altman, John T. Gill, III, David Heeger, Teresa Meng, Mark A. Musen

Assistant Professor: Russell B. Altman, David Heeger, Oyekunle Olukotun, Benjamin Van Roy

Assistant Professor (Research): Yuval Shahar

Senior Lecturer: Margaret Johnson

Lecturers: Gerald Cain, Nicholas J. Parlante, Robert Plummer, Patrick Young, Julie Zelenski

Acting Professor: John K. Salisbury

Acting Assistant Professor: Justin Wan

Consulting Professors: William Coughran, Cynthia Dwork, Richard Gabriel, Anoop Gupta, Kurt Konolige, David Liddle, Pandurang Nayak, Susan Owicki, Prabhakar Ragabhan

Consulting Associate Professors: Craig Partridge, Ted Selker

Consulting Assistant Professors: Peyman Milanfar, Craig Partridge

Visiting Professor: Moni Naor

Visiting Associate Professor: Moshe Tennenholtz

The Department of Computer Science (CS) operates and supports computing facilities for departmental education, research, and administrative needs. These CS systems are connected to SUNet, the campuswide Ethernet/FDDI backbone network, and SUNet is connected to the Internet through GTE/BARNET. All CS students have access to a departmental student machine, a Multi-CPU SUN Enterprise3000, as well as a cluster of public workstations in the Gates Building. In addition, most students have access to systems associated with their research areas. Each research group in CS has systems specific to its research needs. These systems range from PC clones/Macs to high-end Multi-CPU SGI and SUNs. Servers and workstations manufactured by DEC, SUN, HP, SGI, Intel, Apple, and IBM are also in place.

Support for course work and instruction is provided on systems available through Information Technology Systems and Services (ITSS).

**UNDERGRADUATE PROGRAMS**

The department offers both a major and a minor in Computer Science. The requirements for these programs are outlined in the "School of Engineering" section of this bulletin and described in more detail in the Handbook for Undergraduate Engineering Programs published by the School of Engineering. The department has an honors program, which is described in the following section.

In addition to Computer Science itself, Stanford offers several interdisciplinary degrees with a substantial computer science component. The Computer Systems Engineering major (also in Engineering) allows the study of issues of both computer hardware and software, bridging the gap between traditional CS and Electrical Engineering majors. The Symbolic Systems major (in the School of Humanities and Sciences) offers a chance to explore computer science and its relation to linguistics, philosophy, and psychology. Finally, the Mathematical and Computational Sciences major (also Humanities and Sciences) allows students to explore computer science along with more mathematics, statistics, and operations research.

**HONORS**

The Department of Computer Science offers an honors program for selected undergraduates whose academic records and personal initiative indicate that they have the necessary skills to undertake high-quality research in computer science. Admission to the program is by application only. To apply for the honors program, students must be majoring in Computer Science, must have a grade point average (GPA) of at least 3.5 in courses that count toward the major, and must achieve senior standing (135 or more units) by the end of the academic year in which they apply. Coterminus master's students are eligible to apply as long as they have not already received their undergraduate degree. Beyond these requirements, students who apply for the honors program must also find a faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

Students who meet the eligibility requirements and wish to be considered for the honors program must submit a written application to the undergraduate program office by May 1 of the year preceding the honors year. The application must include a letter describing the research project, a letter of endorsement from the faculty sponsor, and a transcript of courses taken at Stanford. Each year, a faculty review committee will select the successful candidates for honors from the pool of qualified applicants.

In order to receive departmental honors, students admitted to the honors program must, in addition to satisfying the standard requirements for the undergraduate degree, do the following:

1. Complete at least 9 units of CS 191 or 191W under the direction of their project sponsor.
2. Enroll in a research seminar, which allows students to share their experience with other students working on research projects.
3. Complete an honors thesis deemed acceptable by a committee consisting of the thesis adviser and at least one additional faculty member.
4. Present the thesis at a public colloquium sponsored by the department.
5. Maintain the 3.5 GPA required for admission to the honors program.

**GRADUATE PROGRAMS**

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.
MASTER OF SCIENCE

In general, the M.S. degree in Computer Science is intended as a terminal professional degree and does not lead to the Ph.D. degree. Most students planning to obtain the Ph.D. degree should apply directly for admission to the Ph.D. program. Some students, however, may wish to complete the master's program before deciding whether to pursue the Ph.D. To give such students a greater opportunity to become familiar with research, the department has instituted a new program leading to a master's degree with distinction in research. This degree is described in more detail in a subsequent section.

Applications for admission to the M.S. program, and all of the required supporting documents, must be received before December 15, 1999. Exceptions are made for applicants who are either Honors Co-op applicants or who are already students at Stanford (including oterrnal applicants). Information on these deadlines is available from the department.

REQUIREMENTS

A candidate is required to complete a program of 45 units. At least 36 of these must be graded units, passed with an average 3.0 (B) grade point average (GPA) or better. The 45 units may include no more than 21 units of courses from those listed below in Requirements 1 and 2. Thus, students need to take more than seven of the courses listed in Requirements 1 and 2 actually complete more than 45 units of course work in this program. Only extremely well-prepared students may expect to finish the program in one year; most complete the program in six quarters. Students hoping to complete the program with 45 units should already have a substantial background in computer science, including course work or experience equivalent to all of Requirement 1 and some of the courses in Requirement 2.

Requirement 1 —The following courses may be needed as prerequisites for other courses in the program: CS 107, 108; 103X or 109; 193L (for specialization 5 only); Electrical Engineering 182; Mathematics 109 or 120.

Requirement 2 —Students must demonstrate breadth of knowledge in the field by completing the following courses:

1. Area A: Mathematical and Theoretical Foundations:
   a) Required:
      1) Statistics (Statistics 116 or Engineering-Economic Systems and Operations Research 120)
      2) Algorithms (CS 161)
      3) Automata (CS 154)
   b) Choose one of:
      1) Numerical Analysis (CS 137 or 237A)
      2) Logic (CS 157, 257, 258, or Philosophy 160A)

2. Area B: Computer Systems:
   a) Required: Architecture (Electrical Engineering 182 or 282)
   b) Choose two of:
      1) Operating Systems (CS 140)
      2) Compilers (CS 143)
      3) Introduction to Computer Networks (CS 244A or Electrical Engineering 284)

3. Area C: AI and Applications:
   a) Choose two of the following, with at least one 200-level course:
      1) AI (CS 121 or 221)
      2) Databases (CS 145 or 245)
      3) Graphics (CS 148 or 248)

   Individual specializations are free to narrow the set of choices in specific areas of the breadth requirement; see the individual specialization sheets in the department office for details. Breadth courses are waived only if evidence is provided that similar or more advanced course has been taken, either at Stanford or another institution. Courses that are waived rather than taken may not be counted toward the M.S. degree. Breadth courses may be taken on a Satisfactory/No Credit basis provided that a minimum of 36 graded units is presented within the 45-unit program.

Requirement 3 —At least 1 but no more than 3 units of 500-level seminars must be taken.

Requirement 4 —A program of 21 units in an area of specialization must be completed. All courses in this area must be taken for letter grades. Eight approved programs are listed below. Students may propose to the M.S. program committee other coherent programs that meet their goals and satisfy the basic requirements. Students who want to include a substantial research project as part of their degree program can arrange with their adviser to replace units in their specialization with a CS 393 (Computer Laboratory) project.

1. Numerical Analysis/Scientific Computation
   a) CS 237A, 237B, 237C

2. Systems
   a) CS 240, 242
   b) At least three of: CS 243, 244A, 245, 248, 348B; Elect. Engr. 271, 275, 382
   c) At least 6 more units selected from '2b' and from the following:

3. Software Theory
   a) CS 242, 243, 256, 258
   b) At least one of: CS 244A, 245, 342, 343, 345
   c) At least one course from the following: CS 255, 261, 351, 355, 356, 361A, 361B, 365, 368
   d) At least one additional course selected from '3b,' '3c,' CS 346

4. Theoretical Computer Science
   a) CS 256, 258, 261 (361A, 361B, or 365 may be used as substitutes for 261)

5. Artificial Intelligence
   a) At least four of: CS 222, 223A, 223B, 224M, 224N, 227, 228, 229, 326A
   b) A total of 21 units from the above and from the following: CS 205, 206, 224, 225A, 225B, 226, 256, 257, 270A, 271, 274, 323, 327A, 328, 329, 354, 377, 379, 426

6. Database
   a) CS 245
   b) Two of: CS 345, 346, 347
   c) Four additional courses selected from '6b' and from the following: CS 222, 240, 242, 243, 244A, 244B, 244C, 249, 255, 270A, 270B, 271, 272, 315A, 315B, 341, 344, 395, 446; Elect. Engr. 489

7. Human-Computer Interaction
   a) CS 147, 247A, 247B
   b) At least 6 units from: CS 148 or 248, 377 (may be taken repeatedly), 378, 447
   c) A total of 21 units from the above and from the following: Commun. 269, 272; CS 249, 270A, 270B, 272, 320, 348A, 348B, 448; Engr. 145; Indust. Engr. 203, 223, 273, 275; Linguistics 238; Mech. Engr. 101, 115A, 215, 313; Psych. 200, 203, 221, 266, 267

8. Real-World Computing
   a) At least two of: CS 223A, 223B, 248
   c) A total of 21 units from the above and from the following: CS 225A, 225B, 247A, 274, 327A, 328, 336, 399, 448; Psych. 267

* With consent of Specialization chair.
**MASTER OF SCIENCE WITH DISTINCTION IN RESEARCH**

A student who wishes to pursue the M.S./CS with distinction in research must first identify a faculty adviser who agrees to supervise and support the research work. The research adviser must be a member of the Academic Council and must hold an appointment in Computer Science. The student and principal adviser must also identify another faculty member, who need not be in the Department of Computer Science, to serve as a secondary adviser and reader for the research report. In addition, the student must complete the following requirements beyond those for the regular M.S./CS degree:

1. **Research Experience:** the program must include significant research experience, at the level of a half-time commitment over the course of three academic quarters. In any given quarter, the half-time research commitment may be satisfied by a 50 percent appointment to a departmentally supported research assistantship, 6 units of independent study (CS 393, 395, or 399), or a prorated combination of the two (such as a 25 percent research assistantship supplemented by 3 units of independent study). This research must be carried out under the direction of the primary or secondary adviser.

2. **Supervised Writing and Research:** in addition to the research experience outlined in the previous requirement, students must enroll in at least 3 units of independent research (CS 393, 395, or 399) under the direction of their primary or secondary adviser. These units should be closely related to the research described in the first requirement, but focused more directly on the preparation of the research report described in the next section. Note that these units must be taken in addition to the 21 units required for the specialization, although they do not count toward the 45 units required for the degree.

3. **Research Report:** students must complete a significant report describing their research and its conclusions. The research report represents work that is publishable in a journal or at a high-quality conference, although it is presumably longer and more expansive in scope than a typical conference paper. Three copies of the research report must be submitted to the Student Services office in the department three weeks before the beginning of the examination period in the student’s final quarter. Both the primary and secondary adviser must approve the research report before the “distinction in research” designation can be conferred.

**DOCTOR OF PHILOSOPHY**

Applications to the Ph.D. program and all supporting documents must be received before December 15, 1999. The following are department requirements (see the Computer Science graduate programs administrator for further details, or visit www-cs.stanford.edu/admissions):

1. A student should plan and successfully complete a coherent program of study covering the basic areas of computer science and related disciplines. The student’s adviser has primary responsibility for the adequacy of the program, which is subject to review by the Ph.D. program committee.

2. Each student, to remain in the Ph.D. program, must satisfy the breadth requirement covering introductory level graduate material in major areas of computer science. Once a student fulfills six of eight whole areas of the breadth requirement, he or she may apply for admission to candidacy for the Ph.D. This is typically done by the end of the second year in the program. The student must completely satisfy the breadth requirement by the end of nine quarters (excluding summers), and must pass a qualifying exam in the general area of the expected dissertation.

3. As part of the training for the Ph.D., the student is required to complete at least 4 units (a unit is 10 hours per week for one quarter) as a teaching assistant or instructor for courses in Computer Science numbered 100 or above.

4. The most important requirement is the dissertation. After passing the qualifying examination, each student must secure the agreement of a member of the department faculty to act as the dissertation adviser. (In some cases, the dissertation adviser may be in another department.)

5. The student must pass a University oral examination in the form of a presentation of the dissertation. It is usually held after all or a substantial portion of the dissertation research has been completed.

6. The student is expected to demonstrate the ability to present scholarly material orally, both in the dissertation defense and by a lecture in a department seminar.

7. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a second member from within the department, and a third member chosen from within the University. The principal adviser and at least one of the other committee members must be Academic Council members.

**Ph.D. MINOR**

For a minor in Computer Science, a candidate must complete 20 units of computer science course work, including at least three of the master’s core courses to provide breadth, and one course numbered 300 to provide depth. The remaining courses must be numbered 200 or above. One of the courses taken must include a significant programming project to demonstrate programming proficiency. A grade point average (GPA) of 3.0 or better must be maintained.

**TEACHING AND RESEARCH ASSISTANTSHIPS**

Graduate student assistantships are available. Half-time assistants receive a tuition scholarship for 9 units per quarter during the academic year, and in addition receive a monthly stipend.

Duties for half-time assistants during the academic year involve approximately 20 hours of work per week. Teaching assistants (TAs) help an instructor teach a course by conducting discussion sections, consulting with students, grading examinations, and so on. Research assistants (RAs) help faculty and senior staff members with research in computer science. Most teaching and research assistantships are held by Ph.D. students in the Department of Computer Science. If there is an insufficient number of Ph.D. students to staff teaching and research assistantships, then these positions are open to a limited number of master’s students in the department. However, master’s students should not plan on being appointed to an assistantship.

Students with fellowships may have the opportunity to supplement their stipends by serving as graduate student assistants.

**COURSES**

(WIM) indicates that the course meets the Writing in the Major requirement.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

**GUIDE TO SELECTING INTRODUCTORY COURSES**

Students arriving at Stanford have widely differing backgrounds and goals, but most find that the ability to use computers effectively is beneficial to their education. The department offers many introductory courses to meet the needs of these students.

For students whose principal interest is an exposure to the fundamental ideas behind computer science and programming, CS 105 is the most appropriate course. It is intended for students in nontechnical disciplines who expect to make some use of computers, but who do not expect to go on to more advanced courses. CS 105 meets the Area 2b General Education Requirement and includes an introduction to programming, and the use of modern Internet-based technologies. Students interested in learning to use the computer should consider CS 11C (Introduction to Computing at Stanford) or 1U (Introduction to Unix).

Students who intend to pursue a serious course of study in computer science may enter the program at a variety of levels, depending on their background. Students with little prior experience or those who wish to take more time to study the fundamentals of programming should take...
106A followed by 106B. Students in 106A need not have prior programming experience. Students with significant prior exposure to programming or those who want an intensive introduction to the field should take 106X, which covers most of the material in 106A and B in a single quarter. All instruction in CS 106 uses ANSI C, although the prior programming experience required for 106X may be in any language. In all cases, students are encouraged to discuss their background with the instructor responsible for these courses.

After the introductory sequence, Computer Science majors and those who need a significant background in computer science for related majors in engineering should take 103 (or 109), 107 and 108. CS 103 offers 400-499 experimental Software Systems For significant use—106A.B or 106X, along with 103, 107, and 108 For a technical introduction—106A For nontechnical use—105. For exposure— 1C or 1U paradigms that illustrate critical strategies used in systems development; the computer science. CS 107 exposes students to a variety of programming paradigms that use different approaches to solving problems, including functional programming, object-oriented programming, and constraint-based programming.

In summary:

For exposure—1C or 1U
For nontechnical use—105.
For scientific use—106A
For a technical introduction—106A
For significant use—106A,B or 106X, along with 103, 107, and 108

NUMBERING SYSTEM

The first digit of a CS course number indicates its general level of sophistication:

0-99 service courses for nontechnical majors
100-199 other service courses, basic undergraduate
200-299 advanced undergraduate/ beginning graduate
300-399 advanced graduate
400-499 experimental
500-599 graduate seminars

The tens digit indicates the area of Computer Science it addresses:

00-09 Introductory, miscellaneous
10-19 Hardware Systems
20-29 Artificial Intelligence
30-39 Numerical Analysis
40-49 Software Systems
50-59 Mathematical Foundations of Computing
60-69 Analysis of Algorithms
70-79 Typography and Computational Models of Language
90-99 Independent Study and Practicum

NONMAJOR

1C. Introduction to Computing at Stanford—for those with limited experience on computers. Introduction to the basics of computing, and a variety of programs, encouraging individual exploration of the programs covered. Topics: word processing, spread sheets, using the WWW and the Internet, and computing resources at Stanford. Macintosh and PC systems. One-hour lecture/demonstration in dormitory clusters. Weekly short assignments and final project. Not a programming course.

1 unit, Aut (Roberts, Shimizu)

II. The Internet—for a computer-literate but not technical audience. What is the Internet and what is it good for? The foundations, resources, and uses of the Internet, emphasizing practical skills for finding, reading, and authoring Internet material. Topics: HTML, FTP, HTTP, web publishing and searching; evolution and future directions; security and privacy issues. Programming-oriented course is 193I. Prerequisites: basic computer skills at level of 1C, e.g., file editing, and access to a computer on the Internet.

1 unit, Win (Staff)

1U. Introduction to Unix—Tutorial on using the Unix operating system. Topics: text editors, the file system, the C shell, standard Unix utilities, PERL. Includes simple shell programming, but is not a programming course and assumes no prior exposure to programming.

1 unit, Spr (Staff)

9. Undergraduate Journal Club—Weekly discussion led by students; encourage juniors and seniors to read and discuss research papers in small, informal format. Topics are selected by participants with advice from faculty sponsor.

1 unit, Aut (Caspi)

50. Problem Solving with Mathematica—For engineers, physicists, mathematicians, and others who need to solve mathematical or quantitative problems. Comprehensive introduction to Mathematica, an interactive mathematical software package that includes a high-level programming language. Symbolic, numerical, graphical, animation, and programming capabilities, including use of Mathematica to manipulate expressions, find roots, solve differential equations, visualize functions and data, import and export data in arbitrary formats, work with expressions in standard mathematical notation, and perform statistical analyses.

2 units (Williams) alternate years, given 2000-01

51. Introduction to Quantum Computing and Quantum Information Theory—For computer scientists, physicists, mathematicians, engineers, and others who want to learn the capabilities of quantum computers and the necessary quantum mechanics and complexity theory. Topics: quantum algorithms (including Shor’s polynomial time algorithm for integer factorization, Grover’s database search algorithm, quantum tree search, quantum wavelets), quantum information theory, quantum cryptography, breaking the RSA cryptosystem, quantum teleportation, circuit design, quantum error correction, and examples of prototype quantum computers. Prerequisites: familiarity with elementary matrix algebra and complex numbers.

2 units, Win (Williams)

99A. Stanford Introductory Seminar: The Downside of Computing Systems—Preference to freshmen. Computers are critical components of our world in such tasks as surgery, air traffic control, and international banking. How computing systems fail, how such failures may affect our society in the future, and how to build and maintain systems to avoid failures. Case studies of computer-related disasters, including the Therac-25 accidents, the Internet worm, and the Ariane 5 crash. Topics: computer security, robust distributed systems, fault-tolerant architectures, organizational behavior.

3 units, Aut (Baker)

99C. Stanford Introductory Seminar: Computers—Fact and Fiction—Preference to freshmen. The question of what computers can and cannot do. Popular culture and the media represent the capabilities of computers in an unscientific way that tends to obscure the promise and the limitations of the technology. Scientists have disagreed about the range of tasks that computers can deal with, and that computers cannot learn to do what they were not explicitly programmed to do (e.g., play championship chess, or create art or music). Conversely, extremely optimistic forecasts and claims have also been made. Students evaluate the relationship between these claims and the current and future state of technology. Prerequisite: 106A.

3 units, Koller (not given 1999-2000)

99D. Stanford Introductory Seminar: The Science of Science—Preference to freshmen. The interwoven histories of science and Western art from the Renaissance to the 19th century. Emphasis is on the revolutions in science and mathematics that have inspired parallel revolutions in the visual arts (e.g., Brunelleschi’s invention of linear perspective, Newton’s discoveries in geometric optics, and the theories of color vision proposed by Goethe, Young, Helmholtz, etc.). The scientific principles behind image making, including a survey of digital image synthesis (a.k.a. computer graphics). Using graphics workstations and commercial software packages, experiments are performed in image making. GER:2b (DR:6)

3 units, Win (Levoy)

99E. Stanford Introductory Seminar: Great Ideas in Computer Science—Preference to freshmen. The power and limitations of comput-
ers; concrete strategies for solving problems using computers. What can a computer do efficiently? Why are programs hard to test? How can we make computers appear clairvoyant? How do you keep secrets in computers? Should tables be sorted? When is it a good idea to be greedy? These questions involve ideas whose impact ranges from the philosophical foundations of computation to concrete applications in everyday life. Prerequisite: mathematical maturity (e.g., AP Math) and exposure to computer programming.

3 units, Win (Motwani, Raghavan)


3 units (Prat) not given 1999-2000

99G. Stanford Introductory Seminar: The Two Cultures—Bridging the Gap—Preference to freshmen. In 1959, the British physicist and novelist C.P. Snow delivered a lecture at Cambridge University in which he argued that "the intellectual life of the whole of western society is increasingly being split into two polar groups." In Snow's view, these groups, which can be characterized roughly as humanists and scientists, exist as separate cultures that have "almost ceased to communicate at all." Professors in Computer Science and English collaborate to examine the nature of this split, reflected at Stanford by the tendency to divide the campus community into "techies" and "fuzzies," and explore ways to bridge this cultural gap.

3 units (Roberts, Saldivar) not given 1999-2000

99H. Stanford Introductory Seminar: Programming and Problem Solving Seminar—Preference to freshmen. Students are given five problems to solve. Each involves programming, but programming is not sufficient to solve the problem (i.e., the approach to the problem is at least as important). Students experiment individually and as a group with techniques, and write a working program as a solution. Group discussions include general problem-solving approaches and concepts relevant to the problem at hand. Prerequisite: 106B or 106X.

3 units (Ullman) not given 1999-2000

99I. Stanford Introductory Seminar: Business on the Information Highways—Preference to freshmen. Understanding the capabilities of the Internet and its services. The effect on commerce, education, and healthcare. Technical and business alternatives. Who will be hurt and who will benefit from the changes occurring? The central project develops a Web publication.

3 units, Win (Wiederhold) alternate years, not given 2000-01

99J. Stanford Introductory Seminar: Computer Security in the Electronic Age—Preference to sophomores. Based on readings and discussions of current issues in computer security. Topics: the history of codes and ciphers and a summary of basic mathematics used in current cryptography; causes of computer vulnerabilities, including program errors, design flaws, and inherent network and browser limitations; policies and practices that restrict or monitor access to information.

3 units, Win (Mitchell)

99K. Stanford Introductory Seminar: Digital Actors—Preference to sophomores. Digital actors are an emerging field, with applications to video games, movies, simulation and training, manufacturing, and animated web pages. Introduces the computational techniques used to create and animate robotics, geometric computing, computer vision, and graphics. The problem of creating/animating digital actors, technical sub-problems. Prerequisite: knowledge of elementary geometry. Recommended: some programming experience.

2 units, Spr (Latombe)

99L. Stanford Introductory Seminar: How Are We to Know?—Preference to sophomores. The scientific method is a set of cultural practices that helps scientists construct, criticize, and refine theories about the universe in which we live. The question of whether analogous methods might be useful in helping construct, criticize, and refine everyday, non-scientific beliefs. Selections from the late philosopher of science, Sir Karl Popper, who counsels scientists to devote as much, if not more, effort to disproving their pet scientific hypotheses as they do trying to buttress them. The ways in which evidence for and against beliefs can be adduced. Discussions, presentations, and a term essay.

3 units, Win (Nilsson)


3 units, Aut (Boneh)

99N. Stanford Introductory Seminar: Ruler, Compass, and Computer—Computational Representations of Geometry—Preference to sophomores. Representations of geometry play an important role in computer science. Models of physical objects and processes, as used in computer graphics, computer vision, and robotics, use geometry as an essential component of representing shape, motion, and other physical modalities. The mathematical ideas behind commonly used representations and algorithms for geometric objects, focusing on intuitive understanding as opposed to formal development. Prerequisite: introductory computer science such as 106A, B or X. Recommended: general background knowledge in mathematics and physics.

2 units, Spr (Guibas)

99P. Stanford Introductory Seminar: Smart Computers and other Technological Opportunities—Preference to freshmen. How smart are computers now? How smart can we make them, and how soon, and what good will they be? Of the current "smart" things, how smart are they and what genuine benefits are offered? Outside of computers, what are the technological opportunities for humanity? To what extent is humanity in difficulty with natural resources? What significant threats are there to humanity?

3 units, Spr (McCarthy)

UNDERGRADUATE

103A. Discrete Mathematics for Computer Science—The fundamental mathematical foundations required for computer science. Topics: logic, relations, functions, basic set theory, proof techniques, combinatorics, recursion, and recurrence relations.

3 units, not given 1999-2000

103B. Discrete Structures—Continuation of 103A. Topics: analysis of algorithms, mathematical formulations of basic data models (linear models, trees, graphs, and sets), regular expressions, grammars. Corequisite: 106B or 106X.

3 units, not given 1999-2000

103X. Discrete Structures (Accelerated)—Covers the material in 103A and B in a single quarter. Students who take 103X feel comfortable with mathematical formalism.

4 units, Spr (Mitchell, Dill, Staff)

105. Introduction to Computers—For non-technical majors. Develops an understanding of what computers are and how they work. Practical experience in programming. Construction of computer programs and basic design techniques. A survey of Internet technology and the basics
of computer hardware. No previous knowledge of computer science is assumed. Students in technical fields and students looking to acquire programming skills should take 106A or 106X. Prerequisite: minimal math skills. GER:2b (DR:6)

*5 units, Aut (Roberts)
Win (Zelenski)
Spr (Staff)

106A. Programming Methodology—For students in technical disciplines; no prior experience is assumed. Broad introduction to the engineering of computer applications, emphasizing software engineering principles: design, decomposition, information hiding, procedural abstraction, testing, and reusable software components. Uses the programming language C and concentrates on the development of good programming style and on understanding the basic facilities provided by the language. Alternatives: 105, 106X. GER:2b (DR:6)

*5 units, Aut (Staff)
Win (Zelenski)
Spr (Staff)

106B. Programming Abstractions—Abstraction and its relation to programming. The software engineering principles of data abstraction, modules, certain fundamental data structures (e.g., stacks and queues), and data-directed design. Recursion and recursive data structures (linked lists and binary trees). Brief introduction to time and space complexity analysis. Prerequisite: 106A or consent of the instructor, based on prior exposure to ANSI C. GER:2b (DR:6)

*5 units, Aut (Plummer)
Win (Young)
Spr (Zelenski)

106X. Programming Methodology and Abstractions (Accelerated)—Covers most of the material in 106A,B. Students are expected to have previous programming experience at a level that allows them to understand the concepts presented in 106A, usually in a language other than C. First three weeks focus on understanding how the concepts are expressed in ANSI C. 106B material is covered for the balance. Students who complete 106A should enroll in 106B. 106X can be taken after 106A only with consent of instructor. GER:2b (DR:6)

*5 units, Aut (Plummer)
Win (Young)
Spr (Zelenski)

107. Programming Paradigms—Introduces a variety of programming language paradigms and their implementations. Topics: structure and implementation of compiled languages, basic concurrent programming, the functional paradigm, and the object-oriented paradigm. Substantial programming projects. Prerequisite: 106B or 106X.

*5 units, Aut, Spr (Cain)

108. Object-Oriented Systems Design—Software design and construction in the context of large OO libraries. May be taught in C++ or Java. Topics: review of OOP, the structure of Graphical User Interface (GUI) OOP libraries, GUI application design and construction, OOP software engineering strategies, approaches to programming in teams. Prerequisite: 107.

*4 units, Aut, Win (Parlante)

109. Introduction to Computer Science—The mathematical and theoretical foundations of computer science. Topics: logic, proof techniques, recursion and recurrence relations, analysis of algorithms, combinatorics, basic data models (sets, relations, linear models, trees and graphs), and introductory computer theory. Prerequisite: 106B or 106X. GER:2b (DR:6)

*4 units, Aut (Staff)
Win (Johnson)

110. Introduction to Computer Systems and Assembly Language Programming—Organization of digital computers, buses, registers, processors, I/O, memory systems, and paged memory. Data representation, data structures, and computer arithmetic. Instruction sets and execution; addressing modes. Assembly language programming, including subroutines, co-routines, interrupts, and traps. Operating systems issues and principles of storage management; combines general principles and practice in implementations. Prerequisite: 106B or 106X.

*4 units, Spr (Engler)

112. Computer Organization and Design—(Enroll in Electrical Engineering 182.)

4 units, Aut, Spr

121. Introduction to Artificial Intelligence—Students intending further work in AI should take 221. Introduction to the history, literature, and fundamental concepts of artificial intelligence (AI), from elementary reactive systems to increasingly complex artificial "agents." Topics: production systems, neural networks, genetic programming, computer vision, heuristic search, logic, knowledge representation and reasoning, Bayes networks, automatic planning, and multi-agent communication. Focuses on ideas rather than applications. Prerequisite: fundamental knowledge of computer science as covered in 109. Recommended: facility with differential calculus, vector algebra and probability theory. Only one of 121 or 221 counts towards CS degree requirements.

3 units, Aut (Nilsson)

137. Introduction to Scientific Computing—The fundamental issues of numerical computation for the mathematical, computational, and physical sciences, and engineering. Emphasis is from the perspective of the computer scientist. Use of numerical algorithms in engineering practice. Problems of accurately computing solutions in the presence of rounding errors and of computing discrete approximations of solutions which are defined on the continuum. The taxonomy of problem classes with methods for their solution and principles useful for analysis of performance and algorithmic development. Topics: error analysis, the solution of linear and nonlinear equations, interpolation and numerical differentiation, the approximation of integrals, and the solution of differential equations. Prerequisites: 106A; Mathematics 103 or 113 or equivalents.

*4 units, Win (Oiler)
Spr (Golub)

138. Matlab and Maple for Science and Engineering Applications—Introduction to use of Matlab and Maple in engineering applications. Emphasis is on the use of software to solve real problems. How the algorithms work, primarily so user may understand their possible limitations. How to use packages to solve a variety of introductory but important problems in: linear systems, eigenvalue problems, ordinary differential equations, elementary statistics, elementary signal processing (Fourier transforms, wavelets), computer algebra, graphical interfaces. Applications for the engineering and physical sciences. Prerequisites: undergraduate linear algebra and a willingness to program.

*4 units, Win (Moler)

140. Operating Systems and Systems Programming—The fundamentals of operating systems design and implementation. Basic structure; synchronization and communication mechanisms; implementation of processes, process management, scheduling, and protection; memory organization and management, including virtual memory; I/O device management, secondary storage, and file systems. Prerequisite: 108. Recommended: Electrical Engineering 182.

*4 units, Aut, Win (Engler)

143. Compilers—Principles and practices in the design of programming language compilers. Topics: lexical analysis; parsing theory (LL, LR, and LALR parsing); symbol tables; type checking; common representations for records, arrays, and pointers; runtime conventions for procedure calls; storage allocation for variables; and generation of unoptimized
Prerequisites: 107, 109.

Students construct simple compiler as programming project.

145. Introduction to Databases—Object-oriented, entity-relationship, relational data models, and approaches to database design. Relational, object-relational, and object-oriented query languages. SQL and ODMG standards. Algebraic query languages and some database theory. Integrity constraints and triggers; functional dependencies and normal forms. Database transactions and security from the application perspective. Designing a database for an application. Interactive and programmatic interfaces to database systems. Individual database application programming project with extensive use of SQL. Prerequisites: 107, 109.

147. Introduction to Human-Computer Interaction Design—Introduction to the concepts underlying the design of human-computer interaction: usability and affordances, direct manipulation, systematic design methods, user conceptual models and interface metaphors, design languages and genres, human cognitive and physical ergonomics, information and interactivity structures, design tools and environments. Structured around a set of case studies in which notable interface designs and/or projects are analyzed as illustrative of underlying principles. Students participate in discussions of cases and do weekly interface analysis and design exercises which do not require programming. 3-4 units, Aut (Johnson)

148. Introductory Computer Graphics—For undergraduates: M.S. students or students with a strong interest in continuing in graphics should take 248. Introduction to two- and three-dimensional computer graphics. Topics: fundamentals of input and display devices, scan conversion of geometric primitives, two- and three-dimensional transformations and clipping, windowing techniques, curves and curved surfaces, three-dimensional viewing and perspective, hidden surface removal, illumination and color models, OpenGL, VRML, and 3-D modeling tools. Emphasis is on the development of practical skills in using graphics libraries and tools. Programming on Macintosh using C, OpenGL, and VRML, with demos in SoftImage. Only one of 148 or 248 counts towards CS degree requirements. Prerequisites: 107, Mathematics 103.


157. Logic and Automated Reasoning Laboratory

1 unit


191. Senior Project—Restricted to Computer Science students. Group or individual projects under faculty direction. Register using the section number associated with the instructor. 1-6 units, any quarter (Staff)

191W. Writing Intensive Senior Project—Restricted to Computer Science students. Group or individual projects under faculty direction. Register using the section number of an Academic Council member. (WIM) 1-6 units, any quarter (Staff)

192. Programming Service Project—Restricted to Computer Science students. Appropriate academic credit (without financial support) is given for volunteer computer programming work of public benefit and educational value. 1-3 units, any quarter (Staff)

193. C++ and Object-Oriented Programming—C++ programming language and object-oriented programming paradigm. The major features of C++ 3.0 and the object design principles which apply generally in Object Oriented Languages. Intensive programming assignments. Prerequisites: knowledge of C and basic programming methodology as developed in 106B or 106X.

193D. C++ and Object-Oriented Programming—C++ programming language and object-oriented programming paradigm. The major features of C++ 3.0 and the object design principles which apply generally in Object Oriented Languages. Intensive programming assignments. Prerequisites: knowledge of C and basic programming methodology as developed in 106B or 106X.

193I. Internet Technologies—Survey of contemporary Internet technologies. Programmer-oriented survey of the authoring, distributing, and browsing technologies. The role, use, and implementation of current Internet tools. Topics: TCP/IP; namespace, connections, and protocols. Client/server structures. World Wide Web/HTTP/HTML techniques for text, images, links, and forms. Server side programming, CGI scripts. Dynamic content with Java. Security and privacy issues. Programming projects on client- and server-side projects. Some projects in C, but the emphasis is on Perl and Java. Understanding, exploiting, and extending Internet technologies. Prerequisites: programming fundamentals at the level of 106B or 106X, and UNIX at the level of 1U.

* May be taken for 3 units by graduate students
193J. Programming in Java—Hands-on experience. Topics: object-oriented
programming (classes, objects, messaging, inheritance), Java
language features (interfaces, exceptions, packages, concurrency, gar-
bage collection), use of the built-in packages (lang, util, io, networking,
awt), understanding applications and applets, security and verification,
Java implementation and the virtual machine. Intensive programming
assignments. Prerequisite: knowledge of C language and programming
experience at the level of 106B/X.
3 units, Aut (Zelenski)

193K. Advanced Java Applications—Tour of the advanced applica-
tions possible in Java. Possible topics: portable GUIs in Swing and
distributed applications with RMI, and the various supporting technolo-
gies (concurrency, reflection, and serialization). Prerequisite: mastery of
Java and/or 193J.
2 units, Spr (Parlante)

193L. Programming in LISP—Introduction to problem solving in the
LISP language, focusing on the functional programming paradigm.
Topics: recursion, list manipulation, mapping, functional arguments,
destructive processing, macros, I/O, Lisp implementation, environ-
ments, packages, efficiency, object-oriented programming, classes, and
methods. Term project. Prerequisite: 106B or 106X, or equivalent.
3 units, Win (Staff)

193U. Software Engineering in C—C programming language and the
UNIX/C programming environment. C programming language issues:
data types, control structures, pointers, dynamic memory allocation,
libraries, performance, bit operations, and the interface to the UNIX
shell. UNIX system programming issues: file system, processes, sig-
als, interprocess communication, and C interfaces to these capabilities.
Includes a significant programming project. Prerequisite: knowledge of
programming at the level of 106B, experience in a high-level language
other than BASIC and as a UNIX user.
3 units, Win (Staff)

193W. Microsoft Windows Programming—The fundamentals of pro-
gramming on the Microsoft Windows platform, focusing on the use of
Microsoft Foundation Class (MFC) framework. Other aspects of Win-
dows programming including Microsoft's COM and OLE object models
and the ODBC database interface. Requires a significant amount of
programming. Prerequisites: knowledge of C++ at the level of 108 or
193D.
3 units, Spr (Young)

194. Software Project—Student teams complete a significant program-
ming project through the phases of specification, coding, and testing
under faculty supervision. Lectures on software engineering methodol-
gies. Students provide written design specifications and user documen-
tation; and must demonstrate a prototype design and the final product.
Prerequisite: 108. (WIM)
3 units, Win, Spr (Plummer)

196. Microcomputer Consulting—Overview of computer consulting,
focusing on Macintosh and IBM-compatible systems. Topics: operating
systems, networks, troubleshooting, and consulting methodology. Bi-
weekly lectures emphasize on-campus computing environments. Stu-
dents work as consultants in campus computer clusters and in residences.
Prerequisite: 1C.
2 units, Aut (Brown)
Spr (Staff)

197. Mainframe and Workstation Computer Consulting—Computer
consulting in a workstation and server environment, focusing on the
UNIX operating system under the SUN, HP, and SGI hardware systems.
Topics: UNIX fundamentals, consulting tips, networking, and systems
administration. Students work as on-duty consultants at the Sweet Hall
and Terman computer clusters. Pre- or corequisite: 1U.
3 units, Win, Spr (Staff)

198. Teaching of Computer Science—Teach a small discussion section
of 106A while learning the fundamentals of teaching a programming
language at the introductory level. Two workshops/meeting weekly
on introductory material in general, 106 specifically, and teaching
techniques. Application and interview required; see the 198 coordinator
in CS for information. Prerequisite: 106B or 106X.
4 units, Aut, Win, Spr (Roberts, Ranganath, Chong)

199. Independent Work—Special study under faculty direction, usually
by leading to a written report. Letter grade given; if this is not appropri-
tate, enroll in 199P. Register using the section number associated with
the instructor.
any quarter (Staff)

199P. Independent Work—Like 199, but graded Satisfactory/No Credit.
any quarter (Staff)

UNDERGRADUATE AND GRADUATE

200. Undergraduate Colloquium—Strongly recommended for junior-
year CS majors as a way to build contacts with faculty. Weekly presen-
tations by faculty and people from industry informally describing their
views of computer science as a field and their experience as computer
scientists. (AU)
1 unit, Aut (Roberts)
Win (Staff)

201. Computers, Ethics, and Social Responsibility—Primarily for
majors entering computer-related fields. Analysis of the ethical and
social issues related to the development and use of computer technology.
Introduction to the relevant background in ethical theory, and the social,
political, and legal considerations. Analysis of scenarios in specific
problem areas: privacy, reliability and risks of complex systems, and the
responsibility of professionals for the applications and consequences of
their work. Prerequisite: 106B or 106X. (WIM)
*4 units, Spr (Johnson)

202. Law for Computer Science Professionals—Equips computer
science professionals with the information and framework to make law-
related decisions affecting their work, while remaining full participants
in design or development decision-making when these legal issues arise.
Problem-oriented. Topics: signing invention assignment and nondisclo-
sure agreements, protecting intellectual property, distinguishing be-
tween independent contractors and employees, and negotiating software
development and publishing agreements.
1 unit, Win (Heckman)

205. Mathematical Methods for Robotics and Vision—Overview of
some of the mathematical background necessary for research in robotics
and vision. Possible topics: geometric meaning of linear algebra con-
cepts; Singular Value Decomposition; Schur Decomposition; differen-
tial equations; dynamic systems and stochastic estimation (Kalman
filtering); vector and tensor calculus; calculus of variations. Prerequi-
sites: 106B or X; Mathematics 51 and 113; or equivalents.
3 units, Aut (Tomasi)

206. Applied Electronic Commerce—As the internet and wide-area
networks are increasingly used to conduct commerce, computer scien-
tists need to understand the nature of economic mechanisms, e.g.,
auctions, and devise the ways to implement them efficiently. Relevant
economic theories. Lab to design and implement a substantial applica-
tion in small groups. Prerequisites: sufficient mathematical maturity to
follow basic combinatorial and probabilistic arguments, and ability to
code in either C++ or Java.
3 units, Win (Shoham)
211. Logic Design—(Enroll in Electrical Engineering 275.)
3 units, Aut, Win

3 units, Aut, Win

221. Artificial Intelligence: Principles and Techniques—Broad technical introduction to core concepts and techniques in artificial intelligence. Topics: search, planning, knowledge representation, managing uncertainty, machine learning, neural networks, vision, robotics, natural language understanding, and intelligent architectures. Only one of 121 or 221 counts towards CS degree requirements. Prerequisites: 109, 157 or Philosophy 160A, and exposure to basic concepts in probability.

222. Knowledge Representation—Declarative knowledge representation methods in artificial intelligence. Topics: time and action, nonmonotonic logics, causality, inheritance and description logics, ontologies, contexts, knowledge reformulation, multiple views, abstraction, deduction vs. abduction, knowledge and other mental attitudes. Prerequisite: basic familiarity with logic. Recommended: prior exposure to artificial intelligence as in 121/221.

223A. Introduction to Robotics—Topics: manipulator kinematics and inverse kinematics; manipulator dynamics, motion, and force control; motion planning and robot programming. Recommended: knowledge of matrix algebra.
3 units, Win (Khatib)

223B. Introduction to Computer Vision—Fundamental issues and techniques of computer vision. Image formation, edge detection and image segmentation, stereo, motion, shape representation, recognition. Project or final. Prerequisite: 205 or equivalent.
3 units, Win (Tomasi)

224M. Multi-Agent Systems—Aimed at advanced undergraduate, master’s levels, and interested Ph.D. students. Various aspects of extending AI theories and techniques from the single-agent case to the multi-agent (MA) case. Topics: MA knowledge representation, planning, reasoning under uncertainty, learning, coordination mechanisms, and automated negotiation. Emphasis is on representation techniques and algorithms, the former drawn from logic, decision theory, and game theory. There are no programming assignments or textbooks on the topic. Prerequisites: knowledge of basic probability theory, first-order logic, and algorithms.
3 units, Spr (Shoham)

224N. Natural Language Processing—Develops in-depth understanding of the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages. Morphological, syntactic, and semantic processing from a linguistic and an algorithmic perspective. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models for acquisition, disambiguation, and parsing. Examination and construction of representative systems. Prerequisites: 121/221 or Linguistics 138/238, and programming experience. Recommended: basic familiarity with logic and probability.
3 units, Spr (Manning)

225A. Experimental Robotics—(Formerly 225.) Hands-on experience with robotic manipulation and navigation systems. Topics: kinematic and dynamic control of motion, compliant motion and force control, sensor-based collision avoidance, motion planning, assembly planning, task specifications, and robot-human interfaces. Limited enrollment. Prerequisite: 223A.
3 units, Spr (Khatib)

225B. Robot Programming Laboratory—(Formerly 224.) Hands-on introduction to the techniques of robot programming for robotics and non-robotics students. Series of guided exercises in which students program mobile robots to exhibit increasingly complex behavior (simple dead reckoning and reactivity, planning and map building, communication and cooperation). Topics: basics of motor control and sensor characteristics; sensor fusion, model construction, and robust estimation; control regimes (fuzzy control and potential fields); active perception; reactive planning architectures; various topics in sensor-based control, including vision-guided navigation. Student programmed robot contest. Programming is in C on Unix or Windows machines, done in teams. Prerequisites: 205 or equivalent, C programming ability.

226. Knowledge-Based Systems and Applications—Knowledge-based (expert) system technology is the most widely-used application technology to emerge from AI. Topics: basics of KBS and ES; tech transfer from research to industry; knowledge engineering, KB programming, knowledge acquisition methodology; evolution of the technology as applied to business and government problems, current and future impact. Case studies, readings. System building project possible. Some guest lectures.
3 units, Aut (Konolige)

227. Reasoning Methods in AI—Technical presentation of algorithmic techniques for problem solving in AI. Combines formal algorithmic analysis with description of recent applications. Topics: search and real-time search, constraint satisfaction, planning, robot motion planning, logical deduction, abstraction and approximation. Focus is on recent results. Prerequisites: familiarity with the basic notions in data structures and design and with techniques in design and analysis of algorithms. Recommended: previous or concurrent course in AI.
3 units, Spr (Nayak)

228. Reasoning under Uncertainty—Modeling (knowledge representation) languages suitable for dealing with an uncertain world, algorithms for reasoning and decision making using these representations, and learning these representations from data. Focus is on graphical modeling languages such as Bayesian belief networks, extensions to temporal modeling using hidden Markov models and dynamic Bayesian networks, and extensions to decision making using influence diagrams and Markov decision processes. Recent applications to domains (speech recognition, medical diagnosis, data mining, statistical text modeling, and robot motion planning). Prerequisites: understanding of basic concepts in probability theory and in design and analysis.
3 units, Win (Koller)

229. Machine Learning—Survey of major research areas in pattern recognition and machine learning. Topics: the foundations of statistical pattern recognition, parametric and non-parametric learning, decision trees, Bayesian and neural networks, reinforcement learning, genetic algorithms, computational learning theory. Focus is on the underlying concepts and the role of machine learning in AI and other disciplines. Representative systems. Prerequisites: 221 or consent of instructor, and ability to write computer programs in one or more commonly used languages.
3 units, Spr (Bregler)

237. Advanced Numerical Analysis—Three-quarter graduate sequence designed to acquaint students in mathematical and physical sciences and engineering with the fundamental theory of numerical analysis. Examples from applications.
3 units, Aut (Golub)

* May be taken for 3 units by graduate students.

3 units, Win (Oliger)


3 units, Spr (Wan)

238. Parallel Methods in Numerical Analysis—Recent developments in parallel computer technology have made it necessary to reformulate numerical algorithms to exploit the full potential of this technology. Emphasis is on the different techniques for obtaining maximum parallelism in various numerical algorithms, especially those occurring when solving matrix problems and partial differential equations, and the subsequent mapping onto the computer. Implementation issues on parallel computers. Topics: parallel architecture, programming models, matrix computations, FFT, fast multiple methods, domain decomposition, graph partitioning. Prerequisite: 237A or Mechanical Engineering 200A, or consent of instructor. Recommended: familiarity with differential equations, and experience in advanced programming language such as F90, C, C++.

3 units, Win (Alonso, Wan)

240. Advanced Topics in Operating Systems—Advanced study in OS topics and exposure to recent developments in OS research. Readings/lectures on classic and new papers. Topics: virtual memory management, synchronization and communication, file systems, protection and security, operating system extension techniques, fault tolerance, and the history and experience of systems programming. Prerequisite: 140 or equivalent.

3 units, Win, Spr (Baker)

242. Programming Languages—The basic elements of programming languages and programming paradigms: functional, imperative, and object-oriented. Introduction to formal semantic methods. Modern type systems, higher-order functions and closure, exceptions and continuations. Runtime support for different language features. Emphasis is on separating the different elements of programming languages and styles. First half uses Lisp and ML to illustrate concepts; second half a selection of object-oriented languages. Prerequisite: 107, or experience with Lisp, C and some object-oriented language.

3 units, Aut (Mitchell)

243. Advanced Compiling Techniques—The theoretical and practical aspects of building modern compilers. Topics: intermediate representations, basic blocks and flow-graphs, dataflow analysis, register allocation, global code optimizations, and interprocedural analysis. Prerequisite: 143 or equivalent.

*4 units, Win (Lam)

244A. Introduction to Computer Networks—The structure and components of computer networks; functions and services; packet switching; layered architectures; ISO’s Open Systems Interconnections (OSI) reference model; physical layer; data link layer; error checking; window flow control; media access control protocols used in local area networks (Ethernet, Token Ring, FDDI) and satellite networks; network layer (datagram service, virtual circuit service, routing, congestion control, IP); transport layer (UDP, TCP); session layer; applications.

3 units, Aut (enroll in Electrical Engineering 284)

Win (McKeown)

244B. Distributed Systems—Distributed operating systems and applications issues, emphasizing high-level protocols and distributed state sharing as the key technologies. Topics: distributed shared memory, object-oriented distributed system design, distributed directory services, atomic transactions and time synchronization, file access, process scheduling, process migration and remote procedure call focusing on distribution, scale, robustness in the face of failure, and security. Prerequisites: 240, 244A.

3 units, Spr (Cheriton)

244C. Distributed Systems Project—Companion project option for students taking 244B. Corequisite: 244B.

3-6 units, Spr (Cheriton)


3 units, Win (Garcia-Molina)

247A. Human-Computer Interaction: Interaction Design Studio—Intended as preparation for project-based courses, such as 377 and 447/ Mechanical Engineering 293. Systematic presentation and experience with the methods used in interaction design, including needs analysis, user observation, idea sketching, concept generation, scenario-building, storyboards, user character stereotypes, usability analysis, and market strategies. Prerequisite: 147 or Mechanical Engineering 101.

3-4 units, Win (Winograd)

247B. Contextual and Organizational Issues in Human-Computer Interaction—(For 1999-2000 only, enroll in Industrial Engineering 205.)

4 units, Spr (Hinds)

248. Introduction to Computer Graphics—The fundamentals of input, display, and hardcopy devices, scan conversion of geometric primitives, 2D and 3D geometric transformations, clipping and windowing, scene modeling and animation, algorithms for visible surface determination, introduction to local and global shading models, color, and photorealistic image synthesis. Written assignments and programming projects. Only one of 148 or 248 counts towards CS degree requirements. Prerequisites: 108, Mathematics 103.

*4 units, Aut (Levoy)

249. Object-Oriented Programming from a Modeling and Simulation Perspective—Object-oriented programming techniques and issues, emphasizing programming as modeling and simulation. Topics: large-scale software development approaches, encapsulation, use of inheritance and dynamic dispatch, design of interfaces and interface/implementation separation, exception handling, design patterns, minimizing dependencies and value-oriented programming. The role of programming conventions/style/restrictions in surviving object-oriented programming for class libraries, frameworks, and programming-in-the-large; general techniques for object-oriented programming. Prerequisites: knowledge of C and basic programming methodology as developed in 106B or 106X; 107; basic knowledge of C++ (may be taken concurrently). Recommended: 193D.

3-5 units, Win (Cheriton)

255. Introduction to Cryptography and Computer Security—Intended for advanced undergraduates and graduate students. Introduction to the basic theory and practice of cryptographic techniques used in computer security. Topics: encryption (single and double-key), digital signatures, pseudo-random bit generation, authentication, electronic commerce (anonymous cash, micropayments), key management, zero-knowledge protocols. Prerequisite: basic understanding of probability theory.

3 units, Win (Boneh)

3 units, Win (Manna)

256L. Formal Methods for Concurrent and Reactive Systems Laboratory
2 units, Win (Manna)

257. Automated Deduction and its Applications—Proving theorems and extracting information from proofs. Uses in software engineering (program specification, synthesis, and verification) and artificial intelligence (commonsense and robotic planning, natural-language understanding). The foundations of logic programming. Deductive tableaux, nonclausal resolution, skolemization, building theories into unification and inference rules, term rewriting, inductive theorem proving. The design of theorem provers. Prerequisite: 157.

3 units (Staff) not given 1999-2000

258. Introduction to Programming Language Theory—Syntactic, operational, and semantic issues in the mathematical analysis of programming languages. Type systems and non-context-free syntax. Universal algebra and algebraic data types. Operational semantics given by rewrite rules; confluence and termination. Scott-semantics for languages with higher-type functions and recursion. Treatment of side-effects. Prerequisites: 154, 157 or Philosophy 160A.

3 units, Win (Mitchell)


3 units (Staff)


3 units, Win (Plotkin)

270A. Introduction to Medical Informatics: Fundamental Methods—(Same as Medical Information Sciences 210A.) Issues in the modeling, design, and implementation of computational systems for use in biomedicine. Topics: controlled terminologies in medicine and biological science, ontologies, fundamental algorithms, basic knowledge representation, information dissemination and retrieval. Emphasis is on the principles of modeling data and knowledge in biomedicine and on the translation of resulting models into useful automated systems.

3 units, Aut (Mussen, Altman)

270B. Introduction to Medical Informatics: Systems and Requirements—(Same as Medical Information Sciences 210B.) Survey of the major application areas in medical informatics, including clinical information systems, imaging systems, bioinformatics, public policy, decision support, and signal processing. Emphasis is on the system requirements, relevant data, algorithms, and implementation issues in each area. Prerequisite: 270A.

3 units, Win (Shortliffe, Shahar, Dev)

271. Decision-Making Methods for Biomedicine—(Same as Medical Information Sciences 211.) For undergraduates or graduate students, building on concepts introduced in 270B. Intermediate biomedical decision making and survey of the methods for the implementation of such concepts in computer-based decision-support tools. Emphasis is on Bayesian statistics, decision analysis, cost-benefit analysis, neural networks, artificial intelligence/expert systems, belief networks, influence diagrams, and the synergies among such approaches. Prerequisites: 270B and at least one programming course.

3 units, Spr (Higgins, Garber, Owens, Sanders, Shortliffe)

272. Medical Informatics Project Course—(Same as Medical Information Sciences 212.) For students who have completed 270A, 270B, 271 or 274, and who wish to implement those ideas in a computer program. Students may take 274 concurrently and complete a project that is coordinated between the two courses. Prerequisites: programming experience, 270B.

3 units, Spr (Koza, Shahar)

274. Representations and Algorithms for Computational Molecular Biology—(Same as Medical Information Sciences 214.) Introduction to basic computational issues and methods used in bioinformatics, including access and use of biological data sources on the Internet. Topics: basic algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, computing with networks of genes, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of diverse data sources, knowledge representation and controlled terminologies for molecular biology, graphical display of biological data, genetic algorithms and genetic programming applied to biological problems. See instructor for unit options. Prerequisites: programming skills and understanding of matrix algebra.

1-4 units, Spr (Alman, Koza)

275A. Musical Information: An Introduction—(Enroll in Music 253.)

1-4 units, Win (Selfridge-Field)

275B. Seminar: Music Representation and Computer Analysis—(Enroll in Music 254.)

1-4 units, Spr (Selfridge-Field)

298. Seminar on Teaching Introductory Computer Science—Opportunity for faculty and undergraduate and graduate students who are interested in teaching to discuss specific topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor.

1-3 units, Aut (Roberts)

PRIMARILY FOR GRADUATE STUDENTS

300. Departmental Lecture Series—For first-year Computer Science Ph.D. students. Presentations by members of the department faculty, each describing informally his or her current research interests and views of computer science as a whole. (AU)

1 unit, Aut (Staff)

309. Industrial Lectureships in Computer Science—The department invites an outstanding computer scientist to give a course in his/her specialty. Lecturers and topics change yearly; courses may be taken repeatedly. See Time Schedule for offerings.

3 units

312. Processor Design—(Enroll in Electrical Engineering 382.)

3 units, not given 1999-2000

315A. Parallel Computer Architecture and Programming—The principles and tradeoffs in the design of parallel architectures. Emphasis is on naming, latency, bandwidth, and synchronization in parallel ma-
chines. Case studies on shared-memory, message-passing, dataflow, and data-parallel machines illustrate techniques. Architectural studies and lectures on techniques for programming parallel computers. Programming assignments on one or more commercial multiprocessors. Prerequisites: Electrical Engineering 282, and reasonable programming experience.

3 units, Spr (Hamdi)

315B. Parallel Programming Project—Continuation of 315A. A significant parallel programming project is required using shared-memory, message-passing, or data-parallel machines. Lectures on parallel programming languages and their implementation, performance debugging of parallel programs, parallel data structures and algorithms. Prerequisite: 315A or consent of instructor.

3 units (Staff) not given 1999-2000

316A. Logic Synthesis of VLSI Circuits—(Enroll in Electrical Engineering 318.)

3 units, Win

316B. Computer-Aided System Design Laboratory—(Enroll in Electrical Engineering 319.)

3 units, Spr


3 units, alternate years, given 2000-01

318. Testing Aspects of Computer Systems—(Enroll in Electrical Engineering 488.)

3 units, Spr

319. Topics in Digital Systems—Advanced material is often taught for the first time as a “topics” course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for topics currently being offered.

by arrangement

320. Interactivity, Narrative, and Artificial Intelligence—Theory of and approaches to interactive narrative systems, especially those that incorporate artificial intelligence techniques. Invited lecturers, discussion readings, critical review of CD ROM titles and other implemented systems. Students create prototypes of AI-based interactive story systems.

2 units (Hayes-Roth, Friedlander) not given 1999-2000

323. Common Sense Reasoning in Logic—Formalizing common sense knowledge and reasoning using situation calculus with nonmonotonic logics, especially circumscription. Variations of situation calculus. Formalizing context. Formalizing facts about knowledge. Prerequisite: basic knowledge of logic such as 157, or Philosophy 160A.

3 units, Aut (McCarthy)

326A. Motion Planning—For students interested in computer graphics, geometrical computing, robotics, and/or artificial intelligence. Computing object motions is central to many application domains (e.g., design, manufacturing, robotics, animated graphics, medical surgery, drug design). Basic path planning methods generate collision-free paths among static obstacles. Extensions include uncertainty, mobile obstacles, manipulating movable objects, and maneuvering with kinematic constraints. Configuration space is a unifying concept, geometric arrangements are a basic combinatorial structure. Theoretical methods with applications in various domains: assembly planning, radiosurgery, graphic animation of human figures.

3 units, Win (Latombe)

327A. Numerical Linear Algebra—First in a three-quarter graduate sequence designed to acquaint students in mathematical and physical sciences and engineering with the fundamental theory of numerical analysis. Solution of systems of linear equations: direct methods, error analysis, structured matrices; iterative methods and least squares. Parallel techniques. Prerequisites: 106A, 137, Mathematics 103 or 113.

3 units, Aut (Golub)

328. Topics in Computer Vision—Fundamental issues of, and mathematical models for, computer vision. Sample topics: camera calibration, texture, stereo, motion, shape representation, image retrieval, experimental techniques. Student papers and project. Prerequisites: 205, 223B, or equivalents.

3 units (Tomasi) alternate years, given 2000-01

329. Topics in Artificial Intelligence—(For 1999-2000, enroll in Psychology 224.) Advanced material is often taught for the first time as a “topics” course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number.

1-3 units, Spr


3 units (Golub) not given 1999-2000

337. Numerical Methods for Initial Boundary Value Problems—Initial boundary value problems are solved in different areas of engineering and science modeling phenomena, e.g., wave propagation and vibration, fluid flow, etc. Numerical techniques for such simulations are discussed in the context of applications. Emphasis is on stability and convergence theory for methods for hyperbolic and parabolic initial boundary value problems, and the development of efficient methods for these problems.

3 units, Spr (Oliger)

339. Topics in Numerical Analysis—Advanced material is often taught for the first time as a “topics” course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for current topics.

3 units, alternate years, given 2000-01

341. Advanced Topics in Data Communication—Readings/discussion are combined with topical lectures to familiarize students with a core of classic and new papers in the field of data networking. Emphasis is on understanding and applying existing work to new problems in the field, especially high-speed networking. Topics: network theory (the end-to-end argument), transport protocol performance (header prediction, checksum efficiency), cell relay (e.g., ATM and SONET), congestion control (Parekh’s thesis, leaky bucket, fair queuing) and high-speed switching (input vs. output queuing, crossbars and banyans). Prerequisite: 244A.

3 units (Partridge) not given 1999-2000

342. Programming Language Design—Problems of programming language design and comparison of traditional solutions. Possible topics: formal semantics, implementation considerations, extensibility, very high level languages, evaluation of language designs, the innovative features of a variety of modern programming languages. Prerequisites: 242, 243.

3 units (Mitchell) not given 1999-2000

343. Topics in Compilers—Advanced topics in compilers. Topics change every quarter; course may be taken repeatedly for credit. Prerequisite: 243.

3 units, Spr (Lam)

344. Projects in Computer Networks—For students with a strong interest in computer networks from novel applications to physical layer coding schemes; software to hardware; theory to design-and-build.
345. Advanced Topics in Database System—Advanced topics in the area of database and information systems. Content differs in each offering; may be taken multiple times for credit. Prerequisite: 145.
3 units, Spr (Ullman)

346. Database System Implementation—A major database system implementation project realizes the principles and techniques covered in earlier courses. Students independently build a complete database management system, from file structures through query processing, with a personally designed feature or extension. Lectures on project details and advanced techniques in database system implementation, focusing on query processing and optimization. Guest speakers from industry on commercial DBMS implementation techniques. Prerequisites: 145, 245. Recommended: programming experience in C++.
*5 units, Win (Widom)

347. Transaction Processing and Distributed Databases—The principles and system organization of distributed databases. Data fragmentation and distribution, distributed database design, query processing and optimization, distributed concurrency control, reliability and commit protocols, and replicated data management. Distributed algorithms for data management: clocks, deadlock detection, and mutual exclusion. Heterogeneous and federated distributed database systems. Overview of commercial systems and research prototypes. Prerequisites: 145, 245.
3 units, Spr (Garcia-Molina)

*4 units, Staff

348B. Computer Graphics: Image Synthesis Techniques—Intermediate level, emphasizing sampling, shading, and display aspects of computer graphics. Topics: local and global illumination methods including radiosity and distributed ray tracing, texture generation and rendering, volume rendering, strategies for anti-aliasing and photo-realism, human vision and color science as they relate to computer displays, and high-performance architectures for graphics. Written assignments and programming projects. Prerequisite: 248 or equivalent. Recommended: exposure to Fourier analysis or digital signal processing.
*4 units, Win (Harrarahan)

348D. Vision and Image Processing—(Enroll in Psychology 267.)
1-3 units (Heeger) alternate years, given 2000-01

349. Topics in Programming Systems—(Enroll in Electrical Engineering 392N.) Advanced material is often taught for the first time as a "topics" course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for topics currently being offered.
3 units, Spr (Prabhakar)

* May be taken for 3 units by graduate students.

351. Topics in Complexity Theory and Lower Bounds—Focus is on one of: basic machine models and complexity measures—their properties and relationships, complexity classes and their properties, reductions and complete problems, concrete representative problems from important complexity classes. Techniques for establishing limits on the possible efficiency of algorithms, and concrete lower bounds based on the following models of computation: decision trees, straight line programs, communication games, branching programs, PRAMs, boolean circuits. Approximation algorithms and the complexity of approximations. Pseudo-randomness and cryptography. Prerequisite: 154, or equivalent.
3 units (Motwani) alternate years, given 2000-01

3 units (Pratt) not given 1999-2000

3 units, Aut (Pratt)

354. Probabilistic Reasoning in Computing—The basics of (Bayesian) probability theory as applied to computing and intelligence systems. Emphasis is on working through applications and understanding relevant theory. Relevant probability theory and techniques: interpretations, graphical and network models, information theory, decision theory, inference, and “alternative” approaches. Probabilistic aspects of computational problems in learning, search, data analysis, neural, and dynamic systems. Some topics by guest lecturers. Prerequisites: 106B or X, 221, a knowledge of basic statistical measures as in Psychology 60, and basic math.
3 units, Staff

355. Advanced Topics in Cryptography—For graduate students. Topics: pseudo-random generation, zero knowledge protocols, elliptic curve systems, threshold cryptography, security analysis using random oracles, lower and upper bounds on factoring and discrete log. Prerequisite: 255.
3 units, Spr (Boneh)

3 units, Win (Dill)

357. Topics in Formal Methods—Formal methods for the specification, verification, analysis, and systematic development of real-time and

3-5 units, Spr (Manna)

358. Topics in Programming Language Theory—Possible topics of current research interest in the mathematical analysis of programming languages: structured operational semantics, domain theory, semantics of concurrency, rich type disciplines, problems of representation independence, and full abstraction. May be repeated for credit. Prerequisites: 154, 157, 258, or equivalents.

3 units (Mitchell) not given 1999-2000

359. Topics in Theory of Computation—Advanced material is often taught for the first time as a "topics" course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for topics currently being offered.

361A. Advanced Algorithms—Advanced data structures: union-find, self-adjusting data structures and amortized analysis, dynamic trees, Fibonacci heaps, universal hash function and sparse hash tables, persistent data structures. Advanced combinatorial algorithms: algebraic (matrix and polynomial) algorithms, number theoretic algorithms, group theoretic algorithms and graph isomorphism, on-line algorithms and competitive analysis, strings and pattern matching, heuristic and probabilistic analysis (TSP, satisfiability, cliques, colorings), local search algorithms. Prerequisite: 161 or 261, or equivalents.

3 units, Aut (Motwani) alternate years, not given 2000-01


3 units (Plotkin) alternate years, given 2000-01

365. Randomized Algorithms—Design and analysis of algorithms that use randomness to guide their computations. Basic tools, from probabilistic theory and probabilistic analysis, that are recurrent in algorithmic applications. Randomized complexity theory and game-theoretic techniques. Algorithms techniques. Probability amplification and derandomization. Applications: sorting and searching, data structures, combinatorial optimization and graph algorithms, geometric algorithms and linear programming, approximation and counting problems, parallel and distributed algorithms, on-line algorithms, number-theoretic algorithms. Prerequisites: 161 or 261, Statistics 116, or equivalents.

3 units (Motwani) alternate years, given 2000-01

367A. Parallel Computation—Introduction to theoretical issues in parallel computation. Properties of parallel computation models and algorithm design techniques specific to each model, including systolic arrays, mesh-connected computers, hypercube-related networks, and PRAM. Topics: algorithms for sorting, connected components, shortest paths, and other basic problems. Upper and lower bounds for randomized and deterministic routing on hypercube and related networks. Techniques for reducing the processor-time product for PRAM algorithms.

3 units (Plotkin)


3 units (Plotkin)

368. Geometric Algorithms—Graduate-level introduction to the basic techniques used in the design and analysis of efficient geometric algorithms including: convexity, triangulation, sweeping, partitioning, and point location. Voronoi and Delaunay diagrams. Intersection and visibility problems. Recent developments using random sampling methods. Emphasizes data structures of general usefulness in geometric computing and the conceptual primitives appropriate for manipulating them. Impact of numerical issues in geometric computation. Applications to motion planning, visibility preprocessing, model-based recognition, and GIS. Prerequisite: 161.

3 units, Spr (Guibas)

369. Topics in Analysis of Algorithms—Advanced material is often taught for the first time as a "topics" course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for topics currently being offered.

3 units (Plotkin)

377. Topics in Human-Computer Interaction—Topics of current research interest in human-computer interaction. Contents change each quarter. May be repeated for credit.

3-4 units


3-4 units, Win (Winograd)

379. Interdisciplinary Topics—Advanced material that relates computer science to other disciplines is often taught for the first time as a "topics" course, perhaps by a faculty member visiting from another institution. Students may therefore enroll repeatedly in a course with this number. See Time Schedule for topics being currently offered.

by arrangement

390A, B, C. Curricular Practical Training—Provides educational opportunities in high-technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-on projects they expect to perform. Meets the requirements for Curricular Practical Training for students on F-1 visas. 390 A, B and C may each be taken only once.

1 unit, any quarter (Motwani)

393. Computer Laboratory—For CS graduate students. A substantial computer program is designed and implemented; written report required. Recommended as a preparation for dissertation research. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

any quarter (Staff)

394. Business Management for Computer Scientists and Electrical Engineers—Focus is on the functional areas necessary for making successful business decisions. Topics: corporate strategy, new product development, marketing, sales, distribution, customer service, and financial accounting. How to identify and analyze issues in each of these
area in a rapidly changing world. A framework and tool set is developed for formulating, evaluating, and recommending action from the general manager point of view and for communicating and defending ideas in a team environment. Required study groups. Written case assignments. Enrollment limited to 60. See http://www-leland.stanford.edu/class/cs394/. Prerequisite: graduate student in Computer Science or Electrical Engineering.

3-4 units (Gibbons, Liddle) not given 1999-2000

395. Independent Database Project—For graduate students in Computer Science. Use of database management or file systems for a substantial application or implementation of components of database management system. Written analysis and evaluation required. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

any quarter (Staff)

399. Independent Project

1-9 units, any quarter (Staff)

399P. Independent Project—Graded satisfactory/no credit.

1-9 units any quarter (Staff)

EXPERIMENTAL

409. Category Theory and Formal Software Development—Introduction to category theory in the context of formal methods of software engineering. Focus is on construction via the composition of large formal specifications, and refinement of specifications into efficient code. The foundations for specification composition and refinement are provided by categorical concepts, e.g., colimits and sheaves. Topics: application-specific domain theories, formal requirement specifications, representation and use of programming knowledge, software architectures, algorithm and data structure design, program optimization techniques, datatype refinement, code generation, and system support.

3 units, Spr (Smith, Green) alternate years, not given 2000-01

426. Genetic Algorithms and Genetic Programming—The genetic algorithm is a domain-independent algorithm for search, optimization, and machine learning patterned after Darwinian natural selection and naturally occurring genetic operators such as recombination, mutation, gene duplication, gene deletion, gene regulation, and embryonic development. Genetic programming is a domain-independent automatic programming technique that extends the genetic algorithm to the breeding of populations of computer programs. Topics: introduction to genetic algorithms and genetic programming; mathematical basis for genetic algorithms; implementation on parallel computers and field-programmable gate arrays; evolution of machine language programs; applications to problems of system identification, control, classification, analysis of genome and protein sequences, and automatic synthesis of the design of topology, sizing, placement, and routing of analog electrical circuits.

3 units, Win (Koza)

444A. Software Development for Critical Applications—Introduction to current methods for developing safety-critical software (e.g., fly-by-wire avionics); and mission-critical software (e.g., Internet commerce). Topics: basic terminology, failure and fault taxonomies, hazard analysis techniques, failure mode analysis, fault tree analysis, software standards, formal methods, testing requirements, fault tolerance, probabilistic models, and engineering techniques for critical systems from embedded systems to large-scale Internet applications. Students apply analysis techniques to example systems, use tools for specification, and implement example algorithms and applications.

3 units, Aut (Dill, Fox)

446. Tools and Processes for Software—The fundamental concepts of software engineering: life-cycle models (waterfall, spiral, etc.), project and software metrics, quality assurance, software reuse. The development process: business process modeling, requirements engineering, analysis, design, implementation, testing, maintenance. Introduction to modeling techniques (UML and design patterns). Research challenges, with reviews of ongoing research by faculty and outside speakers on such topics as specification validation and software composition. Readings and modeling exercises. Focus throughout is on large-scale software development as seen in industry. Part of class (UML, software development process) may be taken for one unit. Prerequisites: prior software experience; graduate standing or consent of instructor.

1-3 units, Aut (Wiederhold, Beringer)

447. Interdisciplinary Interaction Design—(Same as Mechanical Engineering 293.) Small teams develop innovative technology prototypes that combine product and interaction design. Focus is on software and hardware interfaces, interaction, design aesthetics, and some underpinnings of successful design: a reflective, interactive design process, group dynamics of effective interdisciplinary teamwork, and working with users. Prerequisite: 247A.

3-4 units, Spr (Winograd, Kelley)

448. Topics in Computer Graphics—In-depth study of an active research topic in computer graphics. Topic changes each quarter. Previous topics: exotic input and display technologies, modeling of natural phenomena, digital film making, media technologies for graphics and graphics architectures. Readings from literature and a project. May be taken repeated for credit. Prerequisite: 248 or consent of instructor.

3 units, Win (Guibas)

Spr (Hanrahan)

448A. Interactive Workplaces

3 units, Aut (Hanrahan)

448B. Motion Study: An Introduction to Animation, Cartoon Physics, and Funny Walks—Preference to CS students with a graphics or animation specialization, and Art students from the Digital Arts program. Hands-on animation, providing a foundation for future work in computer graphics, animation, and robotics. The techniques, tools and methods used by traditional animators. Animation techniques, timing, spacing, weight, lip-synch, and visual design. The differences between physics and cartoon physics. Walks and what makes a walk believable; looking at walks, analyzing them, and creating an effective and expressive animated walk. Enrollment limited to 15.

3 units, Aut (Loeb)

468. Topics in Geometric Algorithms—Advanced seminar covering different topics related to geometric computing. Recent offerings: shape matching, proximity and nearest-neighbor problems, visibility and motion planning, and collision detection. Readings from the literature and a presentation or a project required. May be taken multiple times for credit. Prerequisite: 368, or consent of instructor.

2 units, Aut (Guibas)

Win, Spr (Staff)

499. Advanced Reading and Research—For CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

any quarter (Staff)

GRADUATE SEMINARS

510. Digital Systems Reliability Seminar—(Enroll in Electrical Engineering 385A.)

1-4 units, Aut, Win, Spr, Sum

523. Readings in Artificial Intelligence—Primarily for students planning to take the AI qualifying exam. A series of lectures and discussions on readings in all areas of artificial intelligence research. Prerequisite: 221.

3 units, Win (Staff)

525. Seminar on Knowledge Acquisition for Expert Systems—(Enroll in Medical Information Sciences 230.)

2 units, given 2000-01
528. Graphics/Geometry/Vision/Robotics Seminar—Weekly series of informal research talks on topics related to perceiving, modeling, manipulating, and displaying the physical world. The computational models and numerical methods underlying these topics. Brings together faculty and students in these five closely related areas. (AU)
1 unit, Aut, Win, Spr (Staff)

530. Applied Mathematics/Scientific Computing Seminar
1 unit, Aut, Win, Spr (Staff)

I unit, Aut, Win, Spr (Golub)

540. Seminar on Computer Systems—(Enroll in Electrical Engineering 380.)
1 unit, Aut, Win, Spr

544. Mobile Computing Seminar—Weekly readings, discussions, and presentations on current research in mobile and wireless computing. Invited speakers from Stanford and elsewhere lecture on topics of current interest. Prerequisites: 240, 244B. (AU)
1-2 units (Baker)

545. Database Research Seminar—Presentations of current research and industrial innovation in information systems, sponsored by Infolab faculty. Topics: fundamental database technology, knowledge-based processing and advanced applications. Interaction with speakers. (AU)
1 unit, Aut, Spr (Staff)

5451. Advanced Image Databases Seminar—Reading/demonstrations/analysis devoted to image and video databases as created by photographic, medical, and commercial sources. Emphasis is on combining image-derived and textual descriptors to retrieve on-line images. Issues: data structures and indexing schemes for real-time interaction, high-dimensional feature vectors for fast retrieval, metrics of closeness between query and stored vectors. Presentations by commercial and research image retrieval organizations illustrate the strengths and weaknesses of specific techniques. May be combined with a 395 project. (AU)
1 unit, Win (Firschein, Wiederhold)

547. Human-Computer Interaction Seminar—Weekly speakers on topics related to human-computer interaction design. (AU)
1 unit, Aut, Win, Spr (Winograd)

548. Distributed Systems Research Seminar—Recent research in distributed systems, computer communications, parallel machines, parallel programming, and distributed applications. Invited speakers from Stanford and elsewhere present topics and results of current interest. (AU)
1 unit, Spr (Cheriton)

559. Seminar on Mathematical Theory of Computation—Possible topics (vary each year): logic and its relation to computation, programming language analysis and design, specification and verification of software and hardware systems, theories of concurrency, approaches to static analysis and program state. Emphasizes presentation of recent results and summaries of articles from the current literature. (AU)
1 unit, by arrangement (Mitchell)

579. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions.

Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.
1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

ELECTRICAL ENGINEERING

Chair: James D. Plummer
Vice Chair: Robert M. Gray
Associate Chair (Admissions): Antony Fraser-Smith
Assistant Chair: Sharon A. Gerlach
Associate Professors: John T. Gill III, Gregory T. A. Kovacs, Marc S. Levoy, Bruce B. Lusignan, Teresa H. Y. Meng, Dwight G. Nishimura, Jennifer Widom*, Howard A. Zebker
Assistant Professors: Mary G. Baker, Dan Bonch, Dawson Engler, Andrea J. Goldsmith, Thomas H. Lee, Nicholas McKeown, Yoku Kunima J. Paulraj, Piero A. Pianetta, Calvin F. Quate
Associate Professors: Nicholas Bambos, David L. Dill, Per Enge, David Heeger, Monica Lam, Sandy Napei, Norbert Pelle, Zhi-Xun Shen, Julius Smith
Assistant Professors: Stacey Bent, Peter Fitzgerald, Armando Fox, Mendel Rosenblum, Daniel Spielman, Claire Tomlin, Benjamin Van Roy
Professor (Teaching): Gilbert Masters
Lecturers: Tamarah Ahrens, Dennis Allison, Dieter Scherzer, Howard Swain, John Wharton
Acting Assistant Professor: Glen Solomon
Acting Assistant Professor (Research): David Bloom
Consulting Professors: Carl Berglund, Elizabeth Cohen, Abbas Emami-Naeini, Timothy Groves, Dale Harris, Masahiro Kawahata, Else Kooi, John Koza, David Leeson, Mark McCord, Dan Meisburger, Roger D. Melen, Madhulika Narasimha, Yoshio Nishi, Kurt Petersen, Donald Scharfetter, Arden Sher, David Stork, John Wakerly, Martin Wainwright
Consulting Associate Professors: Richard Dasher, Yi-Ching Pao, David Stork, Noel P. Thompson
Consulting Assistant Professors: Yucei Altunbasak, David Burns, Isaac Chuang, Syad Ma, Nadim Maluf, Steven Minne, Mehrdad Moslehi, M. Allen Northrup, Stuart Oberman, David Su, Vivek Subramanian, Andrew Wolfe
UNDERGRADUATE PROGRAMS

To specialize in Electrical Engineering (EE), undergraduate students should follow the depth sequence given in the discussion of undergraduate programs in the “School of Engineering” section of this bulletin. Majors must receive at least a 2.0 grade point average (GPA) in courses taken for the EE depth requirement.

For information about an EE minor, see the “School of Engineering” section of this bulletin.

A Stanford undergraduate may work simultaneously toward the B.S. and M.S. degrees. See the “School of Engineering” coterminal section of this bulletin.

GRADUATE PROGRAMS

University regulations governing the M.S., Engineer, and Ph.D. degrees are described in the “Graduate Degrees” section of this bulletin.

The profession of electrical engineering demands a strong foundation in physical science and mathematics, a broad knowledge of engineering techniques, and an understanding of the relation between technology and man. Curricula at Stanford are planned to offer the breadth of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, four years of undergraduate study and at least one year of postgraduate study are recommended. For those who plan to work in highly technical development or fundamental research, additional graduate study is desirable.

A one-year program of graduate study in electrical engineering may lead to the degree of Master of Science. A two-year program, offering a wider selection of engineering course work, more opportunity for study in the related fields of engineering, mathematics, and physics, and in particular, more independent work and individual guidance, may lead to the degree of Engineer.

The degree of Doctor of Philosophy is offered under the general regulations of the University. The doctoral program, requiring a minimum of three years (nine quarters) of graduate study, should be considered by those with the ability and desire to make a life work of research or teaching.

Application for Admission—Applications for admission with graduate standing in Electrical Engineering (EE) can be completed electronically at http://www.stanford.edu/dept/registrar/admissions/applyinfo.html#electronic, or printed application may be obtained by writing to Graduate Admissions, the Registrar’s Office, Old Union, Stanford, CA 94305 or by calling (650) 723-4291. Applications are submitted to and reviewed by the Department of Electrical Engineering, Graduate Admissions Office, 350 Serra Mall, Stanford University, Stanford, CA 94305-9505. Applications for full time study are considered for the Autumn Quarter only. The application deadline is December 15.

Applicants who have not yet earned the equivalent of an M.S. degree should apply for admission to study first toward the master’s degree, indicating any intention of later working toward a more advanced degree. Admission for either the Engineer or Ph.D. degree is normally approved: to students who have completed a master’s degree. In addition, can- didates to the Ph.D. or Engineer degree also require that the department's Committee on Graduate Admissions identify a tentative faculty research supervisor.

MASTER OF SCIENCE

Modern electrical engineering is a broad and diverse field, and graduate education in this department may satisfy a variety of objectives. Students with undergraduate degrees in physics, mathematics, or related sciences, as well as in various branches of engineering, are invited to apply for admission. They will ordinarily be able to complete the master’s degree in one calendar year. Students with undergraduate degrees in other fields may also be admitted for graduate study (see below). The master’s degree program may provide advanced education in electrical engineering, technology, and an understanding of the relation between technology and man. The faculty does not prescribe specific courses to be taken. Each student, with the help of a program adviser, prepares an individual program and submits it to the faculty for approval. The master’s program proposal must be submitted to the department office during the first quarter of study; modifications may be made later. Detailed requirements and instructions are in the Handbook for Graduate Students in Electrical Engineering at Stanford University. (http://ee.stanford.edu/ee/GradHandbook/html/GradHandbook.html).

Programs of at least 45 quarter units that meet the following guidelines are normally approved:

1. A sequence of three or more graded electrical engineering courses numbered above 200, to provide breadth in one area. The student must maintain an average 3.0 grade point average (GPA) or better in both the depth area and overall.

2. At least one EE course numbered above 200 in each of three additional course areas, outside of the area selected under item 1 to provide breadth.

3. Enough additional units of electrical engineering courses so that items 1 through 3 total at least 21 units of graded EE courses numbered above 200, including at least 9 units of such courses numbered in the 300s or 400s. Some 600- or 700-level summer courses may also be considered for inclusion in the M.S. program.

4. Additional course work to bring the total to 45 or more quarter units, including:
   a) at least 36 graded units
   b) at least 36 units at or above the 100 level
   c) at least 30 units in technical areas such as engineering, mathematics, and science; thesis and Special Studies units cannot be included among these 30 units

5. At least three quarters of EE seminars, including 201 in Autumn Quarter. In case of time conflicts, tapes of these classes can be viewed in the Terman Library.

Students must have completed the prerequisites for advanced courses. For the most recent information, see http://ee.stanford.edu/ee/GradHandbook/html/ms.html.
M.S. PROGRAM IN ELECTRICAL ENGINEERING (EE) AND INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT (IEEM)

Admission of Students—For the dual degree, admission to both departments is required, but is coordinated by designated members of both admissions committees who make recommendations to the committees of their respective departments.

Student Advising—Every student in the dual degree program has one adviser in EE, and one in IEEM. In addition, a committee consisting of designated faculty from both departments serves as a review committee on performance and as an overseeing body of ongoing and graduating students of the program. The committee, consisting of designated members of both admissions committees as described in the previous section, may initially serve as this overseeing body.

THE DUAL DEGREE PROGRAM

This dual-degree program enables a small, selective set of graduate students to obtain both the IEEM M.S. degree and the EE M.S. degree simultaneously. The total number of units required to complete the degree is 72 (versus 90 if the two degrees were pursued separately) and the total number of full-time quarters required to complete the dual degree is six (students with a 50 percent Teaching or Research Assistantship, who average 9 units per quarter, earn 62 of a full quarter of residence).

The units and time to complete requirements are based on the student having the relevant background, such as students with work experience. Most students may need to take some of the background courses.

Background Courses (10 units)—

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comp. Sci. 106A. Programming Methodology</td>
<td>5</td>
</tr>
<tr>
<td>Stat. 190. Introduction to Statistical Methods</td>
<td>3-5</td>
</tr>
</tbody>
</table>

Common Foundation Requirements (12 units)—

1. A course on statistical process control and design of experiments at the graduate level. Currently, this can be satisfied by Industrial Engineering (IE) 221, Quality Operations and Management (4 units).
2. A course on basic manufacturing processes as specified by the EE adviser. Currently, this can be satisfied by EE 212 (3 units).
4. EE 203, Entrepreneurial Engineer Seminar; or IE 292, Technology Management Seminar (1 unit).

Electrical Engineering Core Requirements (21 units)—At least 21 units that satisfy the M.S. in Electrical Engineering degree requirements as outlined below:

1. At least three graded EE courses numbered above 200 in one area to provide depth.
2. Three graded EE courses numbered above 200 in an area outside of requirement '1' to provide breadth.
3. Additional units in EE numbered above 200, of which at least nine are above 300, so that the total of requirements 1, 2, and 3 amounts to at least 21 units.

Part of the 21 units above can be satisfied with up to 3 units of seminars, for example EE 201.

Industrial Engineering and Engineering Management Core Requirements (21 to 23 units)—

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 133. Industrial Accounting</td>
<td>3-4</td>
</tr>
<tr>
<td>IE 203. Organizational Behavior</td>
<td>4</td>
</tr>
<tr>
<td>IE 531. Inventory Control and Production Systems</td>
<td>3</td>
</tr>
<tr>
<td>IE 269. Marketing in Technology-Based Firms</td>
<td>4</td>
</tr>
<tr>
<td>IE 270. Strategy in Technology-Based Firms</td>
<td>4</td>
</tr>
<tr>
<td>One additional 200-level course offered by IEEM</td>
<td></td>
</tr>
</tbody>
</table>

Electives (6 units or more)—Additional units in EE and IEEM and other departments to meet the total requirement of 72 units.

ENGINEER

The degree of Engineer requires a minimum of two academic years (90 quarter units) of study beyond the B.S. degree (three academic quarters beyond the M.S.) including six full-time quarters of approved work as a graduate student, of which a minimum of three quarters and 36 quarter units must be in residence at Stanford.

Work toward the degree of Engineer in Electrical Engineering normally includes the requirements for work toward the master's degree in Electrical Engineering, including qualifications for admission.

An additional year allows time for a broader program, or a more concentrated program, or whatever arrangement may seem suitable to the candidate, his adviser, and the department. Advanced study at other universities, or in other departments at Stanford, may be allowed within the foregoing consideration. The equivalent of approximately one quarter is devoted to independent study and thesis work with faculty guidance. The thesis is often of the nature of a professional report on the solution of a design problem. The degree of Engineer differs from the Ph.D. in that it prepares for professional engineering work rather than theoretical research. The candidate may select courses that are suitable for either the degree of Engineer or the Ph.D. degree and decide later which program to pursue.

The best procedure for the applicant to follow is (1) if now working toward the Stanford M.S. degree in Electrical Engineering, request permission to continue graduate studies beyond the master’s degree, using the Graduate Program Authorization Petition form obtained from the Department of Electrical Engineering office, or (2) if not planning to receive the Stanford M.S. degree in Electrical Engineering, apply for admission to the Department of Electrical Engineering as a candidate for the degree of Engineer.

During the first quarter of work beyond the M.S. degree, formal application for admission to candidacy for the degree of Engineer is made on a form that can be obtained from the department office. The program of study is prepared by the student with the help of the thesis adviser and submitted to the academic secretary for approval. The form should contain a list of all graduate courses completed at Stanford and elsewhere and all courses yet to be completed. For the most recent information, see http://ee.stanford.edu/ee/GradHandbook/html/doctor.html.

DOCTOR OF PHILOSOPHY

Admission to a graduate program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement, satisfactory performance on a qualifying examination, and sponsorship by two faculty members. Enrollment in Electrical Engineering 391, Special Studies, is recommended as a means for getting acquainted with a faculty member who might be willing to serve as a supervisor.

Not later than the first Autumn Quarter after receiving the M.S. degree, the applicant should submit an application to the department qualifying examination (given each Winter Quarter). Upon successful completion of the qualifying examination and after securing agreement by two faculty members to serve as dissertation advisers, the student should file an Application for Doctoral Candidacy. Only after receiving department approval to that application does the student become a candidate for the Ph.D. degree.

Requirements may be summarized as follows. The student must complete successfully (1) a minimum of three years of residence with graduate standing, two years of which must be in residence at Stanford; (2) one or more qualifying examinations given by the faculty of the Department of Electrical Engineering; (3) an approved program of courses in electrical engineering and allied subjects; (4) an approved topic of research and a dissertation, based on research, which must be a contribution to knowledge; (5) an oral examination that is a defense of thesis work. The equivalent of approximately one quarter is devoted to independent study and thesis work. The dissertation is devoted to independent study and thesis work with faculty guidance.
AREAS OF RESEARCH

Candidates for advanced degrees participate in the research activities of the department as paid research assistants or as students of individual faculty members. At any one time, certain areas of research have more openings than others. A new applicant should express a second choice of research interest in the event that there are no vacancies in the primary area of interest. At present, faculty members and students are actively engaged in research in the areas listed below.

COMPUTER SYSTEMS

Asynchronous Circuits
Compilers
Computer-Aided Design
Computer Architecture
Computer Graphics
Computer Networks
Computer Organization
Computer Reliability
 Concurrent Languages
Concurrent Processes and Processors
Database and Information Systems
Distributed Systems
Embedded System Design
Hardware/Software Co-Design
Hardware Verification
Human Computer Interaction
Multimedia Systems
Operating Systems
Performance Measurement and Modeling
Programming Languages
Program Verification
Software Engineering
VLSI Design

INFORMATION SYSTEMS

Adaptive Control and Signal Processing
Adaptive Neural Networks
Biomedical Signal Analysis
Computer-Aided Design and Analysis of Systems
Data Communications
Digital Signal Processing
Estimation Theory and Applications
Fourier and Statistical Optics
Information and Coding Theory
Medical Imaging and Image Processing
Multivariable Control
Optical Communications
Optimization-Based Design
Pattern Recognition and Complexity
Quantization and Data Compression
Real-Time Computer Applications
Signal Processing Algorithms and Architectures
Speech and Image Coding

INTEGRATED CIRCUITS

Analog Integrated Circuits
Bipolar, MOS, and other Device and Circuit Technologies
CAD of Processes, Devices, and Equipment
Custom Integrated Circuits for Computers and Telecommunications
Digital Integrated Circuits
Integrated Sensors and Actuators
Mixed Signal Integrated Circuits
Nanostructures
Optoelectronic Integrated Circuits
Process, Device, Circuit, and Equipment Modeling
Sensors and Control for VLSI Manufacturing
VLSI Device Structures and Physics
VLSI Fabrication Technology
VLSI Materials, Interconnections, and Contacts
VLSI Packaging and Testing

LASERS AND QUANTUM ELECTRONICS

Coherent UV and X-Ray Sources
Free-Electron Lasers
Laser Applications in Aeronautics, Biology, Chemistry, Communications, Electronics, and Physics
Laser Devices and Laser Physics
Nonlinear Optical Devices and Materials
Optoelectronic Devices
Photoacoustic Phenomena
Semiconductor Diode Lasers
Ultrafast Optics and Electronics

MICROWAVES, ACOUSTICS, AND OPTICS

Acoustic Microscopy
Acousto-Optic Devices
Fiber Optics
Holography
Microwave Integrated Circuits and Devices
Nondestructive Testing
Optical Interferometry
Scanning Optical Microscopes

SOLID STATE

Applied and Fundamental Superconductivity
Crystal Preparation: Epitaxy and Ion Implantation, and Molecular Beam Epitaxy
Defect Analysis in Semiconductors
Electron and Ion Beam Optics
Electron Spectroscopy
Experimental Determination of the Electronic Structure of Solids
High Resolution Lithography
Laser, Electron, and Ion Beam Processing and Analysis
Magnetic Information Storage
Magnetic Materials Fundamentals and Nanostructures
Nanostructure Fabrication and Applications
Molecular Beam Epitaxy
Novel Packaging Approaches for Electronic Systems
Optoelectronic Devices
Physics and Chemistry of Surfaces and Interfaces
Semiconductor and Solid State Physics
Solid State Devices: Physics and Fabrication
Ultrasmall Electron and Photodevices

SPACE PHYSICS AND RADIOSCIENCE
Detection of Electromagnetic Fields from Earthquakes
Electromagnetic Waves and Plasmas
Geomagnetically Trapped Radiation
Ionospheric and Magnetospheric Physics
Ionospheric Modification
Lightning Discharges
Lightning-Ionosphere Interactions
Planetary Exploration
Radio Wave Scattering
Remote Sensing of Atmospheres and Surfaces
Space Engineering (also see the “Space Science and Astrophysics” section of this bulletin)
Ultra-Low Frequency Fluctuations of the Earth’s Magnetic Field
Very Low Frequency Wave Propagation and Scattering

TELECOMMUNICATIONS AND SPACE INFORMATION SYSTEMS
Applied Optics and Optoelectronics
Cellular Radio Systems/Networks
Coherent Optical Communications
Communication Channels
Digital Telephone Switching
Frequency Reuse in Large Wireless Systems
Mobility Issues in Large Networks
Multiple Access Techniques
Multipath Mitigation Techniques
Optical Fiber Communications
Optical Networks
Optoelectronic Components and Systems
Propagation in and around Buildings
Radar Signal Processing
Radiating Systems
Remote Sensing/Assignment
RF Excision in support of Search for Extraterrestrial Intelligence
Satellite Communication Stations
Space Data Management
Spaceborne Radio Receiver Development
Telephone and Data Networks
Wavelength Division Multiplexing
Wireless Local Area Data Networks
Wireless Personal Communication Systems

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

Electrical engineering courses are numbered according to the year in which the courses are normally taken.

20-99 first or second year
100-199 third or fourth year
200-299 mezzanine course for advanced undergraduates or graduates
300-399 first graduate year
400-499 second or third graduate year

600-799 special summer courses

The Department of Electrical Engineering (EE) offers courses in the following areas:

Communication Systems
Computer Hardware
Computer Software Systems
Control and Systems Engineering
Electronic Circuits
Electronic Devices, Sensors, and Technology
Fields, Waves, and Radioscience
Image Systems
Lasers, Optoelectronics, and Quantum Electronics
Network Systems
Signal Processing
Solid State Materials and Devices
VLSI Design

UNDERGRADUATE

17Q. Stanford Introductory Seminar: From Chips to Genes—Engineering the MicroWorld—Preference to sophomores. Lectures by instructor on the basic material followed by guest speakers from microelectronics, MEMS, and biotechnology. Reading assignments and student reports. Prerequisites: high school physics, knowing how a light microscope works, and the length of scales (meter, millimeter, micrometer, nanometer).

3-3 units, Win (Pease, Quate)

33Q. Stanford Introductory Seminar: Fun Electrical Engineering Stuff (and how it works)—Preference to sophomores. Prospective electrical engineering students are exposed to the capabilities and possibilities in their field, examining the functions and mechanisms of practical systems (toys, home appliances, computers, industrial and medical equipment), and breaking a problem into manageable pieces, recognizing patterns, and thinking beyond what is first seen. Combined lecture and lab; students disassemble and reassemble basic minimal electronics.

3 units, Aut (Dutton, Ahrens)

44Q. Stanford Introductory Seminar: Physics, History, and Mystique of Lightning—Preference to sophomores. The physical properties and phenomenology of lightning discharges, The history and mystique of lightning, emphasizing the role of this phenomena in religions and various age-old mythologies. Benjamin Franklin’s experiments and writings on lightning. The societal impacts of lightning in modem times and in the historical past. Different types of lightning, including discharges, which occur at high altitudes above thunderclouds, lightning on other planets, lightning in volcanoes, and mysterious forms such as “ball” lightning. The physical properties of lightning and techniques for their measurement.

3 units, Win (Inan)

47Q. Stanford Introductory Seminar: Telecommunications and Networks—From Telegraphy to the Internet—Preference to sophomores. Modern communications technology and networking, including the Internet. How the global communications infrastructure evolved from the “plain old telephone service” of 1900 to today’s multimedia “information super-highway.” A historical perspective of the evolution of communications technology, including advancements in communications theory and practical inventions over 200 years. Relevant public policy decisions in the U.S., (the Mann-Elkins Act of 1910 to the Telecommunications Reform Act of 1996). The political goals of these policies, their interplay with market forces, and their impact on the development and deployment of technology.

3 units, Aut (D. Harris)

60Q. Stanford Introductory Seminar: Viewing Hazards on Earth from Space—(Same as Geophysics 60Q.) Preference to sophomores. Natural hazards (earthquakes, volcanoes, floods, hurricanes, and fires)
affect thousands of people everyday. Twenty years of developments in spaceborne imaging technology help monitor and respond to such disasters more rapidly than in the past, saving lives and money. Understanding the physical processes involved allows us to anticipate and plan for mitigation of the consequences of the disasters. Students consider how these new tools are applied to natural disasters, and how remotely-sensed data are manipulated and analyzed.

3 units, Win (Zebker)

93Q. Stanford Introductory Seminar: Energy Processes—Preference to sophomores. Serves as preparation for 293A.B. Topics in non-traditional energy processes. Students groups of 2 or 3 each select one topic for further investigations. Progress reports, final report. Discussions on the physics and chemistry of the processes, concentrating on a journalistic description of what is being accomplished in each area and the near term prospects. Prerequisite: interest in science and engineering in the energy area.

3 units, Aut (da Rosa)

100. The Electrical Engineering Profession—Lectures/discussions on topics of importance to the electrical engineering professional. Continuing education, professional societies, intellectual property and patents, ethics, entrepreneurial engineering, and engineering management. (Extensive reports for 2 units.) (AU)

1-2 units, Aut (Gray)


3 units, Win (Gray)


3 units, Spr (Nishimura)


3 units, Aut (Prabakhar)

104. Signal Processing and Communication—Introduction to communication systems, Fourier series and Fourier transforms, filtering and signal distortion, time domain and frequency domain analysis, communication channel modulation (FM), digital modulation, noise in communication systems, overview of cellular telephones, satellite systems. Prerequisite: 103.

3 units, Win (Goldsmith)

105. Feedback Control Design—(Enroll in Engineering 105.)

106. Planetary Exploration—The other worlds of our solar system as revealed by recent space missions. Comparative properties of the terrestrial and Jovian planets; planetary atmospheres, surfaces, interiors, and rings; planetary and satellite orbits and spacecraft trajectories, orbital perturbations; properties of the interplanetary gas, dust, comets, and meteors. What the planets can tell us about potential terrestrial catastrophes (acid rain, ozone depletion, nuclear winter, runaway greenhouse, collision with an asteroid or large comet). Origin and evolution of planetary systems. Remote sensing from spacecraft at radio, infrared, light, and ultraviolet wavelengths. U.S. and Russian space programs and their comparative engineering and scientific aspects. Prerequisite: one year of college engineering, mathematics, or physics.

3 units, Spr (Fraser-Smith)

111. Electronics I—The fundamental operation of semiconductor devices and their circuit applications. The physical principles of fabrication and electrical behavior of microelectronic semiconductors, emphasizing silicon technology; operating principles and device equations for PN diodes, and junction field-effect transistors; biasing, small-signal models, and elementary circuit applications of semiconductor devices. Prerequisite: Engineering 40. Corequisite: 101.

4 units, Aut (Dutton)

112. Electronics II—Basic operating principles and device equations for MOS capacitors and transistors, and bipolar junction transistors. The basics of transistor amplifier and logic circuit design using MOS and bipolar transistors. Weekly one-hour recitation session. Prerequisites: 101, 111.

4 units, Win (Wong)

113. Electronic Circuits—Bipolar and MOS amplifier design including DC bias, small signal performance, multistage amplifiers, frequency response, feedback. Design and use of operational amplifiers. Prerequisites: 102, 112.

3 units, Aut (Staff) Spr (Dutton)

121. Digital Design Laboratory—Introduction to digital circuits and logic design. Topics: Boolean algebra, logic circuit electrical characteristics, combinational and sequential logic building blocks, state machines, programmable logic devices, hierarchical logic design, computer-aided design and logic simulation. Lab. Prerequisite: 101. (WIM)

4 units, Aut (Wakerly) Spr (Staff)

122. Analog Laboratory—Introduces the practical applications of analog circuits, including simple amplifiers, filters, oscillators, power supplies, and sensors. Goals: lab experience, basic design skills, experience with computer-aided design, and basic circuit fabrication/debugging knowledge. Prerequisite: Engineering 40 or equivalent.

3 units, Aut (Kovacs) Spr (Staff)

133. Analog Communications Design Laboratory—The design and testing of analog communications circuits, including applications. Amplitude modulation (AM) using discrete multiplier circuits and fully integrated implementations. Phase and Frequency Modulation (FM) based on discrete and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phase-Locked Loop (PLL) techniques, characterization of key parameters and their applications. Lectures on the practical aspects of circuit implementations. Labs involve the systematic building and characterization of AM, FM, and PLL circuits and subsystems. Enrollment limited to 40 undergraduate and coterminous EE students. Prerequisite: 122.

3 units, Win (Dutton)

137. Laboratory Electronics—(Enroll in Applied Physics 207.)

138. Laboratory Electronics—(Enroll in Applied Physics 208.)

140. The Earth from Space: Introduction to Remote Sensing—(Enroll in Geophysics 40.)

141. Engineering Electromagnetics—Transmission lines. Reflection, transmission, attenuation, and dispersion. Standing wave ratio, impedance matching, pulses and transients. Electrostatics, Gauss’ Law, capaci-
itance, divergence, and currents. The static magnetic field, magnetic forces, Ampère’s Law, curl and Faraday’s Law. Magnetic materials and devices, inductance, electromechanics, and skin effect. Maxwell’s equations. Uniform plane waves, power and energy relations. Prerequisites: Mathematics 44, 102.

4 units, Aut (Inan)


3 units, Win (Inan)

144. Wireless Electromagnetic Design Laboratory—Required for undergraduate Fields and Waves specialty area. Lecture, lab, and design project. Hands-on experiments and projects with antennas, transmission lines and propagation for wireless communications and remote sensing. Using spectrum analysers, swept frequency generators, frequency counters, couplers, detectors and slotted lines, develop measurement and design capability in the 1-20 GHz range in support of chosen design projects. Two- to three-person team projects from antenna, guided wave distributed circuits, remote sensing, or related topics. Working model constructed and demonstrated; some funding available for project costs. Prizes for best projects. Lab. Enrollment limited to 30. Prerequisites: 122, 142, or consent of instructor.

3 units, Spr (Fox)


181. Introduction to Computer Systems and Assembly Language Programming—(Enroll in Computer Science 110.)


4 units, Aut (Staff)

Spr (Fox)

183. Advanced Logic Design Laboratory—Experiments in digital logic design using TTL integrated circuits, MSI and LSI registers and ALUs, Programmable Gate Arrays, and PLAs. Choice of projects: various sequential machines, D/A converters and CRT displays, integrators, arithmetic processors, stored-program processors, game-playing machines. Lab. Enrollment limited to 25; preference to graduating seniors in Spring Quarter. Co- or prerequisite: 121.

3 units, Win (Staff)

Spr (Briem)

184. Programming Paradigms—(Enroll in Computer Science 107.)

189A. Object-Oriented Systems Design—(Enroll in Computer Science 108.)

189B. Software Project—(Enroll in Computer Science 194.)

190. Special Studies or Projects in Electrical Engineering—Independent work under the direction of a faculty member. Individual or team activities involve lab experimentation, design of devices or systems, or directed reading.

by arrangement

191. Special Studies and Reports in Electrical Engineering—Independent work under the direction of a faculty member given for a letter grade only. If a letter grade given on the basis of required written report or examination is not appropriate, student should enroll in 190.

by arrangement

192. Special Seminars—Special seminars and experimental courses are given on topics of current interest by specialists in the field. Announcements are made one or two quarters prior to presentation. See Time Schedule and bulletins in the department office for current listing.

by arrangement

UNDERGRADUATE AND GRADUATE

201A. Seminar—Weekly discussions of special topics of current interest in electrical engineering. Orientation to Stanford and to the EE department. Students with a conflict may view via videotape in the library.

(AU)

I unit, Aut (Reis)

201B. Seminar—Looks at “Life after Stanford” through a series of presentations primarily directed at MS/EE students. The activities of graduates in industry (large, medium, and small), start-up companies, government laboratories, and community colleges.

(AU)

1 unit, Win (Reis)

202. Medical Electronics—Primarily biological in nature. Introduces electrical engineers to the physiological and anatomic aspects of medical monitoring and imaging. Biological content, transducers, electronic systems, the socio-economic impact, and the constraints unique to medicine. Recommended: some familiarity with circuits and electrical instrumentation techniques (e.g., 113).

3 units, Spr (Kovacs, Thompson)

203. The Entrepreneurial Engineer—Seminar furthers the knowledge base of prospective entrepreneurs with an engineering background. The contributions made to the business world by engineering graduates. Speakers include Stanford (and other) engineering and M.B.A. graduates who have founded large and small companies in nearby communities. Contributions from EE faculty members and other departments (law, business, and industrial engineering).

(AU)

1 unit, Win (Melen)

205. Introduction to Control Design Techniques—(Enroll in Engineering 205.)

206. Control System Design and Simulation—(Enroll in Engineering 206.)

209. Analysis and Control of Nonlinear Systems—(Enroll in Engineering 209.)

212. Integrated Circuit Fabrication Processes—For students interested in IC design and the influence of fabrication processes, or intending to pursue doctoral research involving use of Stanford’s IC laboratory. Process simulators are used to illustrate concepts and provide a “virtual” lab experience. Topics: the fundamental principles of integrated circuit fabrication processes, physical and chemical models for crystal growth, oxidation, ion implantation, etching, deposition, lithography, and backend processing. Required for 410. Prerequisite: 112 or equivalent.

3 units, Aut (Plummer)

213. Heat Transfer in Microdevices—(Enroll in Mechanical Engineering 258.)

216. Principles and Models of Semiconductor Devices—The fundamentals of carrier generation, transport, recombination, and storage in semiconductors. The physical principles of operation of the p-n junction, metal semiconductor contact, bipolar junction transistor, MOS capacitor, MOS and junction field-effect transistors, and related devices such as CCDs and solar cells. First-order device models that reflect physical principles and are useful for integrated-circuit analysis and design. Prerequisites: 111, 112, or equivalent. 3 units, Aut (J. Harris)

217. Electron and Ion Beams for Semiconductor Processing—Focused and flood beams of electrons and ions are employed for processing semiconductor devices. The generation of such beams including thermionic emission, field-induced emission, first-order focusing and glow discharge processes. The interactions of such beams with the target, including scattering in solids, the distribution of energy, heating, sputtering, beam-induced etching (including reactive-ion etching) and beam-induced deposition. Introduction to computer modeling of etching and deposition. Prerequisite: 212 or equivalent. 3 units, alternate years given 2000-01

222. Applied Quantum Mechanics I—Enroll in Applied Physics 222.)

223. Applied Quantum Mechanics II—Enroll in Applied Physics 223.)

228. Basic Physics for Solid State Electronics—Advanced undergraduate/graduate, introducing the physics underlying solid state materials and devices. Topics: the energy band theory of solids, energy bandgap engineering, classical kinetic theory, statistical mechanics, equilibrium and non-equilibrium semiconductor statistics. Prerequisite: 112. 3 units, Aut (Miller)

229B. Thin Film and Interface Microanalysis—Enroll in Materials Science and Engineering 323.)

229D. Introduction to Magnetism and Magnetic Materials—Enroll in Materials Science and Engineering 347.)

231. Lasers I—Introduction to lasers and how they work, including quantum transitions in atoms, stimulated emission and amplification, rate equations, saturation, feedback, coherent optical oscillation, laser resonators, and optical beams. Limited primarily to steady-state behavior; uses classical models for atomic transitions with little quantum mechanics background required. Prerequisites: electromagnetic theory to a level of at least 142, preferably 241, and some knowledge of atomic or modern physics such as Physics 57, 130-131. 3 units, Aut (Solgaard)

232. Lasers II—Continuation of 231, emphasizing dynamic and transient effects including spiking, Q-switching, mode locking, frequency modulation, frequency and spatial mode competition, linear and nonlinear pulse propagation, short pulse expansion, and compression. Prerequisite: 231. 3 units, Spr (Siegman)

238. Electrical and Magnetic Properties of Solids—Enroll in Materials Science and Engineering 209.)

239C. Photoelectronic and Photovoltaic Materials and Devices—Enroll in Materials Science and Engineering 332.)

241. Waves I—Introduction to waves and wave phenomena as they appear in different natural, lab, and application settings. Electromagnetic, acoustic, seismic, atmospheric, plasma, and water waves and their mathematical and physical correspondence in terms of Hamilton's principle. Propagation, attenuation, reflection, refraction, surface and laminar guiding, and intrinsic and structural dispersion; energy density, power flow, and phase and group velocities. Geometric and structural complexities are minimized to stress basic wave concepts common to diverse fields of application. Analysis in terms of transmission line and impedance concepts using exponential notation and vector phasors. Treatment limited to plane harmonic waves in isotropic media. Nonhomogeneous cases limited to plane interfaces and exponentially stratified media. Prerequisite: 142 or equivalent, or other wave course. 3 units, Aut (Tyler)

242. Waves II—Continuation of 241, emphasizing fundamental topics in EM theory for further study and application of microwave, optical, or plasma phenomena. Plane, cylindrical, and spherical waves and boundary value problems; radiation and reciprocity; wave guides, fiber optics, and cavity resonators. Uniaxial and gyrotrropic anisotropic media with magnetoionic plasma, and ferrite applications. Resonators. Perturbation theories, attenuation, and energy conservation. Prerequisite: 142 or 241. 3 units (Staff) not given 1999-2000

243. Semiconductor Optoelectronic Devices—Introduction to semiconductor optoelectronic devices for communications and other applications, covering operating principles and practical device features. Review of relevant semiconductor physics, and optical processes in semiconductors. Semiconductor heterostructures. Semiconductor optical detectors (including p-i-n, avalanche, and MSM), light emitting diodes, electroabsorptive modulators (Franz-Keldysh, QCSE), electorefraction (directional couplers, Mach-Zehnder), switches (SEEDs), and lasers (waveguide and vertical cavity). Prerequisites: basic quantum mechanics, solid state physics, lasers (e.g., 222, 228, 231, or equivalents). 3 units, Win (Miller)

244. Communication Engineering Transmission Systems—Design of transmission systems for TV, telephone, and data-using satellites, microwave repeaters, mobile radio, and broadcast transmitters. Performance of FM, AM, SSB common digital schemes and spread-spectrum modulation, time, frequency, and code multiplexing. Emphasis is on link performance, capacity, total system design, and cost optimization. Current industry design problems and research results. Examples illustrate modern technologies providing service to rural populations. Prerequisite: senior or graduate standing in Electrical Engineering, or consent of instructor. 3 units, Aut (Lusignan)

245. Wireless Electromagnetic Design Laboratory—See 144. 3 units, Spr (Leeson)

246. Microwave Engineering—Coherent development of the concepts and applications of distributed circuits. Emphasis is on MIC structures (microstrip, coplanar waveguide, slotline, finline, and imageline) capable of transmitting millimeter wave analogue signals and picosecond pulses. Modal properties (TEM, quasi-TEM, TE, TM) of general guidelines. Higher order mode excitation effects at discontinuities (steps, bends, etc.) and junctions are modeled by lumped equivalent circuits, using Z- Y- and S-matrix representations. Dispersion, attenuation, and distributed source excitation in distributed circuits. Analysis of circuit components (impedance transformers, directional couplers, hybrids, circulators, filters, solid state amplifiers). Illustrations of IC circuit structures. Computer-aided design principles. Recommended: 142 or equivalent. 3 units, Aut (Leeson) alternate years, not given 2000-01
3 units, Aut (Kazovsky)

3 units, Aut (Yamamoto)

249. Introduction to the Space Environment—Experimentation in the near-earth space environment using radio and other electromagnetic waves and electric and magnetic instrumentation on space probes. Tools used: transmitters, antennas, receivers, sensors, radars, and displays. The earth's ionosphere, magnetosphere, and interplanetary space. The role of the sun, and the effects produced by changes in solar activity. Geoelectrical and geomagnetic fields. Charged particle motion, trapped particles (Van Allen radiation), and the aurora. Applications to current experimental programs. Planning and execution of experiments. Prerequisites: familiarity with electromagnetics at the level of 142 and senior or graduate standing.
3 units, Aut (Fraser-Smith) alternate years, not given 2000-01

250. Telecommunications Seminar—Offered on-line and aimed at those seeking a high-level overview of telecommunications activities in industry and at Stanford. Topics in the areas of high-speed networks, optical communications, mobile networks, wireless systems, distributed systems, network control and telecommunications applications, products, and services. (AU)
1 unit, Aut, Spr (D. Harris)


3 units, alternate years, given 2000-01

254. Principles of Radar Systems—Analysis and design, emphasizing radars as systems. Radar equation and systems parameters, components of radar systems, radar cross-section and target characteristics, signal detection in noise, ambiguity function (with applications to measurement precision, resolution, clutter rejection, and waveform design); pulse compression waveforms, synthetic aperture radar, tracking and scanning radars, HF (OTH) radar, radar environmental and remote sensing, radar astronomy. Prerequisite: senior undergraduate or graduate standing.
3 units, Win (Tyler) alternate years, not given 2000-01

3 units, alternate years, given 2000-01

261. The Fourier Transform and its Applications—The Fourier transform as a tool for solving physical problems. Fourier transform of discrete and continuous time signals, generalized transforms, and Fourier series. Convolutions and correlations, the Dirac delta function, Fourier transform theorems, measures of time duration and bandwidth, analysis of linear systems, sampling theorems, the discrete Fourier transform, and two-dimensional Fourier analysis. Prerequisite: previous exposure to Fourier series at the level of 102.
3 units, Aut (Osgood)
Win (Hesselink)

262. Two-Dimensional Imaging—Time and frequency representations, two-dimensional auto- and cross-correlation, Fourier spectra, diffraction and antennas, coordinate systems and the Hankel and Abel transforms, line integrals, impulses and sampling, restoration in the presence of noise, reconstruction and tomography, imaging radar. Prerequisites: 261. Recommended: 278, 279.
3 units, Aut (Zebker)

263. Introduction to Linear Dynamical Systems—Introduction to applied algebra and linear dynamical systems, with application to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, and state transfer. Least-norm inputs and associated Gramians. Observability and least-squares state estimation. Prerequisites: exposure to basic linear algebra and matrices (as in Mathematics 103); differential equations and Laplace transforms (as in 102).
3 units, Aut (Lobo)

3 units, Aut (Winrod)
Spr (Meng, Dzwonczyk)

268. Introduction to Modern Optics—Geometrical optics: raymatries, Gaussian beams, optical instruments, and radiometry. Wave nature of light: Maxwell’s equations, propagation through media with varying index of refraction (e.g., fibers). Interferometry: basic principles, practical systems, and applications.
3 units, Aut (Hesselink) alternate years, not given 2000-01

271. Introduction to VLSI Systems—Large-scale MOS design. Topics: MOS transistors, static and dynamic MOS gates, MOS circuit fabrication, design rules, resistance and capacitance extraction, power...
and delay estimation, scaling, MOS combinational and sequential logic design, registers and clocking schemes, memory, data-path, and control-unit design. Elements of computer-aided circuit analysis, synthesis, and layout techniques. Prerequisites: 112; familiarity with circuits, logic design, and digital system organization.

3 units, Aut (Staff)
Spr (DeMicheli)

272. Design Projects in VLSI Systems—For students with research and applications interest in VLSI systems. Teams of two complete modest-sized CMOS chip of their own design, including writing a functional model (in Verilog), using synthesis tools, custom layout, and simulation. Overview of the issues involved in VLSI design. Topics: design tools and techniques, complexity management, clocking issues, layout and floor-planning, design of large array structures, testing and testability issues. Lab. Prerequisites: 271, experience with digital design.

4 units, Win (Horowitz)

273. Digital Systems Engineering—Fundamental electrical issues in the design of high-performance digital systems, including signaling, timing, synchronization, noise, and power distribution. High-speed signaling methods; noise in digital systems, its affect on signaling, and methods for noise reduction; timing conventions; timing noise (skew and jitter), its affect on systems, and methods for mitigating timing noise; synchronization issues and synchronizer design; clock and power distribution problems and techniques; impact of electrical issues on system architecture and design. Prerequisites: 113, 121, or equivalents.

3 units, Win (Daily)

274. Introduction to Cryptography and Computer Security—(Enroll in Computer Science 255.)

275. Logic Design— (Formerly 381.) Principles and techniques of logic design. Combinational circuit analysis (hazard detection); combinatorial circuit design including PLA, VLSI, and MSI techniques and testing techniques; IC logic families, flipflop properties, sequential circuit analysis and synthesis for fundamental and pulse mode circuits, design for testability techniques. Prerequisite: 121 or equivalent.

3 units, Aut, Win (McCluskey)


3 units, Spr (Cox)

278. Introduction to Statistical Signal Processing—Random variables, vectors, and processes; time averages, expectations, and laws of large numbers; stationarity, autocorrelation and spectral analysis; mean square error estimation, detection, and linear filtering; independent increment, Gaussian, and Poisson random processes. Prerequisite: 177, and linear systems and Fourier transforms at the level of 102 or 261.

3 units, Aut (Cover)
Win (Probhakar)

279. Introduction to Communication Systems—Analysis and design of communication systems; analog and digital modulation and demodulation, frequency conversion, multiplexing, noise and distortion; spectral and signal-to-noise ratio analysis, error ratios in digital systems. Prerequisites: 102 or 261, 278.

3 units, Win (Cox)

281. Embedded System Design Laboratory—Lectures on the architecture and design of microprocessor-based systems. Lab experiments use MicroChip PIC16C74 microcontroller evaluation board. Five-week individual design project. Lab. Prerequisites: 121, and 181 or 182 or equivalent experience in assembly language programming.

3 units, not given 1999-2000

282. Computer Architecture and Organization—The structure of systems using processors, memories, input/output (I/O) devices, and I/O interfaces as building blocks. Computer system instruction set design and implementation, including memory hierarchies and pipelining. Issues and tradeoffs involved in the design of computer system architectures with respect to the design of instruction sets. Prerequisite: 182.

3 units, Aut (Daily)
Win (Staff)

283. Compilers— (Enroll in Computer Science 143.)

284. Introduction to Computer Networks—Structure and components of computer networks; functions and services; packet switching; layered architectures; ISO's Open Systems Interconnections (OSI) reference model; physical layer; data link layer; error control; window flow control; media access control protocols used in local area networks (Ethernet, Token Ring, FDDI) and satellite networks; network layer (datagram service, virtual circuit service, routing, congestion control, IP); transport layer (UDP, TCP).

3 units, Aut (Tobagi)
Win (enroll in Computer Science 244A)

285. Programming Languages—(Enroll in Computer Science 242.)

286A. Operating Systems and Systems Programming—(Enroll in Computer Science 140.)

286B. Advanced Topics in Operating Systems—(Enroll in Computer Science 240.)

287. Introduction to Computer Graphics—(Enroll in Computer Science 248.)


289. Introduction to Computer Vision—(Enroll in Computer Science 223B.)

290A,B,C. Curricular Practical Training for Electrical Engineers—For EE majors who need relevant work experience as part of their program of study. Final report required. Prerequisite for 290B,C: Electrical Engineering Ph.D. candidate.

I unit, Aut, Win, Spr (Gray)

292. Special Seminars—Special seminars and experimental courses are given on topics of current interest by specialists in the field. Announcements are made one or two quarters prior to presentation. See Time Schedule and bulletins in the department office for current listing.

by arrangement


3 units, Aut (da Rosa)

310. Integrated Circuits Technology and Design Seminar—In-depth treatment of device structures, fabrication technologies, and circuit design issues in integrated circuits. Introduces current research topics in these areas. (AU)

1 unit, Aut (Kovacs, Lee)
Win (Saraswat, Wooley)

311. Advanced Integrated Circuit Fabrication—What are the practical and fundamental limits to the evolution of the technology of modern MOS and bipolar devices? How are modern devices and circuits fabricated and what future changes are likely? Advanced techniques and models of device and back-end (interconnect and contact) processing. Use of SUPREM, PISCES, and SPEEDIE for process modeling. MOS and bipolar process integration. Prerequisites: 212, 216.

3 units, Spr (Saraswat)

312. Solid-State Sensors and Actuators—Surveys solid-state sensors and actuators, focusing on the use of integrated circuit fabrication technology for their realization. Categories of sensors and actuators are biological, chemical, mechanical, optical, thermal, etc. Basic mechanisms of transduction, fabrication techniques, and relative merits of the different technologies. Micromachining techniques for monolithic integration of active circuits with sensors or actuators and directions for future research. Prerequisite: 212.

3 units (Kovacs)


3 units, Win (Wooley)

314. RF Circuit Design—Design of RF integrated circuits for communications systems. Topics: the design of low-noise amplifiers at RF, passive and active filters, mixers, modulators, and demodulators; review of classical control concepts necessary for oscillator design including PLLs and PLL-based frequency synthesizers. Design of high-efficiency (e.g., class E, F) RF power amplifiers, coupling networks. Behavior and modeling of passive and active components at RF. Prerequisite: 214.

3 units, Win (Lee)

315. VLSI Data Conversion Circuits—Design of mixed-signal integrated circuits for implementing the interfaces between analog and digital signals in CMOS VLSI systems. Fundamental circuit elements such as sample-and-hold circuits, comparators, voltage references, operational amplifiers, gain blocks, and analog integrators. The design of the constituent circuits for Nyquist-rate and oversampling analog-to-digital and digital-to-analog converters, sampled-data and continuous-time analog filters, and digital decimation and interpolation filters. Prerequisite: 214.

3 units, Spr (Wooley)

316. Advanced VLSI Devices—In modern VLSI technologies, MOS and bipolar device electrical characteristics are sensitive to structural details and therefore to fabrication techniques. How are VLSI devices and circuits fabricated and what future changes are likely? What are the implications for device electrical performance caused by fabrication techniques? Physical models for submicron structures, control of electrical characteristics (threshold voltage, breakdown voltage, current gain) in small structures, and alternative device structures for VLSI. Prerequisites: 212, 216, or equivalent.

3 units, not given 1999-2000

317. Micropatterning for Integrated Circuits—The fundamentals of generating submicron patterns in integrated circuit manufacturing. Technologies include the formation of submicron images of ultraviolet light, the resulting exposure of polymeric resists, the subsequent development of resist patterns and their transfer into functional circuit material patterns through plasma etching and other techniques. The use of phase-shifting masks and other wavefront-engineering approaches. Extensive hands on use of computer simulations of each of the above steps. Prerequisites: 141 or equivalent, 212 or equivalent, basic competence in computing.

3 units, Spr (Pease) alternate years, not given 2000-01

318. Logic Synthesis of VLSI Circuits—Solving logic design problems with CAD tools for VLSI circuits. Analysis and design of exact and heuristic algorithms for logic synthesis. Topics: representation and optimization of combinational logic functions (encoding problems, binary decision diagrams), representation and optimization of multiple-level networks (algebraic and Boolean methods, “don’t care” set computation, timing verification, and optimization), modeling and optimization of sequential functions and networks (reduction, semicustom libraries and library binding). Prerequisites: familiarity with logic design, algorithm development, and programming.

3 units, Spr (DeMicheli)

319. Computer-Aided System Design Laboratory—Computer-aided design of VLSI systems: theory and practice. Topics: modeling languages (e.g., Verilog), high-level synthesis and optimization methods (scheduling, binding, data-path, and control synthesis), design of systems with low-power consumption, and hardware/software co-design. Individual/group projects involve the use of CAD tools. Prerequisite: 318.

3 units, Spr (DeMicheli)

325. Principles of Magnetic Recording—(Enroll in Materials Science and Engineering 348.)

327. Properties of Semiconductor Materials—Modern semiconductor devices and integrated circuits are based on the unique energy band, carrier transport, and optical properties of semiconductor materials. How these physical properties can be chosen and optimized for operation of semiconductor devices. Emphasis is on the quantum mechanical foundations of the properties of solids, energy bandgap engineering, semiclassical transport theory, semiconductor statistics, carrier scattering, electro-magneto transport effects, high field ballistic transport, Boltzmann transport equation, quantum mechanical transitions, optical absorption, and radiative and non-radiative recombination. Prerequisites: 216, 228.

3 units, Win (J. Harris)

328. Physics of Advanced Semiconductor Devices—The principles governing the operation of modern semiconductor devices. Underlying assumptions and approximations commonly made in analyzing devices. Emphasis is on the application of semiconductor physics to the development of advanced semiconductor devices (e.g., heterojunctions, HJ-bipolar transistors, HJ-FETs, nano structures, tunneling, single electron transistor and photonic devices). Use of ATLAS and MEDICI 2-D Poisson solvers for simulation of ultra-small devices. Examples are related to up-to-date device research.

3 units, Spr (J. Harris)
329. The Electronic Structure of Surfaces and Interfaces—Basic physical concepts and phenomena for surface science techniques probing the electronic structure of surfaces and interfaces. Microscopic and atomic models in understanding microstructures have technologically important applications, e.g., within semiconductor device technology and catalysis. The basic physical processes of low energy electron diffraction, Auger electron spectroscopy, UV and x-ray photoemission spectroscopy, electron/phonon stimulated ion desorption, inelastic tunneling spectroscopy, ion scattering, surface EXAFS, and energy loss spectroscopy; and experimental aspects of these surface science techniques. Prerequisites: Physics 70 or equivalent; 238 or consent of instructor.

3 units, alternate years, given 2000-01


3 units, Win (Wang)

338A. Quantum Optics and Measurements—(Enroll in Applied Physics 387.)

338B. Mesoscopic Physics and Nanostructures—(Enroll in Applied Physics 388.)

343. Advanced Optoelectronic Devices—Semiconductor quantum well structures; superlattices and coupled quantum wells; optical properties of quantum wells; valence band structure; effects of strain; quantum well lasers; intersubband detectors; excitons in quantum wells; absorption saturation; electroabsorption; quantum well modulators and switches. Prerequisites: 222 or equivalent quantum mechanics, 243.

3 units, Spr (Miller)

344. High Frequency Laboratory—Combination lecture/lab emphasizing the lab. Techniques in the 1MHz-1GHz range useful in designing and measuring oscillators, amplifiers, and mixers. Basic high frequency measurement techniques including s-parameter measurements, Amplifier Noise Figure; and oscillator phase noise. Lectures by the professor and experts from Hewlett-Packard. (Two lectures, one lab weekly.) Enrollment limited to 20. Prerequisites: good understanding of transmission lines, Smith charts.

3 units, Aut (Cox)


3 units, Spr (Harris)

347. Optical Methods in Engineering Science—The design and understanding of modern optical systems. Topics: geometrical optics, aberration theory, systems layout, applications such as microscopes, telescopes, optical processors. Computer ray tracing program is used for class demonstrations and as a design tool. Prerequisite: 268 or 366, or equivalent.

3 units, alternate years, not given 2000-01

348. Advanced Optical Fiber Communications—Components: couplers, laser linewidth and phase noise, acousto-optical filters, fiber gratings, fiber Fabry-Perot filters, surface-normal Fabry-Perot filters, isolators. Systems: coherent systems (homodyning and heterodyning, balanced receivers, phase-locked and non-synchronous demodulation, linewidth requirements, polarization fluctuations and techniques to handle them, multichannel systems); optical amplifiers (semiconductor optical amplifiers—impact of facet reflectivity, antireflection coating, angled and buried facets, polarization sensitivity and intermodulation, gain saturation, rate equation model, noise characteristics, optical fiber amplifiers, erbium-doped fibers, pumping at 532, 807, 980 and 1547 nm, gain and gain saturation, noise and noise figure; applications—in-line power amplifiers and receiver preamplifiers); solitons (all-optical vs. electric regenerators, the nonlinear Schrodinger equation, solitons and lumped amplifiers, amplifier spacing and amplified spontaneous emission, ASE-induced timing jitter, error rates in solution transmission, WDM with solutions, sources of solution pulses). Networks: SONET ATM, WDM; signaling and synchronization; routing, scalability, and wavelength conversion; analog systems (dynamic range and noise figure, CATV, and cellular applications). Prerequisite: 247.

3 units, Win (Kazovsky)

349. Advanced Modern Optics—Holography (basic principles, Bragg holography); photorefractive effect (physical principles and applications); wave matter interactions (polarization effects); rigorous coupled wave analysis. Prerequisite: 268 or 366, or equivalent.

3 units, alternate years, given 2000-01

350. Radioscience Seminar—Seminars by university and industrial researchers on topics from space physics, planetary exploration, ionospheric and magnetospheric physics, radar and remote sensing of the environment, applied electromagnetics, waves in optical fibers and information systems with space applications. Student-faculty discussions. (AU)

1 unit, Aut (Zebker)
Win (Inan)
Spr (Fraser-Smith)

351. Digital Switching in Telecommunications—Switching fundamentals; space and time division switching; blocking probability analysis; rearrangeable networks; self-routing networks; ATM switching architectures; performance evaluation of ATM switches; network synchronization and signaling methods. Prerequisite: 374 or basic knowledge of telecom systems.

3 units, Spr (Narasimha)

352. Electromagnetic Waves in the Ionosphere and Magnetosphere—Magneto-ionic theory in multi-component media, signal dispersion, group ray velocity, wave polarization, refractive index surfaces, ray tracing, absorption, boundary effects, interpretation of natural phenomena (whistlers, VLF emissions), remote sensing in plasmas, communication, theory of wave-particle interactions in the magnetosphere. Prerequisite: 142 or equivalent.

3 units, alternate years, given 2000-01

354. Introduction to Radio Wave Scattering—Integral and differential equations of radio wave scattering; exact, approximate, and numerical solutions of single particle scattering for spheres, edges, points, and cylinders. Scattering from rough surfaces with large and small roughness scales, as time permits. Multiple scattering; formulation and solution techniques for equation of transfer in discrete media and scattering by continuous media in weak and strong regimes. Applications to radar, radar astronomy, remote sensing, and biological media. Prerequisites: 241 or equivalent, and partial differential equations, or consent of instructor.

3 units, alternate years, given 2000-01

355. Imaging Radar and Applications—Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: polarimetry and target
3 units, alternate years, given 2000-01

3 units, alternate years given 2000-01

356B. Signal Processing Methods in Musical Acoustics—(Enroll in Music 420.)

356C. Perceptual Audio Coding—(Enroll in Music 422.)

357. Microstructures Fabrication Laboratory—Enrollment preference to students pursuing doctoral research programs requiring the use of the Ginzbrot fabrication facility. Projects on the application of microfabrication technologies to exploratory devices. Planar fabrication techniques including contact lithography, vacuum deposition, and chemical etching. Use of analytical instruments including the scanning electron microscope, surface profilometer, and wafer probe station. Prerequisites: 212 or 333, consent of instructor.
3 units, Spr (Inan) alternate years, not given 2000-01

358A. Lasers Laboratory—(Enroll in Applied Physics 304.)

358B. Nonlinear Optics Laboratory—(Enroll in Applied Physics 305.)

359. Wireless Communication—Performance of digital modulation in fading and intersymbol interference; flat fading countermeasures: diversity, coding and interleaving, adaptive modulation; intersymbol interference countermeasures; equalization, multancarrier modulation, spread spectrum and RAKE receivers; multiple access—FDMA, TDMA, CDMA; cellular mobility issues, capacity and area spectral efficiency. Prerequisite: 276.
3 units, Aut (Goldsmith)

360A. Modern Control Design I—(Enroll in Engineering 207A.)

360B. Modern Control Design II—(Enroll in Engineering 207B.)

361. Applied Vision and Image Systems—(Enroll in Psychology 221.)

362. Linear Dynamic Systems—Continuation of 263. Optimal control and dynamic programming; linear quadratic regulator. More on Lyapunov theory and methods. Time-varying and periodic systems. Realization theory. Linear estimation and the Kalman filter. Examples and applications from digital filters, circuits, signal processing, and control systems. Prerequisites: 263 or equivalent, basic probability as in Statistics 116 or 278.
3 units, not given 1999-2000

364. Convex Optimization with Engineering Applications—Recognizing and solving convex optimization problems that arise in engineering. Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, geometric programming, extremal volume, and other problems. Numerical algorithms for smooth unconstrained problems; interior-point and ellipsoid methods for constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics and mechanical engineering. Prerequisites: working knowledge of linear algebra (e.g., from 263), background in applications, and willingness to program in Matlab.
3 units, alternate years given 2000-01

365. Vision and Image Processing—(Enroll in Psychology 267.)

3 units, Win (Widrow)


3 units, Spr (Widrow)


3 units, Win (Narasimha)

375. Advanced Analysis of Feedback—For advanced students. The required mathematics and basic results in the analysis of linear and nonlinear feedback systems. Nonlinear ODEs, local and global stability, Lyapunov theory. Gains of operators, small gain theorems, loop transformations, circle criteria, Popov theorem. Passive and contractive operators, Kalman-Yacubovich theorem. Robustness of multivariable linear systems, stability of feedback systems, linear systems with nonlinear actuators and sensors, overflow and quantizer induced limit cycles in digital filters. Prerequisite: 263.

3 units, alternate years, given 2000-01

376A. Information Theory—Information theory and statistics. The extreme points of communication theory: data compression to the entropy limit, and communication at the channel capacity limit. Kolmogorov complexity, Shannon entropy, Rate distortion theory. Huffman coding and random coding. Unified treatment based on the asymptotic equipartition theorem. Prerequisite: 278 or Statistics 116, or equivalent.

3 units, Win (Gill)


3 units, alternate years, given 2000-01


3 units, Win (Kailath)

379A. Digital Communication I—Maximum-likelihood data detection, modulation methods and bandwidth requirements, handpass systems and analysis, intersymbol interference and equalization methods, phase-locking, and synchronization. Prerequisites: 103, 278.

3 units, Win (Cioffi)


3 units, alternate years, given 2000-01

379C. Advanced Digital Communication—Topics: transmit optimization for channels with intersymbol interference, combined equalization and coding, line coding design and analysis, discrete multitone (DMT), vector modulation, generalized DFE, spread spectrum.

3 units, Spr (Cioffi) alternate years, not given 2000-01

380. Seminar on Computer Systems—Discussion of current research in the design, implementation, analysis, and use of computer systems ranging from integrated circuits to operating systems and programming languages. (AU)

1 unit, Aut, Win, Spr (Allison, Wharton)

382. Processor Design—Cycle time, area tradeoffs, AT measures of arithmetic units, multiple issue processors, vector and multimedia extensions, shared memory multiprocessors, I/O systems. Design using queueing analysis. Prerequisite: 282 or equivalent.

3 units (Flynn) not given 1999-2000

383. Advanced Compiling Techniques—(Enroll in Computer Science 243.)

384A. Network Protocols and Standards—Local area networks protocol standards: MAC Addressing; IEEE 802.1 bridging protocols (transparent bridging, source routing, virtual LANs). Internet protocol standards: the Internet Protocol (IPv4, IPv6, ICMP); routing protocols for interior gateways (RIP, OSPF, IGRP) and exterior gateways (EGP, BGP, Policy routing); IP multicast (IGMP, DVMRP, CBT, MOSPF, PIM), resource reservation (ST2+, RSVP). Asynchronous Transfer Mode (ATM): (physical layer sonet), ATM layer, ATM adaptation layer, ATM signaling, congestion control, PNNI; interworking with ATM: LAN emulation, IP over ATM. Prerequisite: 284.

3 units, Win (Tobagi)

384B. Multimedia Networking and Communications—Multimedia applications and requirements. Multimedia traffic generation and characterization: audio compression, image and video compression standards (JPEG, H.261, MPEG-2 and H.263). Advances in networking technologies and protocols for multimedia applications: LAN technologies; broadband services to the home including ADSL, cable modems, and hybrid fiber-coax (HFC); Internet protocols including IP multicast, resource reservation protocols (ST2+, RSVP). Integrated services in the Internet: integrated services over specific link layers (ISSLL). Real-time transport protocol (RTP), RTP profiles and payloads. Audio-video conferencing standards: the Internet architecture (SDP, SAP, SIP); ITU recommendations H.320 and H.323. Data conferencing standards; ITU recommendation T.120. Real-time streaming protocol (RTSP). Prerequisites: 284 or Computer Science 244A; 384A.

3 units, Spr (Tobagi)


3 units, not given 1999-2000

384D. Projects in Computer Networks—(Enroll in Computer Science 344.)
385. Special Seminars in Computer Systems—Seminars on current research topics in computer systems are given occasionally and are usually announced one or two quarters in advance. See the Time Schedule and bulletins in department office.

385A. Digital Systems Reliability Seminar—Student/faculty discussions of research problems in the design of reliable digital systems. Areas: fault-tolerant systems, design for testability, and system reliability. Emphasis is on student presentations and Ph.D. thesis research.
   1-4 units, Aut, Win, Spr, Sum (McCluskey)

386A. Parallel Computer Architecture and Programming—(Enroll in Computer Science 315A.)

386B. Parallel Programming Project—(Enroll in Computer Science 315B.)

387. Error-Correcting Codes—Theory and implementation of codes for detection and correction of random and burst errors. Introduction to finite fields. Linear block codes, cyclic codes, Hamming codes, Fire codes, BCH codes, Reed-Solomon codes. Decoding algorithms for BCH and Reed-Solomon codes. Prerequisites: some familiarity with discrete mathematics and linear algebra.
   3 units, Spr (Gill)

388. Programming Language Design—(Enroll in Computer Science 342.)

389. Topics in Programming Systems—(Enroll in Computer Science 349.)

390. Special Studies or Projects in Electrical Engineering—Independent work under the direction of a faculty member. Individual or team activities may involve lab experimentation, design of devices or systems, or directed reading.
   by arrangement

391. Special Studies and Reports in Electrical Engineering—Independent work under the direction of a faculty member; written report or written examination required. Letter grade given on the basis of the report; if not appropriate, student should enroll in 390.
   by arrangement

392. Special Seminars—Special seminars and experimental courses are given on topics of current interest by specialists in the field. Announcements are made one or two quarters prior to presentation. See Time Schedule and bulletins in department office for current listing.
   by arrangement

392A Database System Principles—(Enroll in Computer Science 245.)

392B. Introduction to Image Sensors and Digital Cameras—Introduction to the design and analysis of image sensors and digital cameras. Analysis of the signal path in a digital camera starting from the optics, through the sensor, the A/D converter, to the different color processing steps. Topics: photodetectors; CCD and CMOS passive and active sensor operation; noise and FPN analysis; spatial resolution and MTF; SNR and dynamic range; A/D conversion approaches; color interpolation, correction, and balance; and autofocus. A MATLAB camera simulator is used to explore various tradeoffs in camera design. Prerequisites: undergraduate level device, circuit, and system background, e.g., equivalent to 102, 111, 112, and 113, and some familiarity with noise analysis.
   3 units, Spr (El Gamal)

392F. Advanced Topics in Wireless Communications—Topics from current research areas in wireless communications, including new theoretical developments, system design issues, and implementation constraints. Modulation and coding for fading channels; adaptive modulation and coding; mitigation technologies for ISI channels; equalization, OFDM, and spread spectrum; multicarrier spread spectrum; smart antennas; multiuser detection; cellular system design; dynamic resource allocation, handoff and mobility management, access and channel assignment, power rate control, system capacity. Prerequisites: 142, 278 or equivalent, 279 or equivalent, 276 or equivalent (may be taken concurrently).
   3 units, Spr (Goldsmith) alternate years, not given 2000-01

392J. Digital Video Processing—The principles of digital video and multimedia signal processing, including leading algorithms for various applications. The fundamentals of image and video compression and the emerging world standards for various video and image communication applications, including ADTV/HDTV, multimedia indexing/browsing, and videoconferencing (H series ITU standards). The industrial aspects; imaging appliances such as scanners, digital cameras, graphics cards, DVDs, camcorders and TVs, and software architectures (e.g., DirectShow).
   3 units, Win (Altunbasak)

392K. Genetic Algorithms and Genetic Programming—The genetic algorithm is a domain-independent algorithm for search, optimization, and machine learning patterned after Darwinian natural selection and naturally occurring genetic operators such as recombination, mutation, gene duplication, gene deletion, gene regulation, and embryonic development. Genetic programming is a domain-independent automatic programming technique that extends the genetic algorithm to the breeding of populations of computer programs. Prerequisite: computer programming ability in some language.
   3 units, Win (Koza)

392L. Optical Fiber Communications Laboratory—Experimental techniques in optical fiber communications. Students investigate, experimentally, properties of key optical communications components: fibers, lasers, modulators, photodiodes, optical amplifiers, WDM multiplexers and demultiplexers, etc. Key optical communications systems techniques: eye diagrams and BER measurements. Prerequisites: 247, 348.
   3 units, Spr (Kazovsky)

   3 units, Spr (Prabhakar)


395. Electrical Engineering Instruction: Practice Teaching—Open to limited number of advanced graduate students in Electrical Engineering who plan to make teaching their career. Qualified students conduct a small section of an established course taught in parallel by an experienced instructor.
   1-15 units, Aut, Win, Spr (Gray)

399. Topics in Computer Vision—(Enroll in Computer Science 328.)

400. Thesis and Thesis Research—Limited to students who have established candidacy for the degree of Engineer or Ph.D. A grade of 'S' indicates satisfactory work; no letter grade is assigned.
   by arrangement

402A. Seminar: Topics in International Technology Management—The transformation of R&D in Japan and Asia. The changing role of
government support, high-tech entrepreneurism, new university-industry relationships, and the transition from "catching up" to "leadership."

"strategic" technologies, technology transfer and partnership opportunities, and the implications for the U.S. research community. Distinguished guest speakers from industry and government. (AU)

1 unit, Aut (Dasher)


1 unit, Spr (Dasher)

410. Integrated Circuit Fabrication Laboratory—Preference to students pursuing doctoral research programs in which the facilities of the IC lab are used. Laboratory fabrication of silicon gate NMOS or CMOS integrated circuits. Emphasis is on the practical aspects of IC fabrication, including silicon wafer cleaning, photolithography, etching, oxidation, diffusion, ion implantation, chemical vapor deposition, physical sputtering and wafer testing. Prerequisites: 212, 216, consent of instructor.

3-4 units, Win (Saraswat)

414. Design of RF Integrated Circuits for Communications Systems—Topics: the design of low-noise amplifiers at RF, passive and active filters, mixers, modulators and demodulators; review of classical control concepts necessary for oscillator design including PLLs and PLL-based frequency synthesizers. Design of high-efficiency (e.g., class E, F) RF power amplifiers, and coupling networks. Behavior and modeling of passive and active components at RF. Prerequisite: 214.

3 units, Spr (Lee)


Prerequisite: 142.

3 units, alternate years, not given 2000-01

478. Blind Multichannel Identification and Equalization—Theory and algorithms for blind system identification and channel equalization. Applications to array signal processing, wireless communication, and medical and seismic signal processing.

3 units, Spr (Kailath) alternate years, not given 2000-01

479. Multiuser Digital Transmission Systems—Fundamental theoretical multiuser communications concepts (multiple access, broadcast, multiuser detection, cross talk), matrix channel descriptions and optimized multiuser transmission, code-division multiple access concepts and implementations.

3 units, Aut (Cioffi)


3 units, Spr (Dally) alternate years, not given 2000-01


3 units, alternate years, given 2000-01

483. Topics in Compilers—(Enroll in Computer Science 343.)

484. Topics in Computer Graphics—(Enroll in Computer Science 448.)


486. Advanced Computer Arithmetic—Number systems, floating point representation, state of the art in arithmetic algorithms, problems in the design of high speed arithmetic units. Prerequisite: 282.

3 units, alternate years, given 2000-01

487. Digital Signal Processing Architectures and Systems—The design and implementation of signal processing systems. Survey of a variety of architectures and the tools available to automate this task. Case studies in data communications and image processing. Topics: behavioral specification and hardware simulation of signal processing systems, hardware generation using silicon compilers, dedicated architectures, programmable architectures, real-time operating systems, array processors, architecture design tools, video compression, wireless communication and low-power implementation. Prerequisites: 271, basic DSP concepts, C programming language, and UNIX.

3 units, Win (Meng)


3 units, Spr (McCluskey) alternate years, not given 2000-01


3 units, alternate years, given 2000-01

492. Special Seminars—Special seminars and experimental courses are given on topics of current interest by specialists in the field. Announcements are made one or two quarters prior to presentation. See the Time Schedule and bulletins in department office.

by arrangement

ENGINEERING-ECONOMIC SYSTEMS AND OPERATIONS RESEARCH

Emeriti (Professors): Kenneth J. Arrow, George B. Dantzig, Donald A. Dunn, Frederick S. Hillier, Donald L. Iglehart, Alan S. Manne, Michael M. May

Chair: James L. Sweeney


Associate Professors: Nicholas Bambos, Samuel S. Chiu, Ross D. Shachtier, Edison T. S. Tse
The Department of Engineering-Economic Systems and Operations Research (EES&OR) was founded in 1996 by a merger of the Department of Operations Research and the Department of Engineering-Economic Systems. EES&OR develops, applies, and disseminates principles and engineering methods for improving decision-making in operations, strategy, and policy. The department offers degree programs leading to a Master of Science, Engineer, and Doctor of Philosophy; it also participates in a program leading to a Bachelor of Science in Mathematical and Computational Science.

The department has special strength in theory and application within the following areas: continuous, discrete, and numerical optimization; probability and stochastic processes; dynamic systems and simulation; economics, finance, and investment; decision making, including decision analysis, dynamic programming, and planning under uncertainty; operations and services; corporate and individual strategy; and private and public policy issues.

Each year most faculty members are engaged in one or more projects, some with local industry or government, others in a national or international setting. Many of the projects provide opportunities for student participation, either working directly with the external organizations or through Stanford-based courses and research activities. Technical challenges encountered in such projects provide motivation and opportunity for methodological innovation. Data collection, processing, and presentation issues can be integral to future research efforts. Challenges encountered in these projects can provide invaluable experience for a student’s subsequent professional practice.

CAREERS IN EES&OR

EES&OR helps students prepare for a variety of professional careers in universities, business, industry, and government. Graduates have pursued successful careers in consulting, enterprise management, financial analysis, government policy analysis, industrial research, line management, product development, project management, strategic planning, and university teaching and research. Some have founded companies specializing in financial services, high-technology products, management and systems consulting, or software. Other graduates have helped establish new analytical capabilities in existing firms or government agencies.

Many graduates have become leaders in technology-based businesses, which have an increasing need for well-educated, analytically oriented people who understand both business and technology. The EES&OR program is attractive to people with engineering, physical science, and mathematical science backgrounds as it complements their technical abilities with the conceptual frameworks needed to analyze problems of investment, management, marketing, operations, production, and strategic planning in a technical environment.

UNDERGRADUATE PROGRAMS

The department does not yet have an undergraduate degree program, although one is planned. However, EES&OR participates with the departments of Computer Science, Mathematics, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the “Mathematical and Computational Science” section of this bulletin.

GRADUATE PROGRAMS

Three primary programs of study lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy in EES&OR. The department also offers a coterminal B.S./M.S. program.

Students admitted for graduate study in EES &OR must have a background of undergraduate work that indicates a level of mathematical problem solving sufficient to be found in an undergraduate mathematics, engineering, or physical science program. At a minimum, mathematical preparation would include at least one year of college-level calculus; a background in linear algebra, plus the capability to apply mathematical thinking to problem solving.

Knowledge of computer programming and some familiarity with formal proofs is strongly recommended. Undergraduate course work in economics is not required. Those newly admitted EES&OR students needing a review of linear algebra or calculus are advised to attend the two-week intensive math workshop offered by the department just prior to Autumn Quarter.

CERTIFICATE PROGRAM

The department offers a Certificate Program within the framework of the Non-Registered Option (NDO) program through the Stanford Center for Professional Development. A certificate in one of several specialties can be obtained by completing three core courses, plus one EES&OR elective course for the total of four courses. For further information, see: http://scpd.stanford.edu/ce/ndp/certificate.html.

Applicants apply through the Stanford Center for Professional Development as a NDO program participant. For additional information about the NDO application process, contact the center at (650) 723-3000.

All certificate applicants must meet department final approval for admission.

MASTER OF SCIENCE

University requirements for the master’s degree are described in the “Graduate Degrees” section of this bulletin.

The M.S. program in EES&OR prepares individuals with a solid foundation for a life-long professional career addressing important problems in industry, government, or individual decision making. Department requirements for the M.S. degree provide flexibility for meeting individual objectives consistent with developing depth in some particular area of concentration. The master’s degree may be a terminal degree program with a professional focus, or an exploratory vehicle to formulate and select a more advanced graduate program. The M.S. degree normally can be earned in one academic year (three academic quarters) of full-time work, although many students choose to enrich their education with up to an additional year’s work. The Honors Cooperative Program (HCP) provides opportunities for employees of some local companies to earn a M.S. degree over a longer period, by taking one or two courses per academic quarter. Some required EES&OR courses are only offered on campus; HCP students must plan to attend those courses at Stanford to meet the degree requirements.

In addition to the University’s basic requirements for the master’s degree discussed in the “Graduate Degrees” section of this bulletin, a candidate must complete a pre-designed program, organized to provide coherent depth through a set of courses that mesh both on content and schedule. Each program must include 45 units of course work, 39 units of which must be completed with a grade point average (GPA) of at least 2.75 and the remaining course units may be taken for satisfactory/no credit. Each program requires at least 32 units of graduate (200 level or higher) lecture and project courses in EES&OR. A project course is required and must be taken for a letter grade. Each M.S. program incorporates six or more of the ten 200-level core courses. It must include courses from four or more of the five core areas: Optimization; Probability and Stochastic Processes; Systems and Simulation; Economics, Finance, and Investment; and Decisions. For students with more advanced backgrounds, a 300-level course from the same core area may be substituted for a 200-level core. Core courses used to meet these requirements must be taken for letter grades. (See “Courses” below for a list of core and project courses.)

In addition, each program requires an additional 13 units of course work, designed to give breadth and depth appropriate for individual academic goals. Some of these courses are offered by EES&OR and some
by other departments relevant to the student’s academic goals. The department does not have a thesis requirement for the M.S. degree.

ENGINEER

University requirements for the Engineer degree are described in the “Graduate Degrees” section of this bulletin.

The EES&OR Engineer degree is for students desiring additional academic preparation beyond the master’s degree for a career of professional practice. The degree requires a minimum of one academic year of study beyond the M.S. degree. University regulations governing the Engineer degree are described in the “Graduate Degrees” section of this bulletin.

Students are not admitted directly into the Engineer program. Admission must be obtained from the department while the student is pursuing an M.S. degree in the department. The admissions decision is based on the department’s evaluation of the applicant’s academic record, performance in independent work, potential for advanced study, plus the faculty ability to support and supervise such study. Before acceptance to the Engineer degree program, the student must have personally arranged for a faculty sponsor for thesis supervision and any requisite financial support. However, availability of thesis supervisors and of financial support for the Engineer degree is very limited. The Engineer degree is considered to be a terminal degree.

The department requires the student to complete successfully: (1) an approved M.S. program with at least a 3.0 grade point average (GPA); (2) an additional 45 units beyond the M.S. degree, spanning all five core areas and including, at the 300-level, six or more core courses covering four core areas, with at least a GPA of 3.3 on core courses; (3) approval of a thesis proposal by the thesis supervisor; (4) satisfactory oral presentation of the thesis to the thesis supervisor and one other departmental- appointed faculty; and (5) completion of the Engineer thesis and approval by the thesis supervisor.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. degree are described in the “Graduate Degrees” section of this bulletin.

The program leading to a Ph.D. in EES&OR is for students primarily interested in a career of research, teaching, or high-level technical work in universities, business, industry, or government. Therefore, the Ph.D. program emphasizes scientific and analytical foundations as well as more applied concepts useful for practice at the highest professional levels.

The Ph.D. degree requires a minimum of three academic years of study beyond the B.S. degree. Admission to the doctoral program does not imply that the student is a candidate for the Ph.D. degree. Only after his or her application for doctoral candidacy has received official department and University approval does the student become a candidate. Not later than the Autumn Quarter of the second year in the department, the student should submit an application to participate in the department qualifying procedure.

In addition to University requirements, the student must successfully complete: (1) the department qualifying procedure; (2) a set of courses approved by his or her academic and dissertation advisers; (3) a dissertation, based on original research, which must be a contribution to knowledge; and (4) an oral examination near completion of the dissertation. All Ph.D. students must satisfy requirements for an M.S. in EES&OR by the end of their second year and all who have not already earned a master’s degree must apply for a Stanford M.S. prior to receiving the Ph.D.

The Ph.D. program is based on a requirement that successful candidates develop breadth, depth, and experience within the field. In order to receive approval, each student’s program must lead to sufficient breadth, depth, and experience, as outlined below.

All Ph.D. programs must include at least one course in each of the five core areas, including, at the 300-level, six or more core courses covering four core areas. Because most 300-level core courses have prerequisite 200-level core courses, most Ph.D. candidates first take these prerequisites. Core courses all must be taken for letter grades and each student must earn at least a 3.5 grade point average (GPA) on the core courses. Each program must include at least 39 units of courses from EES&OR.

Each Ph.D. candidate acquires additional depth in primary and secondary fields consistent with the student’s objectives. The student is responsible for working with his or her advisers to define a suitable program. This program must include, at minimum, 18 units of graduate courses, in addition to the core course requirement.

Each Ph.D. program must include a project course taken for a letter grade and may include additional non-academic professional experiences, such as an internship. The EES&OR project course used to satisfy requirements for an M.S. degree can also satisfy this requirement. (See “Courses” below for a list of core courses and project courses.)

Ph.D. MINOR

Doctoral students throughout the University may complete a minor in EES&OR by taking 21 units of EES&OR courses. These must include four or more of the 300-level core courses, covering at least three of the five core areas, with at least a 3.0 GPA.

FINANCIAL ASSISTANCE AND ADMISSION

Financial support is available on a competitive basis for qualified doctoral candidates. This includes a very limited number of course assistantships as well as research assistantships supported by faculty research grants and contracts. However, assistantships are, in most cases, awarded to students who have completed the Ph.D. qualifying procedure.

Supplementary financial support can sometimes be obtained by grading, assisting in special projects, or from University loans.

Most students in the EES&OR doctoral program will, after completing the qualifying procedure, be able to obtain financial support through a combination of research assistantships, course assistantships, and internships, all of which contribute directly to their educational programs. For most students, the critical period is the first two years of graduate work, when sufficient finances are needed to cover tuition and expenses.

Information about loan programs and need-based aid can be obtained from the Graduate Financial Support section of the Financial Aid Office. The application forms for admission may be obtained from Graduate Admissions, the Registrar’s Office. Applications for the Ph.D. degree program, with consideration for merit-based financial awards, must be made by February 1 of the preceding academic year, and must be accompanied by a completed application for admission. Merit-based financial awards for first-year Ph.D. candidates may take the form of fellowships, combination fellowships/assistantships, or assistantships. Applications for the master’s degree program and the Ph.D. degree program (without consideration for merit-based financial awards), are accepted until March 31, 2000. Research assistantships, however, are awarded by the individual faculty research supervisors, not by the department, and have no such deadline.

Except in unusual circumstances, admission is limited to the Autumn Quarter because courses are arranged sequentially with basic courses and prerequisites offered early in the academic year.

INTERNSHIPS

Since most complex system problems cannot be realistically duplicated within a university, some internships are available to help Ph.D. students develop the ability to solve system problems by working on real problems.

Internships may be found in large industrial firms; in companies and research groups concerned with the design, operation, and planning of complex projects and systems; and in government agencies. The duration of an internship ranges from six to twelve months depending on the time required to successfully complete the project. Internships for international students must conform to visa restrictions. Internships are not required, but are strongly encouraged as integral parts of a Ph.D. program.
RESEARCH AREAS

Students should gain experience in applying EES&OR concepts in at least one specific problem area. This experience can be gained through an internship, research projects, and special courses that concentrate on applying EES&OR concepts to specific areas. The current major research programs of the department are listed below. Faculty active in these programs are indicated.

OPTIMIZATION

Numerical Optimization—(Professors Infanger, Murray, Saunders.) The Systems Optimization Laboratory (SOL) provides opportunities for students to gain firsthand experience with computational methods, to participate in research on new algorithms, and to learn about modeling complex systems. Within SOL, there is a long-standing research program on algorithms for constrained optimization. This involves fundamental research on mathematical methods for linear and nonlinear programming, as well as techniques for implementing the methods as efficient and reliable computer software. There is a special interest in algorithms for large-scale problems. General-purpose packages developed at SOL (for example, MINOS and NPSOL) have been distributed to thousands of sites worldwide. Feedback from users brings about many fruitful collaborative efforts with industry, government, and academia.

Recent applications include: design of both yachts in the 1995 America’s Cup final; online control of transmission networks for electricity and gas; prediction of oil prices by the Federal Reserve; climate modeling for the greenhouse debate; determination of forces on the thigh bone prior to prosthesis insertion; optimal control of the DC-X experimental single-stage VTOL rocket.

Stochastic Optimization—(Professors Infanger, Van Roy.) This research program concerns techniques for solving mathematical models of decision problems whose parameters (coefficients, right-hand sides) are not known with certainty but are assumed known from their distributions. Although such problems are large, new breakthrough methods now make them solvable. Recent applications include: planning, scheduling, and control of electric power systems; design and operation of production lines; portfolio optimization and asset/liability management; pattern recognition; vehicle placement and scheduling in transportation; and optimal design of communication systems.

Complementarity Problems and Equilibrium Programming—(Professors Cottle, Eaves.) The research program is concerned with the mathematical study of properties of complementarity problems, the development of efficient algorithms for their solution, and the expansion of their use in practical problems. A central and unifying theme in the analysis of optimization and equilibrium problems, complementarity problems are special systems of equations and inequalities. Such systems arise in a wide range of theoretical and applied settings. Because of their pervasive and essential occurrence, it is efficient to isolate and study them. Complementarity conditions are central to the study of nonlinear programming, fixed points, variational inequalities, duality theory, control problems, and generalized equations. Path-following, homotopy methods and/or deformations are used in the study and solution of complementarity and general equilibrium problems. Examples arise in financial optimization, curve-fitting, economic and market equilibria, equilibria in games of conflict, contact mechanics, structural engineering, network optimization, traffic flow, and electronic circuits.

Network Optimization, Design, and Equilibria—(Professors Bambos, Chiu, Eaves, Infanger, Shachter, Veinott.) Network models are widely used in engineering, government, and industry for communication, construction, distribution, investment, manufacturing, mining, reliability, routing, scheduling, sequencing, supply, and transportation. Networks and graphs also serve as fundamental tools to study the structure of matrices, Markov chains, probabilistic dependence, optimization problems, and so on. The research in this area focuses on single-commodity, multi-commodity, dynamic, equilibrium, and stochastic network flow and design problems. The costs typically exhibit economies, diseconomies, or constant returns to scale. The emphasis is on the identification and/or development of the relevant structural properties of such systems; efficient methods of finding optimal or near-optimal flows, designs, and equilibria; and on applications to a wide variety of industrial, public, and engineering problems.

Lattice Programming—(Professor Veinott.) This area is concerned with predicting the direction of change in global optima and equilibria resulting from changing conditions based on problem structure alone without data gathering or computation. Rooted in the theory of lattices, this work is also useful for characterizing the form of optimal and equilibrium policies, improving the efficiency of computation and suggesting desirable properties of heuristics. The theory can be applied to cooperative and non-cooperative games, dynamic programming, economics, Leontief substitution systems, marketing, network flows, production and inventory management, project planning, reliability and maintenance, scheduling, statistical decisions, and so on. Recent specific applications include price and warranty setting in the automotive industry, and optimally stepping up pressure in gas pipelines.

PROBABILITY AND STOCHASTIC PROCESSES

Stochastic Modeling and Queueing Analysis—(Professors Bambos, Glynn, Iglehart, Shachter.) This research program focuses on the modeling and analysis of systems with essentially random operational parameters, using established techniques of probability and stochastic processes as well as developing novel ones. Such systems arise in various areas of engineering, business organization, production management, and so on. A key issue is the modeling of queueing processes in these systems in order to understand the dynamics of delay and the emergence of performance bottlenecks limiting the system throughout. Closely related research in stochastic scheduling and resource allocation aims at controlling such systems efficiently, in order to optimize their performance (maximize output, minimize delays, and so on.) Key application areas include communication networks, computer systems, flexible manufacturing systems, parallel and distributed processing networks, business organization, service systems, production management, and so on.

SYSTEMS AND SIMULATION

Simulation Methodology—(Professors Glynn, Iglehart.) Performance evaluation of large, complex stochastic systems relies extensively on computer simulation, as simulation is often the only feasible numerical approach to analyzing such systems. Research has, as a goal, the development of computational and statistical techniques that improve the efficiency of simulation methods and extend their applicability to a wide class of stochastic systems. Recent work has applied importance sampling to rare event simulations with applications to ATM communication switches and fault tolerant computer systems. Another recent application has been to polling systems in a manufacturing context. Contributions have also been made to the simulation of stochastic differential equations, which arise in financial engineering.

ECONOMICS, FINANCE, AND INVESTMENT

Investment—(Professors de Villiers, Johnson, Luenberger, Van Roy.) This program is devoted to building a rigorous foundation for the analysis of investment opportunities and the management of investment portfolios. As such, the program incorporates areas of: (1) corporate finance (the study of how corporations select and manage investment projects and how they choose their financial structure), (2) financial economics (the equilibrium analysis of financial markets), (3) financial engineering (the study of derivative securities, such as options and futures, and the design of new securities), (4) financial risk management (the study of hedging strategies), (5) portfolio theory (the design and management of investment portfolios), (6) fundamental analysis (the study of how economic factors influence investment value), and (7) technical analysis (the estimation of future asset prices based on their past values). Current research focuses on several important areas. One is the analysis and management of investment projects whose cash flow streams are uncertain and whose payoffs span several years. A new methodology, which combines the theory and the mathematics of derivative securities, optimal portfolio choice, and asset pricing, is being developed. A second area is the development of portfolio design methods which capitalize on the tools and resources made available by recent advances in.
information technology. A third area is the combination of simulation and optimization methods to solve large investment problems. The general goal of all research in the program is to develop effective and implementable methods for addressing complex practical problems in investment.

Energy, Natural Resources, and the Environment—(Professors Chao, North, Sweeney, Weynant.) Research activities center around the Energy Modeling Forum (EMF) and the International Energy Workshop (IEW). Based in EES & OR, the EMF provides a world-wide forum for improving the use and usefulness of models of energy and of the environment. Current EMF studies focus on an integrated assessment of global climate change, restructuring electricity markets, and energy policy in Japan. Theoretical and empirical research projects focus on both depletable and renewable natural resources, including energy, biological, mineral, and environmental resources, although greatest attention is focused on energy and associated environmental impacts. Current research efforts include economic responses to global greenhouse gas accumulation and quantification of externalities associated with energy and non-energy commodities.

Organizational Analysis—(Professors Sweeney, Tse.) The program studies incentives and information in organizations and inter-organizational systems. Incentives include those created by rules governing activities such as information sharing, cost allocation, and transfer pricing within an organization.

DECISIONS

Decision Analysis—(Professors de Villiers, Howard, Shachter.) Decision analysis is a philosophy, a body of knowledge, and a professional practice for the logical illumination of decision problems; it simultaneously considers the uncertain, dynamic, and complex consequences of a decision, as well as the assignment of value to its consequences. EES & OR research is dedicated to extending the theoretical foundations, increasing the effectiveness of practice, and expanding the field of application of decision analysis. The research program maintains a close relationship with professional decision analysts working on major decision problems. Internships are available at several local consulting firms. Much of the research is conducted through the Decisions and Ethics Center. The center studies how to make decisions both effectively and ethically. Current research areas include (1) designing of agreements to govern actions of several participants to a venture, (2) developing procedures for clarifying unstructured areas of concern as a first step in formulating decision problems, (3) analyzing decisions involving risks of injury or death, (4) developing efficient procedures that allow the benefits of decision analysis to be applied to a broad spectrum of applications at low cost in time, money, and effort, (5) expanding the power of decision analysis by technological improvements, such as incorporating sensitivity to relevance into professional analyses, (6) reconciling the viewpoints of decision analysis and finance theory in making project investment decisions, (7) designing incentive systems that control decision distortion and decision isolation effects, (8) exploring the human side of decision making to assure that decision makers not only know the best action, but will take it, and (9) investigating the short and long run effects of taxation on people's lives, liberty, property, and pursuit of happiness.

Dynamic Programming—(Professors Van Roy, Veinott.) This area currently focuses on the optimal management of populations over time, for example, systems, firms, inventories, jobs, customers, labor force, vehicles, books, passengers, securities, fish, trees, patients. Interest centers on the effective and efficient choice of decisions in the presence of risk, sequential acquisition of information, and possible growth or decline of rewards and/or the population over time. The emphasis is on the development of optimality concepts and system properties; on the existence, characterization, and computation of optimal policies; on the development of useful heuristics with assured performance; and on identifying and exploiting the structure of specific applications to gain insight about them.
STRAteGY

Business and Technology—(Professors Howard, Luenberger, Tse.) This area focuses on the successful creation and management of high technology companies and on the use of advanced technology to change and improve the practices and decision making processes of business enterprises so as to secure new competitive positions in the changing global environment. Research combines analytical thinking with case studies to develop fundamental principles applicable to high technology business and to the use of advanced technology in business decisions and enterprise management. Research topics include strategic allocation of capital, a normative theory of entrepreneurship, product and process innovation, marketing high technology products, business creation, and business re-engineering.

POLICY

National Security Policy—(Professors May, Perry.) Government policy research focuses on issues which involve political, economic, and technological factors in an essential way and which are likely to have long-term impact. Examples include policies with respect to the management and control of weapons of mass destruction and other modern weaponry, exports control, security aspects of energy supply questions, policies with regards to the utilization of space, and policies with regards to the diffusion of information technologies. Research is carried out in collaboration with the Center for International Security and Arms Control.

Energy and Environment Policy—(Professors Chao, North, Sweeney, Weyant.) This area analyzes policies at the state and national levels concerned with the management of depletable and renewable natural resources and the environment. Current research projects focus on the regulation of public utilities providing natural gas and electric power. The policy work is integrated with the research within the Energy, Natural Resources, and Environment area described above.

Medical Policy—(Professors Howard, Shachter.) This area analyzes medical decision making and the insights decision analysis brings to medical policy at the level of the individual patient, the provider, or through practice guidelines established by government, insurers, or professional societies. The department has close ties with the School of Medicine, especially the departments of Medical Informatics, and Health Research and Policy, and students are working on projects with both EES&OR and medical school faculty members.

Telecommunications and Information Policy—(Professors Bambos, Chiu.) This area analyzes policies concerned with the creation, distribution, and utilization of information and communication products, with emphasis on the new and evolving science-based information technologies. These activities are closely linked to the Center for Telecommunications.

Transportation Systems—(Professor Chiu.) This research views transportation systems as economic enterprises, focusing on integrated congestion management. Research topics include supply and demand equilibrium analysis, congestion pricing strategies, economics of congestion, policy evaluation, and analysis. The impact of technology on transportation planning and the role of telecommunications technology in transportation is also examined.

COURSES

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

Core Courses:

- Optimization: 211, 212, 311, 313, 318
- Probability and Stochastic Processes: 221, 222, 321, 322
- Systems and Simulation: 231, 232, 331, 332
- Economics, Finance, and Investment: 241, 242, 341, 342
- Decisions: 251, 252, 351, 352

Project Courses:

401, 402, 434, 441, 442, 444, 452, 453, 455, 478, 483, 495

Course descriptions, organized by area, are listed below. Most core course numbers end with 1 or 2.

GENERAL

208. Practical Training—Students obtain employment in a relevant industrial or research activity, chosen to enhance their professional experience, consistent with the degree program they are pursuing. Report on the experience and faculty overview agreement required. Faculty overview agreement must be confirmed through Student Services office prior to beginning employment.

1 unit, Aut, Win, Spr, Sum (Staff)

400. Ph.D. Qualifying Tutorial—Restricted to Ph.D. students assigned tutorials as part of the EES&OR Ph.D. qualifying process.

1-3 units, Aut, Win, Spr, Sum (Staff)

401. Cases and Projects in Decision Engineering—The development of communication, organization, and modeling skills as they relate to decision making in operations, strategy, and policy. Student teams compete in cases and projects. Emphasis is on problem identification, yield consideration, teamwork, project scheduling, task definition, task allocation, task amalgamation, group behavior, technical writing, public speaking, critique and defense, and the use of software, literature, principals, and experts. Enrollment limited. Prerequisites: three courses in EES&OR or equivalent. Corequisites: three more courses in EES&OR or equivalent.

4 units (Eaves) not given 1999-2000

402. Sponsored Projects in Decision Engineering—Each student team addresses a project in operations, strategy, or policy as sponsored by a business, medical, or government client. Emphasis is on: team interaction with the sponsor, model construction and analysis, data collection, use of literature and experts, formulation of recommendations, and communication. Enrollment limited. Prerequisites: 401, six courses in EES&OR or equivalent, consent of instructor. Corequisites: three more courses in EES&OR or equivalent.

4 units (Eaves) not given 1999-2000

405. Introduction to Engineering-Economic Systems and Operations Research—Introductory lectures by faculty and research staff describing department research programs. (AU)

1 unit, Aut (Staff)


1 unit, Win, Spr (Staff)

407. Teaching Assistants Workshop—Methods of effective pedagogy and course management issues. Designed for students who have been or will soon be teaching/course assistants. Topics depend on the interests of the students, especially problems they are currently encountering.

1 unit (Shachter) alternate years, given 2000-01

408. Directed Reading and Research in Engineering-Economic Systems and Operations Research—Directed study and research on a subject of mutual interest to the student and faculty member.

1 or more units, any quarter (Staff)

409. Thesis and Thesis Research—Limited to students who have established candidacy for the degree of Engineer or Ph.D.

1-15 units, any quarter (Staff)

OPTIMIZATION

111. Introduction to Optimization—(Enroll in Engineering 62.)

4 units, Aut, Spr (Staff)

211. Linear and Nonlinear Optimization—The fundamental concepts of linear and nonlinear optimization theory and modeling. The role of

4 units, Aut (Shachter)


3 units, Win (Eaves)

311. Optimization—Applications, theory, and algorithms for finite-dimensional linear and nonlinear optimization problems with continuous variables. Elements of convex analysis, first- and second-order optimality conditions, sensitivity and duality. Algorithms for unconstrained optimization, linearly constrained optimization problems (including linear and quadratic programs), and nonlinearly constrained problems. Prerequisites: Mathematics 113, 115.

3 units, Win (Cottle)


3 units, Aut (Shachter)

311. Optimization—Applications, theory, and algorithms for finite-dimensional linear and nonlinear optimization problems with continuous variables. Elements of convex analysis, first- and second-order optimality conditions, sensitivity and duality. Algorithms for unconstrained optimization, linearly constrained optimization problems (including linear and quadratic programs), and nonlinearly constrained problems. Prerequisites: Mathematics 113, 115.

3 units, Win (Cottle)

313. Vector Space Optimization—Optimization theory from the unified framework of vector space theory, i.e., treating together problems of mathematical programming, calculus of variations, optimal control, estimation, and other optimization problems. Emphasizes geometric interpretation. Duality theory. Examples. Topics: vector spaces, including function spaces; Hilbert space and the projection theorem; dual spaces and the separating hyperplane theorem; linear operators and adjoints; optimization of functionals, including theory of necessary conditions in general spaces, and convex optimization theory; constrained optimization, including Fenchel duality theory. Prerequisite: Mathematics 115.

3 units (Luenberger) alternate years, given 2000-01


3 units, Aut (Murray)

316. Linear Complementarity—Theory of the linear complementarity problem, its applications, and algorithms for its solution. Elements of quadratic programming theory. Pivotal algebra, Schur complements, and matrix classes. Analytic existence theorems. Lemke's algorithm, the principal pivoting method and degeneracy resolution techniques. Indirect algorithms. Prerequisite: 311 or consent of instructor.

3 units (Cottle) not given 1999-2000


3 units (Veinott) alternate years, given 2000-01

318. Linear Programming—Basic theory plus lab for learning about the numerical, software, and application aspects of the field. Formulation of standard linear programming models. Alternative techniques for solving linear programs. Theory of polyhedral convex sets, linear inequalities, alternative theorems, and duality. Variants of the simplex method, dual simplex method, product form of the inverse. Upper bounding, sensitivity analysis, economic interpretations. Large-scale linear programming, decomposition principle. Prerequisite: Mathematics 113 or consent of instructor.

3 units, Aut (Cottle)


3 units, Win (Van Roy)

PROBABILITY AND STOCHASTIC PROCESSES

120. Probabilistic Analysis—Probabilistic concepts important to rigorous problem solving, focusing on model building and communication: the structuring, processing, and presentation of probabilistic information. Probabilistic information using axiomatic principles. Life examples provide motivation and illustration of modeling techniques for probabilistic situations. Standard spreadsheets use provides probabilistic insights (and solution capability) to complement analytical closed form solutions. Topics: introductory probability (tools and concepts, e.g., the axioms of probability theory, random variables, distributions, the concept of conditioning, expectation and limit theorems, etc.). Materials from legal, social, medical, physical, and daily encountered problems. Prerequisites: multi-variable integration. Recommended: knowledge of spreadsheets.

5 units, Aut (Chiu)


4 units, Spr (Glynn)

221. Probabilistic Analysis I—Applied probability with a unique perspective: probabilistic analysis viewed as the structuring, processing, and presentation of probabilistic information. Introduction of Axioms of Probability Measures, the concepts of sample space, conditioning, random variables, distribution functions, and various expectation, etc., as the means to achieve probabilistic analysis. Concepts, tools, and modeling. Problem solving alone and beyond those achievable with only an analytical closed-form approach. Examples from social, legal, medical, and engineering systems. Prerequisite: working knowledge of calculus. Recommended: elementary knowledge of working with a spreadsheet.

4 units, Aut (Chiu)

222. Probabilistic Analysis II—Continuation of 221. Topics: limit theorems, discrete and continuous time Markov chains, renewal processes, queuing theory, and transform analysis. Emphasis is on building a framework to formulate and analyze probabilistic systems. Prerequisite: 221.

3 units, Win (Bamboz)

321. Stochastic Systems—Topics in stochastic processes, emphasizing applications. Markov chains in discrete and continuous time; Markov processes in general state space; Lyapunov functions; regenerative process theory; renewal theory; martingales, Brownian motion, and diffusion processes. Application to queuing theory, storage theory, reliability, and finance. Prerequisites: 222 or Statistics 217; Mathematics 113 and 115.

3 units, Spr (Glynn)
ECONOMICS, FINANCE, AND INVESTMENT

241. Economic Analysis—Principal methods of the economic analysis of the production activities of firms (production technologies, cost and profit; perfect and imperfect competition); individual choice (preferences and demand); and the market-based system (price formation, efficiency, welfare.) Emphasis is on the analytical foundations and the practical applications of the methods presented. See 341 for continuation of 241. Recommended: 211.

4 units, Win (Sweeney)

242. Investment Science—Introduction to modern quantitative investment analysis: theory and practical application. How modern investment concepts can be used to evaluate and manage opportunities, structure portfolios, and use sophisticated investment products including stocks, bonds, mortgages, and annuities. Topics: deterministic cash flows (time-value of money, present value, internal rate of return, term structure of interest rates, bond portfolio immunization, project optimization); mean-variance theory (Markowitz model, capital asset pricing); dynamic and uncertain cash flows. Emphasis is on translating theory into actual procedures. Examples of applications for every major topic. Group project devoted to application of the theory. See 342 for continuation of 242.

3 units, Aut (Luenberger)

243. International Investments—Introduction to international financial markets, their comparative behavior, and their inter-relations. Focus is on assets traded in liquid markets: currencies, equities, bonds, swaps, and derivatives. Institutional arrangements, taxation, and regulation; international arbitrage and parity conditions—valuation of target firms for cross-border acquisitions; international diversification and portfolio management; derivative instruments and dynamic investment strategies; international performance analysis; miscellaneous topics of current relevance and importance. Corequisite: basic finance theory (equivalent of 242 or Industrial Engineering 235).

3 units, Sum (Feinstein)

245. Risk Analysis: Theoretical, Legal, and Economic Perspectives—The theoretical aspects of risk analysis and applications in law, finance, and economics. Economic applications: problems related to arbitrage in financial markets, estimating corporate bond default risk, analysis of catastrophic economic events such as stock price crashes, investment portfolio rebalancing, and financial risk management. Legal applications focus on areas of law in which the concept of risk plays a crucial role, e.g., law and finance, and the law of product liability. The background "black letter law" relevant to a legal problem or doctrine is contrasted to alternative analytical approaches based on, e.g., traditional law and economics, probabilistic analysis, fuzzy logic, etc.

3 units, Spr (de Villiers)

246. Economics of Natural Resources—Intertemporal economic analysis of natural resource use, particularly energy, and including air, water, and other depletable mineral and biological resources. Emphasis is on an integrating theory for depletable and renewable resources. Stock-flow relationships; optimal choices over time; short- and long-run equilibrium conditions; depletion/extinction conditions; market failure mechanisms (common-property, public goods, discount rate distortions, rule-of-capture); policy options. Prerequisite: 241 or Economics 51.

4 units, Win (Sweeney)

249. Growth and Development—How to assess new investment opportunities in the countries of the Pacific Rim and other fast growing economies. Useful for investors and those guiding their country's development choices. Topics: the mechanism of economic growth, the equation of interest, optimal growth, economic interpretation of the calculation of growth.
of variations and optimal control theory results, uncertainty, tools for evaluating long-term growth rate, geometric moments, and exponormal distribution. Investment incentives, country risk indices. The long view: rule of law vs. rule of people. Practical cases from Ireland, E. European countries, China, and other E. Asian countries.

341. Economic Analysis—Builds on 241 concepts. Market structure and industrial organization (oligopoly, strategic behavior of firms, game theoretic models); economics of uncertainty; general equilibrium theory and economic efficiency (formulation, Walras’ Law, existence, uniqueness, duality between efficiency and general equilibrium; trade); intertemporal equilibrium and asset markets; macroeconomic analysis and economic growth (accounting identities, general equilibrium perspective); public goods, externalities. Background for advanced advanced economics. Prerequisite: 241.

3 units, Sum (de La Grandville)

342. Advanced Investment Science—Advanced topics and research in the theory and application of investment concepts. Topics: forwards and futures contracts, continuous and discrete time models of stock price behavior, geometric Brownian motion. Ito’s lemma, basic options theory. Black-Scholes equation, advanced options techniques, models and applications of stochastic interest rate processes, and optimal portfolio growth. Computational issues and general theory. Teams work on independent projects that apply the principles. Prerequisite: 242.

3 units, Win (de Villiers)

344. Equilibrium Programming—Mathematical models of equilibria in economics and in conflict. Price equilibria. Extensive form games, general and partial equilibrium economic models, Nash equilibria. Solution of equilibrium models by the homotopy principle: deform the system to an easily and uniquely solved one, and follow the solution of the system as it is deformed, with retrogressions, back to the original system. Piecewise linear and differential homotopies and curve following. Subdivisions, atlases, regularity, degree, fixed points, stationary points, general and special case algorithms. Prerequisite: 211.

3 units (Eaves) not given 1999-2000

346. Economic Analysis of Market Organizations—For second-year or more advanced graduate students. Applies theories of microeconomics and operations research to decision behavior and mechanism design in market organizations, emphasizing asymmetric information structures. Topics: game theory, economics of information, and nonlinear pricing. Applications: priority pricing of congested services, emission trading of pollutants, design of competitive markets for electric power, competitive product pricing, etc. Prerequisites: basic knowledge of microeconomics, optimization, probability theory, and decision theory. Recommended: familiarity with mathematical modeling and skills in computer programming.

3 units, Aut (Chao)

347. Capital Investment and Financing Decisions—Optimal capital investment and financing decisions for firms operating in a dynamic and uncertain environment. Forecasting and valuing project cash flows. Designing and managing projects to create and capitalize on operating and follow-on investment opportunities. Financing alternatives and the relationship between investment type and optimal financial structure. Prerequisites: basic finance theory (equivalent of 242 or Industrial Engineering 225).

3-4 units (Johnson) not given 1999-2000

349. Investment Science Frontiers—Restricted to EES&OR Ph.D. students. Advanced concepts of investment science with emphasis on theories and methods for solving practical problems: valuing and structuring projects, mergers, acquisition, and contracts; designing portfolios for optimal growth; and managing risk and enhancing value within a complex business enterprise. Combination lecture, seminar, and project. No auditors. Prerequisites: 242, 313, 342.

3 units, Aut (Luenberger) alternate years, not given 2000-01

442. Investment Projects—Students work in teams to address a practical problem in investment. Faculty assist in identifying appropriate projects and in developing students’ understanding of relevant analytical tools. Students assume full responsibility for project analysis and presentation to the decision maker.

4 units (Johnson) not given 1999-2000

444. Investment Practice—Project course is designed to enhance student’s abilities to formulate and design superior solutions to financial issues in industry and the financial services sector. Short projects illustrate the basic application and implementation of investment principles. Students complete a new project from industry. Enrollment limited to 30 EES&OR students. Prerequisites: 242, 342.

4 units, Spr (Luenberger)

446. Transportation, Energy, and Environment Research Roundtable (TEERR)—Presentation and discussions of research in progress or contemplated, focused on the interplay of transportation, energy, and environmental economics and policy issues. Students present either their own research or, subject to approval, recent research by others.

1 unit, Aut, Win, Spr (Sweeney)

447. Investment Research Seminar—Presentation/discussion of recent research on investment. Topics vary with the current research interests of participants. Students should be actively involved in research on investment. Prerequisite: consent of instructor.

1-3 units (Johnson) not given 1999-2000

DECISIONS

152. Introduction to Decision Analysis—How to make good decisions in a complex, dynamic, and uncertain world. People often make decisions that on close examination they regard as wrong. Decision analysis uses a structured conversation based on actional thought to obtain clarity of action in a wide variety of domains. Topics: distinctions, possibilities and probabilities, relevance, value of information and experimentation, relevance and decision diagrams, risk attitude. GER:2b (DR:6)

3 units, Spr (Shachter)

251. Stochastic Decision Models—Efficient formulation and computational solution of sequential decision problems under uncertainty. Markov decision chains and stochastic programming. Maximum expected present value and rate of return. Optimality of simple policies: myopic, linear, index, acceptance limit, and (s,S). Optimal stationary and periodic infinite-horizon policies. Applications to investment, options, overbooking, inventory, production, purchasing, selling, quality, repair, sequencing, queues, capacity, transportation. MATLAB is used. Prerequisites: probability, linear programming.

3 units, Win (Van Roy)

252. Decision Analysis I—Coherent approach to decision making, using the metaphor of developing a structured conversation having desirable properties, and producing actional thought that leads to clarity of action. Instruction is Socratic, with computational issues covered in problem sessions. Emphasis is on creation of distinctions, representation of uncertainty by probability, development of alternatives, specification of preference, and role of these elements in creating a normative approach to decisions. Evaluates information gathering opportunities in terms of a value measure. Relevance and decision diagrams represent and clarify inference and decision. Principles are applied to decisions in business, technology, law, and medicine. See 352 for continuation of 252.

4 units, Aut (Howard)

254. The Ethical Analyst—The professional analyst who uses technical knowledge in support of any individual, organization, or government is ethically responsible for the consequences. Material sensitizes the indi-
individual to ethical issues, providing the means to form ethical judgments, and questions the desirability of physical coercion and deception as a means to reach any end. Exploration of human action and relation in society is conducted in the light of previous thought, and is used to provoke additional research on the desired form of social interactions. Attitudes toward ethical dilemmas are explored by creating an explicit personal code. Issues from the range of human affairs test the student’s framework for ethical judgment.

1-4 units, Spr (Howard)


3 units, Spr (Van Roy)

352. Decision Analysis II—The extension of decision making from a system of thought about decisions to the considerations necessary for aiding other people and organizations in decision making: decision engineering. Topics: how to organize the decision conversation, the role of the decision analysis cycle and the model sequence, assessing the quality of decisions, framing decisions, the decision hierarchy, strategy tables for alternative development, creating decision diagrams that are spare and effective, understanding and overcoming biases in assessment, developing and using evocative and assessed knowledge maps, dealing with “uncertainty about probability.” Interpretation of various forms of sensitivity analysis, use of approximations, value of revelation, value of joint information, options, flexibility, bidding, assessing and using corporate risk attitude, risk sharing and scaling, and treating decisions involving health and safety. See 353 for continuation of 352. Prerequisite: 252.

4 units, Win (Howard)

353. Decision Analysis III—The extension of decision analysis beyond the basic paradigm. Emphasis is on determining and extending the boundaries of systematic analysis of decisions. Topics: the concept of decision composite; probabilistic insurance and other challenges to the normative approach; the relationship of decision analysis to classical inference and data analysis procedures; the likelihood principle and exchangeability principles; inference, decision, and experimentation using conjugate distributions; developing a risk attitude based on general properties; examination of alternative decision-aiding practices like analytic hierarchy and fuzzy approaches. Presentations on current research. Object is to prepare doctoral students for research and to enable all to understand the discipline at the most fundamental levels. Prerequisite: 352.

3 units, Spr (Howard)


3 units, Win (Shachter)

358. Optimization under Uncertainty and Applications in Finance—How to make optimal decisions in the presence of uncertainty, solution techniques for large-scale systems resulting from decision problems under uncertainty, and selected applications in finance. Decision trees, utility, two-stage and multi-stage decision problems, approaches to stochastic programming, model formulation; large-scale systems, Bend-
3 units, Aut (Bambos) alternate years, not given 2000-01

3 units (Staff) alternate years, given 2000-01

3 units (Veinott) alternate years, given 2000-01

378. Competitiveness in High Tech and Semiconductors: Operations and Strategy—The development of new analytical models and techniques for improving high tech and semiconductor enterprise performance by modeling the electronic food-chain from semiconductors to computers, telecom, and software. Strategic and operational enterprise performance and management issues including financial investment aspects, market structures, design process capacity management, manufacturing and supply chain management, and quality emphasizing yield learning together with fab and enterprise economics. Prerequisites: basic optimization, probability and statistics or consent of instructor to participate in tutorial option.
4 units, Win(Akella, Tse)

478. Competitiveness in High Tech and Semiconductors: Projects and Strategy—Projects with companies in high tech and semiconductor, guest industry speakers, and advanced optional lectures. Enterprise analysis and senior management presentations cover product and process design, costing, financial decisions, demand and market structures, enterprise economics, facility design, manufacturing, supply chain management, yield and learning, business models for enterprises, information technology and organizational design, strategic management. Recommended: 378.
4 units, Spr(Akella, Tse)

479. Management of Technological Enterprises Seminar—Speakers from industry on leading edge technologies and their management. Seminar series focus is on the electronic foodchain in the Internet age, primarily semiconductor, computer, telecom, and software industry experts and executives. Objective: provide insights into industry dynamics and economics, and the development of strategies to succeed in a volatile marketplace crowded with mature and emerging technologies, and to help synthesize the variety of systems approaches learned in “solving” key strategic issues faced by the high tech industry.
1 unit, Spr(Akella, Tse)

284. Building Dynamic Entrepreneurial Organizations—Focus is on the dynamic development of corporate skills, knowledge, and infrastructure to compete in a changing global competitive environment due to rapid technology advancement, global economic development, changes in consumer’s preference, and government regulations. Model analysis and case studies are used to develop a methodology in building dynamic entrepreneurial organizations in response to dynamic competitive requirements. Links between EES&OR core and the notion of managing change as a basis for a normative theory on entrepreneurial activities in new business creation and corporate expansion.
3 units, Spr(Tse)

286. Pricing Next Generation Telecommunications Products and Services—Telecommunication products and services pricing as the key to success in a rapidly changing and highly competitive market. Interdisciplinary approach to position, price, and distribution of traditional/innovative telecommunication services. Topics: the telecommunication industry as driven by technological advances, policy choices, and explo- sive business opportunities; the pricing revolution and arbitrage opportuni- ties in international voice created by data-voice convergence and liberalization; competitive aspects of service delivery channels; commoditizing of bandwidth and basic services; clearinghouses; financial risk hedging through futures/derivatives trading; the need to develop intelligent pricing and provisioning agents for product bundling; grade of service differentiation; positioning and revenue optimization by captur- ing consumer preferences. Group project in industrial participation.
3 units, Sum (Chiu)

483. Strategy Models—The design and application of formal models in the study of strategic planning problems. Problems involving issues of technology development, resource management, and uncertainty in a corporate setting. Emphasis is on the integrated utilization of modeling tools drawn from diverse methodologies and the requirements for success- ful application in a policy-making or corporate strategy context. Links between art, theory, and practice are emphasized. Prerequisites: 211, 241, and 252 or equivalent. Recommended: some background in finance and marketing.
4 units, Spr(Weyant)

489. Interdisciplinary Seminar on Conflict Resolution—(Same as Economics 386, Law 611, Psychology 283.) Addresses problems of conflict resolution and negotiation from an interdisciplinary perspective. Presentations by faculty and by scholars from other universities.
1-2 units, Win(Arrow, Ross, Wilson, Alexander)

POLICY
193/293. The Role of Technology in National Security—(Graduate students register for 293.) Examines critical decisions made by the U.S. in selected security and space programs, emphasizing current issues. Case studies illustrate the process by which technical, political, and econom- ic issues are brought into the policy process; particularly, the way in which technical organizations in government, government committees, and science advisory boards interact to bring advice to senior policy makers. Examination of some case decisions in other countries.
3 units, Aut(Perry)

194/294. The Role of Analysis in Environmental Policy Decisions—(Graduate students register for 294.) Examines major past and current public policy decisions on issues such as air pollution, toxic chemicals, nuclear waste, and global climate alteration. Case studies from the instructor’s personal experience illustrate the process by which technical, political, and economic factors are brought into the policy process. Emphasis is on the role of analysis in summarizing technical information and uncertainties and on the reconciliation of differing points of view among government experts, scientific advisory boards, and interested/affected parties among the public. Recommended: background in quan-
titative analysis (i.e., basic undergraduate courses in engineering, science, or economics).

3-5 units, Spr (North, Sweeney)

195. International Security in a Changing World—(Same as Political Science 138.) Surveys the major international and regional security problems in the modern world. Interdisciplinary faculty lecture on the political and technical issues involved in arms control, the military legacy of the Cold War, regional security conflicts, proliferation of advanced weapons capabilities, ethnic conflicts, and peacekeeping efforts. GER:3B (DR:9)

5 units, Win (Blacker, Perry, May, Sagan)

196. Transportation Systems and Urban Development—Introduction to transportation systems and planning, and their roles in society. Analytical tools introduced at a conceptual level examine issues and evaluate alternatives. Policy implications and system effectiveness analysis of transportation in an urban context. Topics: economic analysis of transportation, supply and demand equilibrium analysis, urban transportation networks, congestion management, short and long term transportation planning, the impact of technology on transportation systems, land use and transportation, case studies and analysis of current transportation news items. Prerequisite: Mathematics 21.

3 units, Win (Chiu)

297. Progress in Worldwide Telecommunications—Interdisciplinary study of topics in current worldwide developments and economic trends with the participation of prominent guest speakers from international, regional, national, and corporate organizations and agencies. Topics: telecommunications services, technology, standardization, (de)regulation, market-driven competition, and the needs of the underserved parts of the world. Individual or team case study and a verbal presentation. May be repeated for credit.

3 units, Sum (Ivanek, Chiu)

299. Voluntary Social Systems—Exploration of ethical theory, feasibility, and desirability of a social order in which coercion by individuals and government is minimized and people pursue ends on a voluntary basis. Topics: efficacy and ethics; use rights for property; contracts and torts; spontaneous order and free markets; crime and punishment; guardian-ward theory for incompetency; the state and interventionism, hypothesis of reverse results; applications help for the needy, victimless crimes, and environmental protection; transition strategies to a voluntary society.

1-3 units, Win (Howard)

493. Decision Making and National Security Problems—Seminar for graduate students with an interest in government decision making in areas which involve a technological component, e.g., defense, energy, and environment, and high-technology trade and policy. Follows 193 or 194.

3 units, Spr (Perry)

495. Quantitative Analysis of Public Policy Decisions—A current public policy problem is addressed as a single project team, completing the major phases of analysis during the quarter: framing, modeling, data gathering, evaluation, and communication. Instructor coaches the team and provides guidance on gaps in the team’s knowledge. Past topics: environmental, health, technology, and transportation issues. Enrollment limited. Prerequisites: 211, 231, 241, 252 equivalent, or consent of instructor.

3 units, Spr (Borison)

INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT

Emeriti: (Professors) James L. Adams, Robert V. Oakford, Henry E. Riggs, David A. Thompson
Chair: M. Elisabeth Paté-Cornell
Assistant Professors: Diane E. Bailey, Pamela J. Hinds, Ulrich W. Thomann
Professor (Teaching): Robert E. McGinn
Associate Professor (Teaching): Thomas H. Byers
Consulting Professors: Naushad Forbes, Thomas Kosnik
Consulting Associate Professors: Laura Kopczak, Behnam Tabrizi
Affiliated Faculty: David Beach, Peter W. Glynn, J. Michael Harrison, Charles A. Holloway, Kosuke Ishii, James G. March, David B. Montgomery, Evan L. Porteus, Krishna Saraswat

The Department of Industrial Engineering and Engineering Management (IEEM) focuses on the understanding, operation, and design of industrial and technological systems involved in the production of goods and services. Activities include the management of resources, the design of processes, and the coordination of the people, organizations, and technology necessary to produce and distribute goods and services. Depending on the degree level, students are prepared to design, manage, perform research on, or teach about productive systems that may be in private industry; in federal, state, or local government; or in public, quasi-public, or nonprofit institutions.

Engineering management is concerned with the knowledge and processes required to manage technically-based enterprises.

UNDERGRADUATE PROGRAM

BACHELOR OF SCIENCE

The program leading to the B.S. degree in Industrial Engineering (IE) is stated earlier under the “School of Engineering” section of this bulletin. This curriculum serves those students whose long-run objective is the planning, design, and implementation of complex economic and technological management systems where a scientific and engineering background is necessary or desirable. The fundamentals of engineering are stressed. The Industrial Engineering program is designed to introduce the student to computers and information systems, economic analysis and modeling, facilities planning and design, management, measurement and control theory, and organization theory and behavior. The objective is to provide the student with systems concepts, an introduction to the role and function of management, methods of analysis, and the human and economic factors that bridge the gap between engineering design and management. To achieve the objective, the student will take several courses in which a group project represents an important part of the course. In these projects, the student has the opportunity to formulate and solve problems and implement solutions for firms and organizations in the surrounding community.

Many students completing the bachelor’s program pursue graduate study in industrial engineering, in other professional schools (law, medicine, or business) or in fields related to industrial engineering such as economics, statistics, or operations research.

For information about an IE minor, see the “School of Engineering” section of this bulletin.
GRADUATE PROGRAMS

The University requirements governing the M.S. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin. IEEM, in collaboration with other departments of the University, offers programs leading to the degrees of Master of Science and Doctor of Philosophy. The department also offers a master’s degree in Manufacturing Systems Engineering in cooperation with the Department of Mechanical Engineering and a dual IEEM/EE master’s degree in cooperation with the Department of Electrical Engineering.

Applicants for admission as graduate students in IEEM must submit the results of the verbal, quantitative, and analytical parts of the Graduate Record Examination. The deadline for application is February 1.

Assistantships and Fellowships—A limited number of fellowship and assistantships are awarded each year. Written requests to be considered for fellowships and assistantships should be made by February 1.

MASTER OF SCIENCE

The M.S. degree programs require a minimum of 45 units beyond the equivalent of a B.S. degree at Stanford. All programs represent substantial progress in the major field beyond the bachelor’s degree.

INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT

The M.S. program is designed to prepare students for a professional career and to address the critical technical and managerial needs of the companies that are employing graduates. It provides knowledge of production and distribution systems and the processing of management as applied to technically-based enterprises, as well as additional skills in the student’s chosen concentration.

Background requirements, taken in addition to degree requirements, include engineering economy, probability, and statistical methods. Industrial Engineering course requirements include:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
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<tbody>
<tr>
<td>133. Industrial Accounting</td>
<td>3-4</td>
</tr>
<tr>
<td>203. Organizational Behavior</td>
<td>4</td>
</tr>
<tr>
<td>221. Quality and Operations Management</td>
<td>4</td>
</tr>
<tr>
<td>269. Marketing for Technology-Based Companies</td>
<td>3</td>
</tr>
<tr>
<td>270. Strategy in Technology-Based Companies</td>
<td>4</td>
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</table>

Additional requirements are three courses within a specified concentration and graduate technical and management electives.

Any student admitted to graduate standing on the basis of a bachelor’s degree in a field other than engineering or science must complete the 45 units of work as outlined above, and the equivalent of 45 units of mathematics, science, and engineering breadth. In addition, the student must comply with the prerequisites for the courses listed on the program for the M.S. degree.

The detailed requirements for the M.S. degree are available from the IEEM office.

ENGINEERING: MANUFACTURING SYSTEMS ENGINEERING

The M.S. in Engineering with a concentration in Manufacturing Systems Engineering addresses the need for engineers who combine management and design skills focused on manufacturing. There is a critical need for individuals who can deal directly with product design for manufacturability; design of integrated manufacturing systems; financial, organizational, and strategic management issues; and elements of automation technology such as computer-aided design, computer-aided manufacturing, robotics, and microprocessor control.

Manufacturing Systems Engineering is a joint effort of the departments of Mechanical Engineering, and Industrial Engineering and Engineering Management. The program seeks highly qualified students with strong educational backgrounds in engineering and provides a demanding curriculum that is strong in both hardware and engineering management. Successful applicants should have a minimum of one year of full-time industrial experience.

The hardware and engineering-design aspects of the program include:
- Ambidextrous Thinking
- Design for Manufacturability
- Integrated Design for Marketability and Manufacturing
- Mechatronic Systems Design
- Microprocessor Applications
- Robotics and Manipulation

The engineering management subjects include:
- Engineering Economy
- Industrial Accounting
- Inventory Control and Production Systems
- Manufacturing Strategy
- Manufacturing Systems Design
- Organizational Behavior and Management
- Quality Assurance and Control

The hardware and engineering design courses provide hands-on training of these functions and the trade-offs that must be made in selecting alternative systems configurations.

The engineering management subjects provide a suitable perspective so that alternative system choices can be appropriately evaluated for their financial, organizational, and production impacts, as well as their impact on the firm’s manufacturing policy.

Beyond the required core, the curriculum allows for elective courses chosen from a broad set of relevant electives providing additional training in engineering management, engineering-design hardware, and aspects of computer science. A student may follow individual interests and tailor the program to meet individual needs.

Students interested in a career focused on manufacturing management and product development may apply for the Dual Manufacturing Systems Engineering and M.B.A. Program. Minimum requirements can be met through six to seven quarters of study if the candidate matriculates in both programs simultaneously.

The detailed requirements for the M.S. in Manufacturing Systems Engineering are available from the IEEM office.

INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT (IEEM) AND ELECTRICAL ENGINEERING (EE)

Admission—For the dual degree, admission to both departments is required, but is coordinated by designated members of both Admissions Committees who make recommendations to the committees of their respective departments.

Advising—Every student in the dual degree program has one adviser in EE, and one in IEEM. In addition, a committee consisting of designated faculty from both departments serves as a review committee on performance and as an overseeing body of ongoing and graduating students of the program. The committee, consisting of designated members of both Admissions Committees as described in the previous section, may initially serve as this overseeing body.

The Dual Degree Program—This dual-degree program enables a small, selective set of graduate students to obtain both the IEEM master’s degree and the EE master’s degree simultaneously. The total number of units required to complete the dual-degree is 72 (versus 90 if the two degrees were pursued separately), and the total number of full-time quarter residency equivalents required to complete the dual degree is six (students with a 50 percent teaching or research assistantship, who average 9 units per quarter, earn .62 of a full quarter of residence).

The units and time to complete requirements are based on the student having the relevant background such as students with work experience. Most students may need to take some of the background courses.

Background Requirements (do not count toward degree units)—

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Comp. Sci. 106A. Programming Methodology</td>
<td>5</td>
</tr>
<tr>
<td>Stat. 190. Introduction to Statistical Methods (Post Calculus)</td>
<td>5</td>
</tr>
</tbody>
</table>

Common Foundation Requirements (8 units)—

1. A course on statistical process control and design of experiments at the graduate level. Currently, this can be satisfied by Industrial Engineering (IE) 221 Quality and Operations Management (4 units).
2. A course on basic manufacturing processes as specified by the EE adviser. Currently, this can be satisfied by EE 212 (3 units).
3. EE 203, Entrepreneurial Engineer Seminar or IE 292, Technology Management Seminar (1 unit).

**Electrical Engineering Core Requirements** (21 units)—At least 21 units that satisfy the M.S. in Electrical Engineering degree requirements as outlined below:

1. At least three graded EE courses numbered above 200 in one area to provide depth.
2. Three graded EE courses numbered above 200 in an area outside of requirement '1' to provide breadth.
3. Additional units in EE numbered above 200, of which at least 9 are above 300, so that the total of requirements 1, 2, and 3 amounts to at least 21 units.

Part of the 21 units above can be satisfied with up to 3 units of seminars, for example EE 201.

**Industrial Engineering and Engineering Management Core Requirements** (21 to 23 units)—

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB 133. Industrial Accounting</td>
<td>3-4</td>
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<tr>
<td>EE 203. Organizational Behavior</td>
<td>4</td>
</tr>
<tr>
<td>EE 261. Inventory Control and Production Systems</td>
<td>3</td>
</tr>
<tr>
<td>IE 269. Marketing in Technology-Based Firms</td>
<td>4</td>
</tr>
<tr>
<td>IE 270. Strategy in Technology-Based Firms</td>
<td>4</td>
</tr>
<tr>
<td>One additional 200-level IEEM course</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Electives** (21 units or more)—Additional units in EE and IEEM and other related departments to meet the total requirement of 72 units.

**DOCTOR OF PHILOSOPHY**

The Ph.D. degree is intended for students who desire careers in teaching and research. The program requires a minimum of three years (nine quarters) of full-time graduate study, at least two years of which must be at Stanford. However, the typical student takes four years after entering the doctoral program to complete all Ph.D. requirements. The Ph.D. degree must include a minimum of 90 quarter units of approved course work beyond the bachelor's degree, not including units for dissertation research. Frequently, a Ph.D. applicant has already completed a master's degree and would therefore be required to complete a minimum of 45 additional units. The Ph.D. program is organized along three lines of research: production systems, organizational behavior, and engineering risk analysis. Doctoral students are required to take a number of courses and to pass a qualifying exam in one of these three fields. Detailed requirements for the Ph.D. program are available from the IEEM office.

Responding to the dramatic changes occurring in manufacturing today, the School of Engineering and the Graduate School of Business have created the Future Professors of Manufacturing (FPM) program. This joint program is designed to train exceptional professors of manufacturing, who will lead U.S. education and research in manufacturing into the next century. More information on this program can be obtained from the IEEM office or the Stanford Integrated Manufacturing Association (SIMA).

**COURSES**

(WIM) indicates that the course meets the Writing in the Major requirements.

**UNDERGRADUATE**

60. Engineering Economy—(Enroll in Engineering 60.)

100. Organizations: Theory and Management—for undergraduates only, with preference to IEEM majors. Survey of classical and modern organization theory, covering the behavior of the individual, the work group, and the organization.

4 units, Au (Eisenhardt) Spr (Hinds)

101. Issues in Technology and Work for a Post-Industrial Economy—Introduces undergraduates in industrial engineering and other engineering disciplines to the study of technology and work, exploring topics of contemporary concern and identifying challenges posed by a post-industrial workplace. Objectives: explore how changes in technology and organization are altering the way we work and live our lives; become acquainted with approaches to studying and designing work; and examine how a more grounded understanding of work and work practices can assist engineers in designing better technologies and better organizations. Representative topics: job design, distributed and virtual organizations, the blurring of boundaries between work and family life, computer supported cooperative work, trends in skill requirements and occupational structures, monitoring and surveillance in the workplace, downsizing and its effects on work systems, project work and project-based lifestyles, the growth of contingent employment, telecommuting, electronic commerce, and the changing nature of labor relations.

3 units, Spr (Barley)


4 units, Win (Kopczak)

125. Manufacturing Systems Design—(Graduate students see 225) The concepts and techniques of designing and improving productive systems. Emphasis is on the physical and organizational design of high-performance manufacturing systems. Multidisciplinary approach with the use of digital simulation as a tool for evaluating design alternatives. Prerequisites: 100, 121; Engineering-Economic Systems and Operations Research 121. (WIM)

5 units, Spr (Bailey)

133. Industrial Accounting—Non-majors and minors who have taken or are taking elementary accounting should not enroll. Introduction to accounting concepts and the operating characteristics of accounting systems. The principles of financial and cost accounting, design of accounting systems, techniques of analysis, and cost control. Designed for the user of accounting information and not as an introduction to a professional accounting career. Interpretation and use of accounting information for decision making is stressed.

3-4 units, Au, Sun (Bhimjee)

170. Work, Technology, and Society—(Fulfills the School of Engineering's Technology in Society requirement.) Seminar on work in contemporary society as influenced by rapid technological change. The causes and consequences of the current revolution in work and policies for grappling with resultant problems. Focus is on the U.S., with attention to key trends in selected foreign countries. Topics: new technology in the workplace and its bearing on occupational and organizational changes, industrial relations, worker health and safety, economic competitiveness, women workers, workplace ethics, and innovative public and private policies on work. Limited enrollment. GER: 3B (DR: 9)

4 units, Spr (McGinn)

175. Information Systems—Introduction to the design and use of computer-based information systems. Topics: software and hardware used in information systems, information requirements, database design, information system design, organizational aspects of information systems, and applications of information systems in different industries. Prerequisites: 100; Computer Science 106A, 106B.

4 units, Win (Thonemann)

180. Senior Project—Restricted to IE majors in their senior year. Students participate in a major project in groups of four. Attention to problem identification and definition, emphasizing data collection, synthesizing feasible solutions to real problems, and presentation of results. Prerequisites: 100, 121, 125, 133, 235, 260; Computer Science 106B or X; Engineering 40, 62; Engineering-Economic Systems and Operations Research 121.

5 units, Win (Staff)
191. Directed Study—Directed study on a subject of mutual interest to the student and faculty member. Student must find a faculty sponsor and submit a one-page description of plan.

1 or more units (Staff)

PRIMARILY FOR GRADUATE STUDENTS

203. Organizational Behavior and Management—Organization theory; concepts and functions of management; behavior of the individual, work group, and organization. Emphasis on the role and related discussion. Enrollment limited to 65 graduate students per section; priority given to IEEM majors.

4 units, Aut (Sutton)

205. Contextual and Organizational Issues in Human-Computer Interaction—Focus is on the contextual issues associated with designing and using computer interfaces and technology, providing insights into, experience with, and ways of understanding issues in work and consumer settings that influence the design of computer interfaces. Team student projects develop skills in: observing individuals and groups of people in context, using models of work and other activity to extend their design capabilities, identifying constraints and tradeoffs on designs within the context of use, and observing and working with people in interdisciplinary design groups. Enrollment limited. Prerequisite: 203 or Computer Science 147, or consent of instructor.

4 units, Spr (Hinds)

220. Management and Organization of Research and Development—The organization of R&D in industry and the problems of the technical labor force. Relevant theoretical perspectives from sociology, anthropology, and management theory on the social and pragmatic issues that surround technical innovation and the employment of scientists and engineers. Possible topics: organization of scientific and technical communities, industrialization of research, nature of scientific and technical work, strategies for fostering innovation, careers of scientists and engineers, and managerial problems characteristic of R&D settings.

4 units, Aut (Barley)


4 units, Win (Kane)

223. Technology and Work—Theory and research on the social implications of technology and technological change for workers at all levels. Alternate conceptions of technology as social phenomenon, approaches to the study of technology in the workplace, reactions of individuals and groups to technological change, the construction of a technology’s social meaning, and the management of technological change. Emphasis is on automation, electronic data processing, and sophisticated microelectronics, including CAD-CAM systems, telecommunication networks, medical imaging technologies, artificial intelligence, and personal computers.

4 units (Barley) given 2000-01

225. Manufacturing Systems Design—(Undergraduates see 125.) The concepts and techniques useful in the initial design and redesign of modern, high-performance manufacturing systems. Multidisciplinary approach considers the design of the physical and organizational aspects of manufacturing systems. Emphasis is on the use of simulation as a tool for design evaluation. Prerequisite: graduate standing in engineering.

4 units, Aut (Jucker)

227. Innovations in Manufacturing—Major trends in innovations in manufacturing as they have evolved over time. Emphasis is on understanding why changes occur in addition to what they entail. Topics: changes in the mode of production, performance objectives, sources of inspiration, factory set-up, work organization, arenas of competition, and information technology. Implications for future design.

4 units (Bailey) given 2000-01

234. Managing to IPO: Control Systems—(Same as Business 319A.) How firms evolve and adapt their control/information systems when changes occur in their markets, technology, competition, and in their own internal capabilities. Emphasis is on the challenges faced by start-up and pre-IPO ventures when designing their control/information systems. Topics: target costing, activity-based management, quality and customer satisfaction, balanced scorecards, competitor cost/pricing analysis, and incentive-system design.

4 units, Spr (Foster)


4 units, Aut (Turki)

236. Introduction to Finance—(Same as Business F221.) The foundations of finance, with applications in corporate finance and investment management. The process of valuation, which is central to many of the major financial decisions made by corporate managers and investors. Topics: criteria for making investment decisions, relationships between risk and return, market efficiency, and the valuation of derivative securities (e.g., options). The major financial instruments issued by corporations including short and long term debt, equity, and convertible securities. Conceptually rigorous; cases illustrate applications of the main concepts. Prerequisites: 133, Engineering 60, and Engineering-Economic Systems and Operations Research 120 or Statistics 116. Recommended: Engineering 62; Statistics 110 or 190.

4 units, Win (Admati)

237. International Investment and Financing—Builds on the concepts in 235, e.g., NPV, capital structure, and cost of capital estimation, and extends these concepts to an international setting, where foreign exchange plays a key role. Topics: exchange rate determination theories, the performance of exchange forecasting models, exchange rate exposure and hedging, international borrowing and capital structure, and international project evaluation. Practical standpoint; however, an understanding of the theory is a necessity in “real world” applications. Prerequisite: 235.

3-4 units, Spr (Turki)

240. Engineering Risk Analysis—The techniques of analysis of engineering systems for risk management decisions involving trade-offs (technical, human, environmental aspects). Four parts: elements of decision analysis; probabilistic risk analysis (fault trees, event trees, etc.); economic analysis of failure consequences (issues of human safety and long-term economic discounting); and case studies (e.g., space, systems, nuclear power plants, liquefied natural gas terminals, and dams). Emphasis is on risk management issues in the public and private sectors. Prerequisites: Statistics 116, Engineering 60, or equivalents.

3 units, Win (Paté-Cornell)

241. Project Course in Engineering Risk Analysis—Students, individually or in groups, choose, define, formulate, and resolve a real risk management problem, preferably from a local firm or institution. Oral presentation and report required. Scope of the project is adapted to the number of students involved. Three phases: risk assessment, risk communication, and risk management. Emphasis is on the use of probability for the treatment of uncertainties and sensitivity to problem boundaries. Enrollment limited and at discretion of instructor. Prerequisite: 240.

3 units, Spr (Paté-Cornell)
260. Analysis of Production and Operating Systems—Introduction to the design, operation, and control of production systems using mathematical, computational, and modern analytical techniques. Topics: determination of optimal facility location, determination of production lot sizes, optimal timing and sizing of production capacity expansion, and introduction to inventory control. Prerequisites: Engineering 62, Statistics 116.
3 units, Aut (Thonemann)

261. Inventory Control and Production Systems—Topics in the planning and control of manufacturing systems. The functions of inventory, determination of order quantities and safety stocks, alternative inventory replenishment systems, item forecasting, production-inventory systems, materials requirements planning (MRP), Just-in-Time systems, master and operations scheduling, supply chain management, and service operations. Enrollment limited. Prerequisite: Statistics 116 or equivalent.
3 units, Win (Hausman)

262. Supply Chain Management—Definition of a supply chain, coordination difficulties, pitfalls and opportunities in supply chain management, inventory-service tradeoffs, performance measurement and incentives. Supply chain network design, global supply chain management, the manufacturing/distribution interface, supplier management. Design and redesign of products and processes for supply chain management, tools for design, industrial applications, strategic alliances, current industry initiatives. Enrollment limited to IEEM majors. Prerequisite: 260 or 261.
3 units, Spr (Hausman)

263. Service Operations Management—Operations management in the service industries (e.g., banking, transportation, travel and tourism, health, government) and within service functions of manufacturing (e.g., financing, customer service). Topics: design and delivery of services, the measurement of productivity and quality, managing capacity and demand, quality management, reengineering of service delivery processes, management of technology in services, and managing human resources. Prerequisite: Statistics 116. Recommended: Engineering 62.
3 units (Brandeau) given 2000-01

264. Global Project Coordination—Students engage in projects that are global in nature, and which are related to the planning and design of supply chains and product development. Project teams from Stanford and an overseas university work on common projects using telephones, faxes, emails, internet, video-conferencing, face-to-face meetings, etc. As part of the project, students travel to Hong Kong, the Netherlands, or Sweden and Singapore.
3 units, Win (Tabrizi, Kopczak)
Spr (Kosnik)

265. Reengineering the Manufacturing Function—Preference given to undergraduates. Student teams of four to six redesign the manufacturing and distribution system of a medium-sized manufacturer, focusing on the transportation system, inventory policies for a regional warehouse, design of a national distribution system, operational improvements of work flow, layout of the manufacturing plant and redesign of the planning and control system. Redesign is at an operational level consistent with a strategy of integrating the functions of manufacturing and distribution. Modular approach, with each module requiring analytical or game software. Data is provided. Groups meet twice per module with faculty; written report required. Topics: production planning, inventory theory, linear/integer programming, simulation, economic analysis, and applied probability. Modules are integrated via the focus on the customer; group learning is emphasized. Enrollment limited. Prerequisite: senior or graduate standing.
4 units, Spr (Carlson)

266. Management of New Product Development—Techniques of managing or leading the process of new product development that have been found effective. Emphasis is placed on how much control is desirable and how that control can be exercised in a setting where creativity has traditionally played a larger role than discipline. Topics: design for manufacturability, assessing the market, imposing discipline of the new product development process, creating effective development organization, and developing products to hit cost targets.
4 units, Win (Carlson)

267. Information Technology and Supply Chain Management—(Same as Business T372.) Advancements in information technology have enabled major innovations in the re-engineering of industry supply chains, redefining the ways companies operate their supply chains. New ventures have emerged to create values for business partners and the consumers in supply chain integration. How information technologies have advanced supply chain integration and coordination. The dimensions of business and process improvements. New opportunities using supply chain management concepts and emerging technologies. Enrollment limited.
4 units, Spr (Lee)

268. Manufacturing Strategy—For graduate students only; priority given to Manufacturing Systems Engineering. The development and implementation of the manufacturing functional strategy. Emphasis is on the integration of manufacturing strategy with the business and corporate strategies of a manufacturing-based firm. Topics: types of manufacturing technologies and their characteristics, quality management, capacity planning and facilities choice, the organization and control of operations, and determining manufacturing’s role in corporate strategy. Prerequisite: 261 or 260.
3 units, Spr (Carlson)

269. Marketing for Technology-Based Companies—Priority given to IEEM graduate students. Introduction to marketing strategy and execution for technology-based companies in imagination-intensive industries. Topics: market segmentation and selection, positioning, product management, pricing, channels of distribution, marketing communication. Using case studies based on real companies, students learn to diagnose problems and opportunities, make decisions, analyze customers, competitors, channels, economic and ethical issues that affect their decisions, and reality test their recommended approach. Prerequisites: 133, Engineering 60. Recommended: 235.
4 units, Win (Kosnik)

270. Strategy in Technology-Based Companies—For graduate students; priority given to IEEM. Introduction to the basic concepts of strategy, with emphasis on high technology firms. Topics: strategic alliances, standards setting, vertical integration, strategic choice, generic and hypercompetitive approaches, organizational capabilities, and complexity/evolutionary perspectives. Enrollment limited.
4 units, Aut (Eisenhardt)

271. Global Entrepreneurial Marketing—Designed to equip an engineer with the marketing skills needed to launch and lead a high-growth, high-tech venture, cultivating the skills needed to market new products to new customers, using new technology, sometimes in a new company. The marketing challenges facing entrepreneurs who expand internationally early in the life of the company. Learning is by case method, working in teams, and with a field-based entrepreneurial project. Each student writes a strategic thinking paper. Team performance cultivates entrepreneurial leadership and teamwork skills. Prerequisites: 133, Engineering 60. Recommended: 235, 273.
4 units, Spr (Kosnik)

272. Entrepreneurial Finance—Primarily for graduate engineering students. Introduction to the concepts in and around the financing of entrepreneurial companies. Focus is on teaching future general managers how to use financial perspective to make better decisions in entrepreneurial settings, including selecting financial partners, evaluating financing vehicles, and financing companies through all growth stages.
from start-up through initial public offering. Prerequisites: 133, Engineering 60. Recommended: 235.

3 units, Win (Mackenzie)

273. Technology Venture Formation—Open to graduate students interested in high technology entrepreneurship. Emphasis is on how technology ventures are created. Topics: opportunity identification, market assessment, product plans, selling strategies, financing options, and team development. Student teams write and present a business plan. Enrollment limited. Recommended: 133 or equivalent.

4 units, Aut, Spr (Lyons, MacLean)

275. Organizations and Information Systems—For graduate students interested in how information systems impact organizations and how organizations take control of information technology (IT) to gain a competitive edge. Topics: IT strategy, the fit between IT and corporate culture, IT architectural alternatives, changing technologies and organizational learning, the effect of IT on competition, and outsourcing as an offensive strategy. Student teams perform field studies based on situations in which information technology is creating a significant management problem or business opportunity. Case based. Enrollment limited, consent instructor. Prerequisite: 100 or 203.

2-4 units, Aut (Forbes)

279. Technology, Policy, and Management in Newly-Industrializing Countries—(Same as Science, Technology, and Society 279.) Technology is seen as the key to development and prosperity in most parts of the world. Building technological capability in newly-industrializing countries at the national and firm level. What makes technology special, government intervention that affects technology, the concept of technology leader and technology follower environments, the transfer of technology from "leader" countries, indigenous technological capability, human capital, culture and innovation, the role of small firms and new enterprises in technological capability. Managing innovation in firms: how innovation is different in technology-followers, organizing for shop-floor innovation, building an innovation culture, the special role of R&D in followers, the role of design, technology strategy for followers. Cases from Korea, India, Brazil, Singapore, and other NICs.

1 or more units (Staff)

291. Directed Study—Directed study on a subject of mutual interest to student and faculty member. Prerequisite: find a faculty sponsor.

1 or more units (Staff)


1 unit, Aut (Eisenhardt)

Win (Kosnik)

Spr (Byers)


Aut, Win, Spr (Staff)

302. Doctoral Research Seminar in Organizations—Enrollment limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

3 units, Spr (Bailey)

321. Doctoral Research Seminar in Work, Technology, and Organizations—Enrollment limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

3 units (Barley) given 2000-01

322. Organizations as Social Networks—Social structures can be investigated as social networks. Organizational and inter-organizational structures may be analyzed as patterned relationships among individuals, groups, and other organizations. Such networks appear as predictors of a variety of social dynamics (attitude similarity, the diffusion of innovation, turnover, and the allocation of organizational resources). Methods for collecting and analyzing network data include graph theory, sociometry, clique detection, centrality analysis, blockmodeling, and the quadratic assignment procedure. Readings of recent published research, actual data sets, and relevant computer programs. Prerequisites: one or more courses in organizational behavior, sociology, psychology, anthropology, or political science. Recommended: course in statistics or research methods.

3 units (Barley) given 2000-01

323. Doctoral Seminar on Ethnographic Research—Designed for graduate students; upper-level undergraduates with consent of instructor. Ethnographic interviewing and participant observation is emphasized. Techniques for taking, managing, and analyzing field notes and other qualitative data. 15 hours per week outside of class collecting and analyzing own data. Methods texts and ethnographies offer examples of how to analyze and communicate ethnographic data. Prerequisite: consent of instructor.

8 units (Barley) given 2000-01

324. Creativity in Organizations—Draws on organizational behavior, psychology, sociology, engineering, history, economics, and anthropology to explore the meaning, determinants, and effects of creativity in organizations. Theory and research on individual creativity; creativity as a social process. Focus is on understanding, building, and testing scholarly theory about creativity. Enrollment limited to 12. Prerequisites: doctoral standing and completion of Psychology 212 and Sociology 360.

3 units, Win (Sutton)

325. Remote and Distributed Work—Prerequisite: consent of instructor.

3 units (Hinds) given 2000-01

326. Strategy and Organization Doctoral Research Seminar—Review of current research at the interface between strategy/business policy and organization theory. Topics: top management teams and strategic decision making processes; strategic boundary issues (e.g., strategic alliances, vertical integration, and diversification); reward structure and board relationships; evolution of strategies, technology, and populations of organizations. Enrollment limited and at the discretion of instructor. Prerequisite: Sociology 260 or equivalent.

4 units, Win (Eisenhardt)

340. Doctoral Seminar in Risk Analysis—Limited to doctoral students. Doctoral study including reading/review of the literature in the fields of engineering risk assessment and risk management. New methods and topics, emphasizing probabilistic methods and decision analysis. Applications to risk management problems involving the technical, economic, and organizational aspects of engineering system safety. Possible topics: treatment of uncertainties, learning from near misses, and use of expert opinions.

3 units, Spr (Paté-Cornell)


3 units (Carlson) alternate years, given 2000-01

363. Advanced Models in Management Science—Primarily for doctoral students. Theoretical treatment of advanced models for procurement, transportation, storage, and distribution problems in production systems. Topics: logistics models for global supply chain management, distribution network design, routing and routing/scheduling models,
network models, and logistics management. Prerequisites: 260 or equivalent, Engineering-Economic Systems and Operations Research 121 or equivalent.

3 units (Thoneman) alternate years, given 2000-01

364. Single and Multi-Location Inventory Models—Theoretical treatment of the management and control problems of inventory systems in production and distribution, with models for single and multi-location systems. Emphasis is on operating characteristics, performance measures, and optimal operating and control policies. Prerequisite: Statistics 217 or equivalent.

3 units (Spr, Hausman) alternate years, not given 2000-01


3 units (Brandeau) given 2000-01

367. Advances in Integrated Supply Chain Management—The integration and coordination of material, information, and financial flows in a supply chain that spans suppliers, manufacturers, distributors, logistics providers, and customers. Recent advances prepare students for research. Topics: information distortion, postponement, centralized vs. decentralized control, vendor managed inventory, logistic restructuring, incentive issues, manufacturer and retailer interface, replenishment coordination, and value of information.

3 units, Spr (Lee)

390. IEEM Doctoral Research Seminar—Presentations of current research papers by speakers from inside and outside the department. Ph.D. students must attend during every quarter in residence. No letter grades or units given.

Aut, Win, Spr (Staff)

MATERIALS SCIENCE AND ENGINEERING

Chair: John C. Bravman
Associate Chair: Bruce M. Clemens
Associate Professor: Reinhold H. Dauskardt
Assistant Professors: Paul C. McIntyre, Charles B. Musgrave, Shan X. Wang
Professor (Research): Robert S. Feigelson
Curtesy Professors: Curtis W. Frank, James S. Harris, James D. Plummer, Jonathan F. Stebbins
Curtesy Associate Professor: Huajian Gao
Acting Assistant Professor: Jonathan Dean

The Department of Materials Science and Engineering is concerned with the relation between the structure and properties of materials, factors that control the internal structure of solids, and processes for altering the structure and properties of solids. It brings together in a unified discipline the developments in physical metallurgy, ceramics, and the physics and chemistry of solids. The undergraduate program, described under the “School of Engineering” section of this bulletin, provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable students are encouraged to take at least one year of graduate study to extend their course work. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines. Graduate programs lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy.

FACILITIES

The department is based in the Thomas F. Peterson Engineering Laboratory (Building 550). Offices for the chair and most of the faculty, for the administrative and technical staff, and for most graduate students are located there, as are a number of lecture and seminar rooms. Facilities for teaching and research are also available within the Peterson Lab, including equipment for electrical measurements; mechanical testing of bulk and thin film materials; fracture and fatigue of advanced materials; metallurgy: optical, scanning, transmission electron microscopy and atomic force microscopy; UHV sputter deposition; vacuum annealing treatments; wet chemistry; and x-ray diffraction. The Peterson Lab is also the home for the Center for Research on Information Storage Materials (CRISM) with corresponding facilities for magnetic measurements. The Rapid Prototyping Laboratory (RFL), housing material deposition and removal stations, is a joint facility with Mechanical Engineering, and is housed next to the Peterson Labs in Building 530. The department maintains two microcomputer clusters for its students, one with a number of Macintosh computers, and the other with five HP and DEC workstations. Both clusters are linked with the world-wide Internet network.

Depending on the needs of their program, students and faculty also conduct research in a number of other departments and independent laboratories. Chief among these are the Center for Integrated Systems (CIS), the Center for Materials Research (CMR), and the Stanford Synchrotron Radiation Laboratory (SSRL).

The Center for Integrated Systems (CIS) is a laboratory joining government and industrially funded research on microelectronic materials, devices, and systems. It houses a 10,000 square foot, class 100 cleanroom for Si and GaAs integrated circuit fabrication; a large number of electronic test, materials analysis, and computer facilities; and office space for faculty, staff, and students. In addition, CIS provides start-up research funds and maintains a “Fellow-Mentor” program with industry.

For information on CMR and SSRL, see the “Center for Materials Research” and “Stanford Synchrotron Radiation Laboratory” sections of this bulletin.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

The undergraduate program provides training in solid state fundamentals and in physical metallurgy. Students desiring to specialize in this field during their undergraduate period may do so by following the curriculum outlined in the “School of Engineering” section of this bulletin as well as the School of Engineering Undergraduate Handbook. The University’s basic requirements for the bachelor’s degree are discussed in the “Undergraduate Degrees” section of this bulletin. Electives are available so that students with broad interests can combine materials science and engineering with work in another science or engineering department.

For information about an MSB minor, see the “School of Engineering” section of this bulletin.

COTERMINAL B.S./M.S. PROGRAM

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminial program should apply for entrance after the beginning of the eighth quarter of undergraduate work and before the end of the eleventh quarter. The application must give evidence that the student possesses the potential for strong academic performance at the graduate level. Each application is evaluated by the department’s Admissions Committee. Scores from the Graduate Record Exam (GRE) General Test must be reported before action can be taken.
on an application. Materials science is a highly integrated and interdiscipli- 
disciplinary subject, and so applications from students of any engineering 
course undergraduate major are encouraged. Information forms per-
taining to the coterminal program may be obtained from the department’s 
Student Resource Center, room 550B, or from Degree Progress in the 
Registrar’s Office, Old Union. Students entering the coterminal program 
and receiving both their B.S. and M.S. degree in Materials Science and 
Engineering should also see the “Master of Science for MS&E Cotermi-
nal Students” section below.

GRADUATE PROGRAMS

Graduate students can specialize in any of the areas of materials sci-
ence and engineering. In collaboration with other departments of the 
University, additional special programs are available.

MASTER OF SCIENCE

The University’s basic requirements for the M.S. degree are discussed in the “Graduate Degrees” section of this bulletin. The following are specific departmental requirements.

The Department of Materials Science and Engineering (MSE) re-
quires a minimum of 45 units for a master’s degree. Up to 9 units of work 
done as a graduate student at another institution may sometimes be trans-
ferred to give unit credit toward the electives used in acquiring a Stanford 
degree. Substitution of courses taken for specific Stanford courses is 
approved on the Master’s Program Proposal. Master’s Program Propo-
sals should be filled out, signed by the student’s academic adviser, 
and submitted to the department’s Student Services Coordinator by the 
end of the first week of the students’ second quarter of study. (Gener-
ally, this means by the end of the first week of Winter Quarter.) Final chang-
es to the master’s program must be submitted no later than one academic 
quarter prior to degree conferral.

Degree requirements (for students entering after September 1, 1997) 
are as follows:

1. A minimum of 33 units of MSE course work, including cross-listed courses, taken for a letter grade. The following are limitations:
   a) A maximum of 9 units of cross-listed courses may be used in fulfilling this requirement.
   b) One-unit seminars and research units cannot be used to fulfill this requirement.

2. Lab courses MSE 171, 172, 173 (which count toward the required 33 
   units of MSE course work).

Note: students who have had equivalent lab courses at other uni-
versities, equivalent practical experience, or have a materials related 
degree or background are expected to file a petition with the depart-
ment’s Student Services Coordinator to have this requirement waived.

3. Six courses selected from MSE 152, 215, and 201 through 209. These 
   “core” courses count towards the required 33 units of MSE course work, 
   however:
   a) MSE 152 is not an option for students with materials science 
       undergraduate degrees.
   b) MSE 251 may not be used to fulfill this “core” requirement if 
       the student has a materials science undergraduate degree, 
       although it may be applied towards the required 33 units of 
       MSE course work.

4. Approved course electives to bring total units to 45. Of the 12 units 
   of elective courses:
   a) Nine of the 12 units must be taken for a letter grade.
   b) A maximum of 3 units may be seminars.
   c) If writing a Master’s Research Report, a minimum of 6 and a 
      maximum of 9 units of MSE Research units may be used.
   d) A maximum of 3 units may be undergraduate units (offered at 
      Stanford University).
   e) A maximum of 5 units may be used for a foreign language 
      course (not including any remedial English courses).
   f) The combination of seminar, undergraduate, and language units may not exceed 6 units total.

5. A minimum grade point average (GPA) of 2.75 for course work at 
   Stanford.

All proposed degree programs are subject to approval by the depart-
ment’s Academic Degree Committee which has responsibility for assur-
ing that each proposal is a technically coherent program.

PETITION PROCESS FOR TRANSFER FROM M.S. TO Ph.D. 
DEGREE PROGRAM

When a student is admitted to the graduate program, he or she is ad-
mitted specifically into either the M.S. or the Ph.D. program. Admission 
to the Ph.D. program is required for the student to be eligible to work 
towards the Ph.D. degree. A student in the M.S. program can petition to 
be admitted to the Ph.D. program by filing an M.S. to Ph.D. Transfer 
Petition.

This petition must be accompanied by a one-page statement of pur-
pose stating the reasons why the student wishes to transfer to the Ph.D. 
program, and two letters of recommendation from members of the 
Stanford faculty, including one from the student’s prospective adviser 
and at least one from an MSE faculty member belonging to the Academ-
ic Council.

The M.S. to Ph.D. Transfer Petition is due to the Student Services 
Coordinator by the end of the second week of Spring Quarter during the 
student’s first year in the M.S. program. Only students enrolled in the 200 
series core-course sequence are eligible to petition, and a grade point 
average (GPA) of 3.25 or better in the first two quarters of the core-course 
sequence is required.

Transferring to the Ph.D. program is a competitive process and only 
fully qualified M.S. students are admitted. The Admissions Committee 
and the department chair consider the student’s original application to 
the graduate program as well as the material provided with the transfer 
petition. Decisions regarding these petitions are normally available by 
the fourth week of Spring Quarter.

MASTER’S RESEARCH REPORT

Students wishing to take this option must submit a program of study, 
including not more than 9 and no less than 6 MSE research units, to the 
department for approval at least two quarters before the degree is grant-
ed. The total combined units of MSE research units, seminars, language 
courses, and undergraduate courses cannot exceed 12. If a master’s re-
search report is not to be submitted, units of MSE 200 cannot be applied 
to the department’s requirement of 45 units for the master’s degree.

The report must be approved by two faculty members. One faculty 
member is the student’s research adviser. The other faculty member is 
assigned by the department. Three copies of the report (one copy for each 
approving faculty member and the department library), in final form and 
signed by two faculty members, must be in the hands of the department’s 
Student Services Coordinator one week prior to the beginning of the fi-
nal examination period of the final quarter of the program. The report is 
not an “official” University thesis but rather is intended to demonstrate 
to the department faculty an ability to conduct and report directed re-
search. The Master’s Report is not appropriate for students wishing to 
petition for the Ph.D. program. Refer to the Materials Science and En-
gineering Student Handbook for more information and further clarifica-
tion concerning this report.

M.S. FOR MSE COTERMINAL STUDENTS

The University’s basic requirements for the M.S. degree are discussed in the “Graduate Degrees” section of this bulletin. The following are specific departmental requirements.

The Department of Materials Science and Engineering (MSE) re-
quires a minimum of 45 units for a master’s degree. Students who have 
received or are currently working towards a B.S. degree in Materials 
Science and Engineering from Stanford and are pursuing a M.S. in Ma-
terials Science and Engineering should follow the requirements below 
in lieu of those stated in the “Master of Science” section listed above.

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Master’s Program Proposal forms should be filled out, signed by the students’ academic adviser, and submitted to the department’s Student Services Coordinator by the end of the first week of the students’ second quarter of study. (Generally, this means by the end of the first week of Winter Quarter.) Final changes to the master’s program must be submitted no later than one academic quarter prior to degree conferral.

Degree requirements (for students who entered after September 1, 1997) are as follows:

1. A minimum of 21 units of MSE course work taken for a letter grade. Crosslisted courses, 1-unit seminars, research units and/or MSE 400 cannot be used to fulfill this requirement. These 21 units of MSE courses must include:
   a) The three remaining core classes (MSE 191/201-199/209) not taken for the B.S. degree in MSE.
   b) Twelve units of non-crosslisted MSE 300 level courses (not including 300).
2. Approved course electives to bring the total units to 45. Of the 24 units of elective courses:
   a) Twenty-one of the 24 units must be taken for a letter grade.
   b) A maximum of 3 units may be seminars.
   c) If writing a Master’s Research Report, a minimum of 6 and a maximum of 9 units of M.S. research units (MSE 200) may be used.
   d) A maximum of 6 units may be undergraduate units.
   e) A maximum of 5 units may be used for a foreign language course (not including any remedial English courses).
   f) The combination of seminar, undergraduate, and language units may not exceed 9 units total.
   g) The combination of research*, seminar, undergraduate, and language units may not exceed 15 units total.
3. A minimum grade point average (GPA) of 2.75 for course work at Stanford.

* Research units are only allowed when writing a Master’s Research Report.

See the Master’s Research Report section listed above, noting the additional unit privileges allotted to coterminal students. See the department’s Student Services Coordinator for more information and/or clarification on what constitutes an approved course.

ENGINEER

The University’s basic requirements for the degree of Engineer are outlined in the “Graduate Degrees” section of this bulletin.

A student wishing to enter the Engineer program must have completed the substantial equivalent requirements of the M.S. in Materials Science and Engineering, and must file with the department’s Student Services Coordinator a petition requesting admission to the program as well as stating the type of research to be done and the professor who will be supervising. Once approved, the Application for Candidacy must be submitted to the department’s Student Services Coordinator by the end of the students’ second quarter of study. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.

A program should include 9 units of graduate non-crosslisted courses in materials science (exclusive of research units, seminars, colloquia, MSE 400—Participation in Teaching, and so on) beyond the requirements for the M.S. degree, and additional research or other units to meet the 36-unit University minimum requirement. A grade point average (GPA) of 3.0 must be maintained for all course work taken at Stanford.

Completion of an acceptable thesis is required. The Engineer thesis must be approved by two Academic Council faculty members, one of whom must be a member of the department, and submitted in triplicate. A petition is required for non-Academic Council members.

DOCTOR OF PHILOSOPHY

The University’s basic requirements for the Ph.D. degree are outlined in the “Graduate Degrees” section of this bulletin.

Degree requirements (for students entering after September 1, 1996) are as follows:

1. Complete the requirements for the M.S. in Materials Science and Engineering (MSE) unless receiving residency credit for completing a master’s degree elsewhere*.
2. Pass a departmental oral qualifying examination the second year after admission. A GPA of 3.25 from the nine core classes (201-209) is required for admission to the Ph.D. qualifying exam. Students whose GPA is between 3.00 and 3.25 may petition for possible admission to the exam. Students who have passed the departmental oral examination are required to complete the Application for Candidacy for the Ph.D. degree by the end of the quarter in which they pass the exam. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.
3. Submit a program consisting of at least 72 units, which contains minimum of 12 technical non-crosslisted MSE course units beyond the minimum requirement of MSE courses for the M.S. degree (exclusive of research units, seminars, colloquia, MSE 400—Participation in Teaching, and so on). These MSE courses must be taken for a letter grade. The remaining units may consist of research, seminar, language classes, and so on. The program for the M.S.* and Ph.D. combined must include the following:
   a) MSE 201 through 209 (27 units), except for students who have had equivalent courses at other universities and have successfully petitioned out.
   b) A minimum of 12 units of 300-level courses from the MSE faculty (not including MSE 300).
   c) A minimum of 12 units of courses taken from one of the following lists of Advanced Specialty Courses (see below). Some and/or all of these courses can be the same as the courses used to meet requirement ‘3b’ above; however, the units may not be counted twice.
4. Maintain a GPA of 3.0 for all course work taken as a graduate student at Stanford.
5. Present the result of the dissertation at a department seminar immediately preceding the University Oral examination.

ADVANCED SPECIALTY COURSES

Materials Characterization: Elect. Engr. 329, 331; MSE 320, 321, 322, 323, 324, 325

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AN) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

PRIMARILY FOR UNDERGRADUATES

50. Introductory Science of Materials—(Enroll in Engineering 50)
   4 units, Win (Brauman)
   Spr (Sinclair)

100. Undergraduate Independent Study—Independent study in materials science under supervision of a faculty member.
   1-3 units, any quarter (Staff)

150. Undergraduate Research—Participation in a research project.
   3-6 units, any quarter (Staff)
151. Microstructure and Mechanical Properties—For undergraduates; see 251. Prerequisite: Engineering 50 or equivalent.
3 units, Aut (Dauskardt)

3 units, Spr (McIntyre)

159Q. Stanford Introductory Seminar: Research in Japanese Companies—Preference to sophomores. The home-campus equivalent of the course taught at Kyoto. Knowledge from this research and company visits is evaluated in a seminar/discussion setting. Lecture/discussion on the structure of a Japanese company from the point-of-view of Japanese society. Visiting researchers from Japanese companies, with brief presentations and extensive question and answer periods, explore the Japanese research ethic.
3 units, Spr (Sinclair)

3 units, Aut (Doan)

2 units, Win (Doan)

163. Materials Science Lab III—For undergraduates. Lab on experimental techniques for the study of the mechanical properties of materials, including fracture toughness testing of metallic materials, ductile-to-brittle transition curves, fracture of ceramics using indentation techniques, and effects of grain size on yielding and strain hardening. Prerequisites: 198/208, 151/251, or equivalent.
2 units, Spr (Nix)

169Q. Stanford Introductory Seminar: Issues in Science and Christianity—Preference to sophomores. Insights as provided by modern science and the Christian perspective, and ways to integrate them. Seven patterns that have been used in the effort to describe the interaction between them. Consideration of contemporary issues such as creationism vs. evolution, determinism vs. free will, issues at the beginning and ending of life, and responsibility for the environment.
3 units, Win (Bube)

170. Materials Selection in Design—For undergraduates; see 270. Prerequisites: Engineering 14 and 50 or Mechanical Engineering 111.
3 units, Win (Prinz)

171. Materials Science Lab I—For graduates; see 161. Prerequisite: Engineering 50 or equivalent.
2 units, Aut (Doan)

172. Materials Science Lab II—For graduates; see 162. Prerequisite: 193/203.
2 units, Win (Doan)

173. Materials Science Lab III—For graduates; see 163. Prerequisites: 198/208, 151/251, or equivalent.
2 units, Spr (Nix)

179Q. Stanford Introductory Seminar: Materials in Sports—Preference to sophomores. Introduction to materials science using sporting equipment as a vehicle to highlight material properties, performance, and selection criteria. The classes of material, and the properties relevant to sporting equipment performance. Examples from modern sporting equipment (golf clubs, tennis rackets, skis, and bicycles) highlight the relationship between material properties and product performance.
3 units, Spr (Clemens)

191. Mathematical and Computational Methods in Materials Science—For undergraduates; see 201. Prerequisite: familiarity with ordinary differential equations.
4 units, Aut (Staff)

192. Solid State Thermodynamics—For undergraduates; see 202. Prerequisite: physical chemistry or introductory thermodynamics.
4 units, Aut (Musgrave)

193. Atomic Arrangements in Solids—For undergraduates; see 203.
4 units, Aut (Sinclair)

194. Phase Equilibria—For undergraduates; see 204. Prerequisite: 192/202.
4 units, Win (McIntyre)

195. Waves and Diffraction in Solids—For undergraduates; see 205. Prerequisite: 193/203 or consent of instructor.
4 units, Win (Clemens)

196. Imperfections in Crystalline Solids—For undergraduates; see 206. Prerequisite: 193/203.
4 units, Win (Nix)

197. Rate Processes in Materials—For undergraduates; see 207. Prerequisites: 191/201, 192/202, 194/204.
4 units, Spr (Clemens)

198. Mechanical Properties of Materials—For undergraduates; see 208. Prerequisites: 193/203, 196/206.
4 units, Spr (Dauskardt)

199. Electrical and Magnetic Properties of Solids—For undergraduates; see 209. Prerequisite: 193/205 or equivalent.
4 units, Spr (Wang)

PRIMARILY FOR GRADUATES

200. Master’s Research—Participation in a research project.
1-15 units, any quarter (Staff)

3 units, Aut (Staff)

3 units, Aut (Musgrave)
203. Atomic Arrangements in Solids—Atomic arrangements in perfect and imperfect crystalline solids, defect chemistry, and elements of formal crystallography, including development of point groups and space groups.

3 units, Aut (Sinclair)


3 units, Win (McIntyre)

205. Waves and Diffraction in Solids—The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell’s equations. Diffraction intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: 193/203 or consent of instructor.

3 units, Win (McIntyre)


3 units, Win (Nix)


3 units, Spr (Clemens)


3 units, Spr (Dauskardt)

209. Electrical and Magnetic Properties of Solids—Introduction to the electronic, magnetic, optical, and ferroelectric properties of solids. Emphasis is on concepts and models of phonons and electronic energy bands as applied to metals, semiconductors, magnetic materials, and insulators. Elementary quantum and statistical mechanics concepts are utilized. Prerequisite: 195/205 or equivalent.

3 units, Spr (Wang)


1-15 units, any quarter (Staff)

227. Scattering Physics—(Enroll in Applied Physics 196/218.)

3-4 units, Spr (Greven)
313. Principles of Ceramics Processing—Fundamental description of the unit process operations used to fabricate polycrystalline ceramic components. Topics: grain growth, solid state and liquid phase sintering, drying, ceramic forming processes, beneficiation, introductory rheology, particle packing, size/shape effects, influence of processing additives, powder synthesis through solid state reactions and wet chemical methods. Prerequisites: 204 and 207, or their equivalents.

3 units (McIntyre) alternate years, given 2000-01

315. Polymer Physics—(Enroll in Chemical Engineering 460.)
3 units (Frank) alternate years, given 2000-01

317. Advanced Integrated Circuit Fabrication—(Enroll in Electrical Engineering 311.)
3 units, Spr (Saraswat)

318. Integrated Circuit Fabrication Laboratory—(Enroll in Electrical Engineering 410.)
3-4 units, Win (Saraswat)

319. Electron and Ion Beams for Semiconductor Processing—(Enroll in Electrical Engineering 217.)
3 units, alternate years, given 2000-01

3 units (Sinclair) alternate years, given 2000-01

321. Transmission Electron Microscopy—Image formation and interpretation. The contrast phenomena associated with perfect and imperfect crystals from a physical point of view and from a formal treatment of electron diffraction theory. The importance of electron diffraction to systematic analysis and recent imaging developments. Prerequisite: 193/203, 195/205, or equivalent.
3 units (Sinclair) alternate years, given 2000-01

323. Thin Film and Interface Microanalysis—The science and technology of a variety of microanalytical techniques, including Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), ion scattering spectroscopy (ISS), and x-ray photoelectron spectroscopy (XPS or ESCA). Generic processes such as sputtering and high-vacuum generation. Prerequisite: some prior exposure to atomic and electronic structure of solids.
3 units, Spr (Kelly)

324. Selected Topics in Thin Film Microcharacterization—Case study characterizing materials, defining problems in characterizing surfaces or thin films, carrying out analyses of relevant samples, and reporting the results. Students operate modern electron, ion, and x-ray probe instruments to study samples. Methodology for approaching characterization problems; experience in interpreting and presenting experimental results. Emphasis is on the application of theoretical measurement capabilities to practical problems, and the capabilities and limitations of modern techniques. Topics: choosing the appropriate techniques, analytical pitfalls, quantitative analysis, effects of noise and other uncertainties on analytical precision. Enrollment limited. Prerequisite: 323 or consent of instructor.
3 units (Kelly) alternate years, given 2000-01

325. X-Ray Diffraction—Diffraction theory and its relationship to structural determination in solids. Focus is on applications of x-rays; concepts can be applied to neutron and electron diffraction. Topics: Fourier analysis, kinematic theory, Patterson functions, diffraction from layered and amorphous materials, single crystal diffraction, dynamic theory, defect determination, surface diffraction, techniques for data analysis, and determination of particle size and strain. Prerequisites: 193/203, 195/205.
3 units (Clemens) alternate years, given 2000-01

327. Scattering Physics—(Enroll in Applied Physics 218.)
3 units, Spr (Greven)

3 units, Aut (McIntyre)

332. Photoelectronic and Photovoltaic Materials and Devices—Phenomena involving the interaction between light and electrons in semiconductors. Photoconductivity, recombination, defect analysis, grain boundary effects, amorphous semiconductors, photovoltaic effects and current photovoltaic research, and photoeffects in quantum wells and superlattices. Prerequisite: 209 or equivalent.
3 units (Bube) alternate years, given 2000-01

334. Basic Physics for Solid State Electronics—(Enroll in Electrical Engineering 228.)
3 units, Aut (Miller)

335. Properties of Semiconductor Materials—(Enroll in Electrical Engineering 327.)
3 units, Win (J. Harris)

336. Physics of Advanced Semiconductor Devices—(Enroll in Electrical Engineering 328.)
3 units, Spr (J. Harris)

341. Principles and Models of Semiconductor Devices—(Enroll in Electrical Engineering 216.)
3 units, Aut (J. Harris)

342. The Electronic Structure of Surfaces and Interfaces—(Enroll in Electrical Engineering 329.)
3 units, alternate years, given 2000-01

344. Solid-State Sensors and Actuators—(Enroll in Electrical Engineering 312.)
3 units (Kovacs)

345. Advanced VLSI Devices—(Enroll in Electrical Engineering 316.)
3 units, not given 1999-2000

3 units, Spr (White)

348. Principles of Magnetic Recording—Fundamental understanding and applications of magnetic recording. Read and write processes, inductive and MR and GMR heads, thin film and particulate media, medium and head noise, head-media interface. Technology trends and recording system issues introduced. Prerequisite: 347 or equivalent or consent of instructor.
3 units, Aut (Wang)
349. Introduction to Information Storage Systems—(Enroll in Electrical Engineering 335.)
3 units, Win (Wang)

350. Micromechanics—Use of the theory of elasticity to discuss fields of dislocations, inclusions, inhomogeneities, and their interactions in deformable solids. Applications to the microscopic foundations of macroscopic plasticity, the effects of strain energy on morphologies associated with phase transformations, and the determination of "effective" properties of composite media. Prerequisite: any brief introduction to the theory of elasticity, or consent of instructor.
3 units (Barnett) not given 1999-2000

351. Microstructural Design of Advanced Materials and Composites—Strategies for the control of mechanical properties through microstructural design in a range of engineering materials and their composites. Emphasis is on a fracture mechanics description of strengthening and toughening methods in advanced ceramics and various composites. The structural reliability of brittle materials systems and their relationship to microstructure and processing in terms of fracture statistics, and long-term properties in terms of subcritical crack-growth processes with examples and applications, including cyclic fatigue and high-temperature creep of metals and ceramics. Prerequisites: basic understanding of materials microstructure, mechanical properties, and fracture mechanics; 251 and 358, or equivalents.
3 units, Spr (Dauskardt)

352. Stress Analysis of Thin Films and Layered Composite Media—Introduction to methods of stress analysis of layered dissimilar media, including thin films deposited on substrates, composite laminates, and stratified anisotropic elastic materials based on techniques pioneered by Stroh. Stress states generated by thermal and elastic mismatch and local stress concentrations at interfacial cracks or corners with applications to integrated circuit devices, aircraft materials, and geophysical media. Prerequisites: introductory course in strength of materials or the theory of elasticity, some familiarity with matrix algebra.
3 units (Barnett) alternate years, given 2000-01

3 units, Spr (Nix) alternate years, not given 2000-01

354A. Theory and Applications of Elasticity—(Enroll in Mechanical Engineering 240A.)
3 units, Win (Gao)

354B. Introduction to Fracture Mechanics—(Enroll in Mechanical Engineering 240B.)
3 units, Spr (Gao)

355. Time-Dependent Plasticity—Theories and mechanisms of creep. Temperature and strain rate effects on the plastic flow of solids. The relation of high temperature strength and ductility of materials to structure. Prerequisite: 198/208.
3 units (Nix) alternate years, given 2000-01

356. Fatigue Design and Analysis—(Enroll in Mechanical Engineering 245.)
3 units, Win (Nelson)

3 units, Win (Dauskardt)

359. Crystalline Anisotropy—Introductory matrix and tensor analysis with applications to the effects of crystal symmetry on elastic deformation, thermal expansion, diffusion, piezoelectricity, magnetostriction, and thermodynamics, following a treatment at the level of Nye's text. Homework sets use Mathematica™.
3 units (Staff) alternate years, given 2000-01

360. Techniques of Failure Analysis—(Enroll in Aeronautics and Astronautics 252.)
2 units, Spr (Ross)

361. Mechanics of Composites—(Enroll in Aeronautics and Astronautics 256.)
3 units, Win (Springer)

400. Participation in Materials Science Teaching—Can be repeated for credit.
1-3 units, Aut, Win, Spr (Staff)

403. Frontiers in Interdisciplinary Biosciences—(Same as Chemical Engineering 459.)
1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

405. Seminar in Applications of Transmission Electron Microscopy—Can be repeated for credit. (AU)
1 unit, Aut, Win, Spr (Sinclair)

MECHANICAL ENGINEERING

Chair: Ronald K. Hanson
Associate Chair of Student Services: M. Godfrey Mungal
Associate Chair for Design and Manufacturing: Mark R. Cutkosky
Division Chairs: Thomas P. Andriacchi, Dennis R. Carter (co-chairs; Biomechanical Engineering), Thomas Hughes (Mechanics and Computation); (the Design Division, and the Flow Physics and Computation Division operate without a chair), Mark Cappelli, Thermosciences Division
Laboratory Directors: David W. Beach (Program Director, Manufacturing Systems Engineering and Product Realization Laboratory), J. Edward Carrery (Smart Product Design Laboratory), Mark Cutkosky (Manufacturing Sciences Lab and Manufacturing Models Laboratory), John K. Eaton (Heat Transfer and Turbulence Mechanics), Larry J. Leifer (Center for Design Research and Stanford Learning Lab), Reginald E. Mitchell (High Temperature Gasdynamics), Parviz Moin (Center for Turbulence Research), Friedrich B. Prinz (Rapid Prototyping Laboratory), William C. Reynolds (Center for Integrated Turbulence Simulations)

The programs in the Department of Mechanical Engineering (ME) are designed to provide background for a wide variety of careers. The discipline is very broad, but is generally understood to emphasize an appropriate mix of applied mechanics, biomechanical engineering, computer simulations, design, and energy science and technology. Graduates at all degree levels have traditionally entered into energy industries, product manufacturing industries, transportation, government laboratories and agencies dealing with these problems, and a variety of academic positions.

Since mechanical engineering is a broad discipline, the undergraduate program can be a springboard for graduate study in business, law, medicine, political science, and other professions where a good understanding of technology is often important. Both undergraduate and graduate programs provide excellent technical background for work in biomechanical engineering, environmental pollution control, ocean engineering, transportation, and on other multidisciplinary problems that concern our society. Throughout the various programs, considerable emphasis is placed on developing systematic procedures for analysis, effective communication of one’s work and ideas, practical and aesthetic aspects in design, and responsible use of technology. This can provide a student with an approach and a philosophy of great utility, irrespective of an ultimate career.

The department has five divisions: Biomechanical Engineering, Design, Flow Physics and Computation Division (jointly with the Department of Aerospace and Astronautics), Mechanics and Computation, and Thermosciences. Each maintains its own labs, shops, and offices.

The Biomechanical Engineering (BME) Division has teaching and research activities which focus primarily on musculoskeletal biomechanics, cardiovascular biomechanics, and rehabilitation engineering. Research in other areas including hearing, ocean, plant, and vision biomechanics exist in collaboration with associated faculty in biology, engineering, and medicine. The Biomechanical Engineering Division has particularly strong research interactions with the Mechanics and Computation Division, the Design Division, and the departments of Functional Restoration, Surgery, and Radiology in the School of Medicine.

The Design Division emphasizes cognitive skill development for creative R&D in the design process and is specifically concerned with automatic control, computer-aided design, creativity, design aesthetics, design research, experimental stress analysis, fatigue and fracture mechanics, finite element analysis, human factors, kinematics, manufacturing systems, microcomputers in design, micro-electromechanical systems (MEMS), optimization, and robotics. The Design Division offers undergraduate and graduate programs in Product Design (jointly with the Department of Art and Art History). The division offers a master’s pro-
Computational and experimental work is also conducted in various facilities throughout the School of Engineering and the School of Medicine, particularly the Advanced Biomaterials Testing Laboratory of the Department of Materials Science and Engineering, the Orthopedic Research Laboratory in the Department of Functional Restoration, and the Vascular Research Laboratory in the Department of Surgery. In collaboration with the School of Medicine, biologically and clinically oriented work is conducted in various facilities throughout the Stanford Medical Center and the Veterans Administration Palo Alto Health Care System.

The Design Division has facilities for lab work in experimental mechanics and experimental stress analysis. Additional facilities, including MTL's electrohydraulic materials test systems, are available in the Solid Mechanics Research Laboratory. Design Division students also have access to Center for Integrated Systems (CIS) and Ginzton Lab microfabrication facilities.

The division also maintains the Product Realization Laboratory, a teaching facility offering students integrated experiences in market definition, product design and prototype manufacturing. The PR Lab provides coaching, design and manufacturing tools, and networking opportunities to students interested in product development. The ME 210/310 Design Project Laboratory has facilities for CAD, assembly, and testing of student designs by master's and student engineers. These design projects are part of the CDR Manufacturing Sciences Lab. The Manufacturing Modeling Laboratory (MML) addresses various models and methods that lead to competitive manufacturing. MML links design for manufacturing (DFM) research at the Department of Mechanical Engineering with supply chain management activities at the Department of Industrial Engineering and Engineering Management. The Rapid Prototyping Laboratory consists of seven processing stations including cleaning, CNC milling, grit blasting, laser deposition, low temperature deposition, plasma deposition, and shot peening. Students gain experience by using ACIS and Pro Engineer on Hewlett Packard workstations for process software development. The Design Division also has a unique "Product Design Loft," in which students in the joint program in Design develop graduate thesis projects.

The Flow Physics and Computation Division (FPC) is a joint laboratory of the departments of Aeronautics and Astronautics and Mechanical Engineering. FPC is contributing new theories, models and computational tools for accurate engineering design analysis and control of complex flows (including acoustics, chemical reactions, interactions with electromagnetic waves, plasmas, and other phenomena) of interest in aerodynamics, electronics cooling, environmental engineering, materials processing, planetary entry, propulsion and power systems, and other areas. A significant emphasis of FPC research is on physical modeling and analysis of physical phenomena in engineering systems. FPC students and research staff are developing new methods and tools for generation, access, display, interpretation and post-processing of large databases resulting from numerical simulations of physical systems. Research in FPC ranges from advanced simulation of complex turbulent flows to active flow control. The FPC faculty teach graduate and undergraduate courses in acoustics, aerodynamics, computational fluid mechanics, combustion and thermodynamics, computational mathematics, fluid mechanics, and propulsion.

The Mechanics and Computation Division has a Computational Mechanics Laboratory that provides an integrated computational environment for research and research-related education in computational mechanics and scientific computing. The laboratory houses Silicon Graphics, Sun, and HP workstations and servers, including a 4-processor SGI Origin2000 and a 16-processor networked cluster of Intel architec-
departmental major (math; science; science, technology, and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if the instructor offers the option.

A Product Design program is offered by the Design Division and leads to the B.S. Engineering (Product Design). An individually designed major in Biomechanical Engineering (B.S.E.: Biomechanical Engineering), offered by the Biomechanical Engineering Division, may be appropriate for some students preparing for medical school or graduate bioengineering studies.

Grade Requirements—To be recommended by the department for a B.S. in Mechanical Engineering, a student must achieve the minimum grade point average (GPA) set by the School of Engineering (2.0 in engineering fundamentals and engineering depth).

For information about an ME minor, see the “School of Engineering” section of this bulletin.

COTerminal B.S./M.S. PROGRAM

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminous program should apply for entrance after the beginning of the eighth quarter of undergraduate work and before the end of the 11th quarter. The application must provide evidence of potential for strong academic performance as a graduate student. The application is evaluated and acted on by the graduate admissions committee of the department. Typically, a GPA of at least 3.25 in engineering, science, and math is expected. Applicants must have completed two of 111, 112, 113, 131A, 131B, 131C, and must take the Graduate Record Examination (GRE) before action is taken on the application. Product designers must have completed 116A to be considered, and are required to work at least one year before rejoining the program. Ceterminal information and forms can be obtained from the ME Student Services office.

GRADUATE PROGRAMS

ADMISSION AND FINANCIAL ASSISTANCE

To be eligible for admission to the department, a student must have a B.S. degree in engineering (the Ph.D. degree requires the completion of the M.S.), physics, or a comparable science program. Applications for all degree programs are accepted throughout the year, although applications for fellowship aid must be received by January 14. The department annually awards, on a competitive basis, a limited number of fellowships, teaching assistantships, and research assistantships to incoming graduate students. Research assistantships are used primarily for post-master's degree students and are awarded by individual faculty research supervisors, not by the department. Preference for teaching assistantships is generally given to students who obtain the bachelor’s or master’s degrees at Stanford.

Mechanical engineering is a varied profession, ranging from primarily aesthetic aspects of design to highly technical scientific research. Discipline areas of interest to mechanical engineers include biomechanics, energy conversion, fluid mechanics, materials, nuclear reactor engineering, propulsion, rigid and elastic body mechanics, systems engineering, scientific computing, and thermodynamics, to name a few. No mechanical engineer is expected to have a mastery of the entire spectrum. M.S. degree programs are offered in Mechanical Engineering (M.S.: ME), Engineering (Manufacturing Systems Engineering, M.S.E.: MSE), Engineering (Biomechanical Engineering, M.S.E.: BME), Engineering (Product Design, M.S.E.: PD), and Engineering (M.S.E.).

The following sections list specific requirements for the master’s degree listed above.

MASTER OF SCIENCE

The basic University requirements for the M.S. degree are discussed in the “Graduate Degrees” section of this bulletin.

The master’s program normally consists of three quarters of full-time course work. No thesis is required, although many students become involved in research projects during the master’s year, particularly to explore their interests in working for the Ph.D. degree. Students whose undergraduate backgrounds are entirely devoid of some of the major subject disciplines of engineering (for example, applied mechanics, applied thermodynamics, fluid mechanics, ordinary differential equations) may need to take some undergraduate courses to fill in obvious gaps and prepare themselves to take graduate courses in these areas. Such students may require more than three quarters to fulfill the master’s degree requirements, as the make-up courses may not be used for other than the unrestricted electives (see item ‘4’ below) in the M.S. degree program. However, it is not the policy to require fulfillment of mechanical engineering B.S. degree requirements in order to obtain an M.S. degree; furthermore, students who have already fulfilled certain categories of the M.S. degree requirements as a result of undergraduate work may find they have sufficient time (see item ‘3’ below) to obtain the M.S. degree in the normal three quarters.

MECHANICAL ENGINEERING

The master’s degree program requires 45 units of course work taken as a graduate student. At least 36 of the units must be taken at Stanford; any units transferred from other universities (up to 9 are allowed) must be in graduate-level courses taken while registered as a graduate student and may not be applied toward fulfillment of item ‘2’ below. No thesis is required. However, students who desire some research experience during the master’s year may participate in research through ME 290, 291, and 292.

The department’s requirements for the M.S. in Mechanical Engineering are:

1. Mathematical Competence in Two of the Following Areas: partial differential equations, linear algebra, complex variables, numerical analysis, modern algebra, vector and tensor analysis, or statistics, as demonstrated by completion of two courses from ME 200-208; Mathematics 106, 109, 113, 131, 132; Computer Science 137, 205, 237A, B, C; Statistics 110, 161. Requirement: 6 units.

Students who completed comparable graduate-level courses as undergraduates and who can demonstrate their competence to instructors may be exempted from this requirement by their advisers and the ME Student Services office and place the units in the approved elective area.

2. Eighteen units of graduate-level courses in ME consisting of:
   a) A Specialty in Mechanical Engineering: a set of graduate-level courses in mechanical engineering to provide depth in one area. These sets have been approved by the faculty as providing depth in specific areas as well as a significant component of application of the material in the context of engineering synthesis. These courses are listed in the Mechanical Engineering Graduate Handbook.
   b) Breadth in Mechanical Engineering: at least two additional graduate-level courses outside the depth area to bring the total number to at least 18 ME units in courses numbered 207 and above, excluding 290-301 and math courses. Courses 200-206, 288-301, and 311 may not be counted in these categories.

3. Approved Electives (to bring the total number of units to 39): all these units must have adviser approval. Graduate engineering, math, and science courses are normally approved, and upper-level undergraduate courses may be approved if consistent with the student’s objectives. Of the 39 units, no more than 6 may come from ME 291 and 292, and no more than 3 may come from the other courses numbered 290-299 or other seminars. Students planning a Ph.D. degree should discuss with their adviser the desirability of taking 291 or 292 during the master’s year.

4. Unrestricted Electives (to bring the total number of units submitted for the M.S. degree to 45): students are encouraged to use these units outside of engineering, mathematics, or the sciences. Students should consult their advisers on course loads and on ways to use the unrestricted electives to make a manageable program.

5. Within the courses satisfying the requirements above, there must be at least one graduate-level course dealing with lab studies. Courses which satisfy this requirement are 207A, B, 217B, 218A, 224, 225A, 226B, 248, 254, 267, 282A, 282B, 303, 310A.B.C.
Candidates for the M.S. in Mechanical Engineering are expected to have the approval of the faculty, and a minimum grade point average (GPA) of 2.75 in the 45 units presented in fulfillment of degree requirements. All courses used to fulfill requirements 1, 2, 3, and 5 above must be graded (excluding seminars and courses for which a Satisfactory/No Credit grade is given to all students).

Students falling below a GPA of 2.5 at the end of 20 units may be disqualified from further registration. Students failing to meet the complete degree requirements at the end of 60 units of graduate registration are disqualified from further registration. Courses used to fulfill deficiencies arising from inadequate undergraduate preparation for mechanical engineering graduate work may not be applied to the 60 units required for graduate registration.

PRODUCT DESIGN

The focus of the Joint Program in Design is the intersection of technology with human needs and aspirations. This program is a joint offering of the Department of Mechanical Engineering and the Department of Art and Art History. The resulting two-year degree of MS in Engineering (Product Design) is considered a terminal degree for the practice of design.

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art &amp; Art History 160, 169/269, 268</td>
<td>6</td>
</tr>
<tr>
<td>Art &amp; Art History 360A B C, Master's Project*</td>
<td>6</td>
</tr>
<tr>
<td>ME 211 A B C, Master's Project*</td>
<td>12</td>
</tr>
<tr>
<td>ME 212, Calibrating the Instrument</td>
<td>2</td>
</tr>
<tr>
<td>ME 303, Manufacturing and Design</td>
<td>4</td>
</tr>
<tr>
<td>ME 313, Ambidextrous Thinking</td>
<td>3</td>
</tr>
<tr>
<td>ME 316 A B C, Advanced Product Design</td>
<td>9</td>
</tr>
<tr>
<td>Approved Electives†</td>
<td>12</td>
</tr>
<tr>
<td>Free Electives†</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

* Taken jointly each quarter.  
† These electives allow a student to pursue studies suited to personal needs. A list of pre-approved product design electives is outlined in the Mechanical Engineering Graduate Handbook.

BIOMECHANICAL ENGINEERING

Students interested in graduate studies in biomechanical engineering can choose one of the programs below.

1. M.S. in Mechanical Engineering: students who apply and are admitted to the M.S. - ME program can elect to take biomechanical engineering courses as part of their M.S. - ME requirements. These courses are usually applied towards the student's engineering breadth or technical electives.

2. M.S. in Engineering: Biomechanical Engineering (M.S.E.: BME): this degree program allows students more flexibility in taking courses in the life sciences and generally emphasizes a more interdisciplinary curriculum. Minimum grade point average (GPA) requirements are the same as for the M.S. in Mechanical Engineering.

A Ph.D. in Biomechanical Engineering is not offered. Students from either master's degree path (Mechanical Engineering or Biomechanical Engineering) receive their Ph.D. degrees in Mechanical Engineering. The Ph.D. qualifying examinations are flexible enough to accommodate students with either master's degree preparation.

MANUFACTURING SYSTEMS ENGINEERING

The M.S. in Engineering (Manufacturing Systems Engineering) addresses the need for engineers who combine management and design skills focused on manufacturing. There is a critical need for individuals who can deal directly with product design for manufacturability; design of manufacturing tools; financial, organizational, and strategic management issues; and elements of automation technology such as computer-aided design, computer-aided manufacturing robotics, and microprocessor control.

Manufacturing Systems Engineering (MSE) is offered jointly by two departments: Mechanical Engineering, and Industrial Engineering and En-gineering Management. The program seeks high-quality students with strong educational backgrounds in engineering and provides a demanding curriculum strong in both hardware aspects and engineering management. Students must apply directly to the MSE program by submitting an application to the Department of Mechanical Engineering.

The hardware and engineering-design aspects of the program include:

- ME 207 A B, Integrated Design in Marketing and Manufacturing
- ME 310 A, Tools for Team Based Design
- ME 218 A B C, Smart Product Design
- ME 310 B C, Design Project Experience with Corporate Partners
- ME 313, Ambidextrous Thinking
- ME 319, Robotics and Vision Lab

The engineering management subjects include:

- Ind. Engr. 203, Organization Behavior and Management
- Ind. Engr. 221, Quality Assurance and Control
- Ind. Engr. 225, Manufacturing Systems Design
- Ind. Engr. 261, Inventory Control and Production Systems
- Ind. Engr. 262, Supply Chain Management
- Ind. Engr. 268, Manufacturing Strategy

Hardware and engineering design courses provide hands-on knowledge of these functions and the trade-offs that must be made to take advantage of the relationships between design and manufacturing.

Engineering management subjects provide a suitable perspective for evaluating alternative financial, organizational, and production systems as well as a firm's manufacturing policy.

Beyond the required core, the curriculum allows for choice from a broad set of relevant electives to provide additional training in engineering management, engineering design hardware, and aspects of computer science. Here a student may tailor the program to meet individual interests and needs.

Students in the MSE program must have faculty approval and a minimum GPA of 3.0 in the 45 units presented in fulfillment of the degree requirements.

BIOMECHANICAL ENGINEERING

Students interested in graduate studies in biomechanical engineering can choose one of the programs below.

1. M.S. in Mechanical Engineering: students who apply and are admitted to the M.S. - ME program can elect to take biomechanical engineering courses as part of their M.S. - ME requirements. These courses are usually applied towards the student's engineering breadth or technical electives.

2. M.S. in Engineering: Biomechanical Engineering (M.S.E.: BME): this degree program allows students more flexibility in taking courses in the life sciences and generally emphasizes a more interdisciplinary curriculum. Minimum grade point average (GPA) requirements are the same as for the M.S. in Mechanical Engineering.

A Ph.D. in Biomechanical Engineering is not offered. Students from either master's degree path (Mechanical Engineering or Biomechanical Engineering) receive their Ph.D. degrees in Mechanical Engineering. The Ph.D. qualifying examinations are flexible enough to accommodate students with either master's degree preparation.

ENGINEERING

As described in the "School of Engineering" section of this bulletin, each department in the school may sponsor students in a more general degree, the M.S. in Engineering. Sponsorship by the Department of Mechanical Engineering (ME) requires (1) filing a petition for admission to this program on the day before instruction begins, and (2) that the center of gravity of the proposed program lies in ME; no more than 18 units used for the proposed program can have been previously completed. The program must include at least 9 units of graduate-level work in the department other than ME 200-206 and 288, 290-297, 301, 311. The petition must be accompanied by a statement explaining the program objectives and how it is coherent, contains depth, and fulfills a well-defined career objective. The grade requirements are the same as for the M.S. in Mechanical Engineering.

POST-MASTER'S DEGREE PROGRAMS

The department offers two post-master's degrees: Engineer and Doctor of Philosophy. Post-master's research generally requires some evidence that a student has research potential before a faculty member agrees...
to supervision and a research assistantship. It is most efficient to carry out this preliminary research effort during the M.S. degree year.

ENGINEER

The basic University requirements for the degree of Engineer are discussed in the "Graduate Degrees" section of this bulletin. This degree represents an additional year of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone.

Admission standards are substantially the same as indicated under the master's degree. However, since thesis supervision is required and the availability of thesis supervisors is limited, admission is not granted until the student has personally engaged a faculty member to supervise a research project. This frequently involves a paid research assistantship awarded by individual faculty members (usually from the funds of sponsored research projects under their direction) and not by the department.

Thus, personal arrangement is necessary. Students studying for the M.S. degree at Stanford and desiring to continue to the Engineer degree ordinarily make such arrangements during the M.S. degree year. Students holding master's degrees from other universities are invited to apply and may be admitted providing they are sufficiently well qualified and have made thesis supervision and financial aid arrangements.

Department requirements for the degree include an acceptable thesis; up to 18 units of credit are allowed for thesis work. In addition to the thesis, 27 units of approved advanced course work in mathematics, science, and engineering are expected beyond the requirements for the M.S. degree; the choice of courses is subject to approval of the adviser. Thus, personal arrangement is necessary. Students studying for the M.S. degree at Stanford and desiring to continue to the Engineer degree ordinarily make such arrangements during the M.S. degree year. Students holding master's degrees from other universities are invited to apply and may be admitted providing they are sufficiently well qualified and have made thesis supervision and financial aid arrangements.

Department requirements for the degree include an acceptable thesis; up to 18 units of credit are allowed for thesis work. In addition to the thesis, 27 units of approved advanced course work in mathematics, science, and engineering are expected beyond the requirements for the M.S. degree; the choice of courses is subject to approval of the adviser. Students who have not fulfilled the Stanford M.S. degree requirements are required to do so (with allowance for approximate equivalence of courses taken elsewhere).

Candidates for the degree must have faculty approval and have a minimum grade point average (GPA) of 3.0 for all courses (exclusive of thesis credit) taken beyond those required for the master's degree.

DOCTOR OF PHILOSOPHY

The basic University requirements for the Ph.D. degree are discussed in the "Graduate Degrees" section of this bulletin. The Ph.D. degree is intended primarily for students who desire a career in research, advanced development, or teaching; for this type of work, a broad background in math and the engineering sciences, together with intensive study and research experience in a specialized area, are the necessary requisites. The department allows a minor field but does not require one. However, if a minor is waived, the candidate must show breadth of training by taking a group of courses in one or more related fields or departments as noted below.

A student studying for the Ph.D. degree ordinarily will not take an Engineer degree, although this is not precluded. However, the student must have a master's degree, and must fulfill in essence the requirements for the Stanford M.S. degree in Mechanical Engineering.

In special situations dictated by compelling academic reasons, Academic Council members who are not members of the department's faculty may serve as the principal dissertation adviser when approved by the department. In such cases, a member of the department faculty must serve as program adviser and as a member of the reading committee, and agree to accept responsibility that department procedures are followed and standards maintained.

Admission involves much the same consideration described under the Engineer degree. Since thesis supervision is required, admission is not granted until the student has personally engaged a member of the faculty to supervise a research project. Once a student has obtained a research supervisor, this supervisor becomes thereafter the student's academic adviser. Research supervisors may require that the student pass the departmental oral examination before starting research and before receiving a paid research assistantship. Note that research assistantships are awarded by faculty research supervisors and not by the department.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of engineering fundamentals by passing a qualifying oral examination. The academic level and subject matter of the examination correspond approximately to the M.S. program described above. The form and timing of the examination differs for the five divisions of the department. Information may be obtained from the division or Student Services office.

Normally, the qualifying examination is taken during the first post-master's year. A student must have the written approval of a tentative dissertation supervisor (sponsor) in order to take the examination. Sponsorship carries no implication of financial support. To apply for the examination, a student must have a Stanford graduate grade point average (GPA) equivalent of at least 3.25. Courses used in the GPA evaluation are the same as those that would be used to meet the M.S. GPA requirement. Students entering Stanford with an M.S. from another school must have a 3.25 GPA in that school's M.S. program to take the examination in their first quarter at Stanford. After the first quarter at Stanford, such a student must meet the GPA of 3.25 for courses taken at Stanford.

Ph.D. candidates must complete a minimum of 36 units of approved formal course work (excluding research, directed study, and seminars) in advanced study beyond the M.S. degree. The courses should consist primarily of graduate courses in engineering and sciences, although the candidate's reading committee may approve a limited number of upper-division undergraduate courses and courses outside of engineering and sciences, as long as such courses contribute to a strong and coherent program. In addition to this 36-unit requirement, all Ph.D. candidates must participate each quarter in one of the following (or equivalent) seminars: ME 290, 294, 288, 289, 295, 296, 297, 298, 311; Aeronautics and Astronautics 296 or 297.

The Ph.D. thesis normally represents at least one full year of research work and must be a substantial contribution to knowledge. Students may register for course credit for thesis work (ME 301) to help fulfill University residence requirements, but there is no minimum limit on registered dissertation units. Candidates should note that University residence requirements (see the "Graduate Degrees" section of this bulletin) are expressed in terms of equivalent full-time registration and not in terms of units per se; questions on this should be addressed to the manager of Student Services.

The department has a breadth requirement for the Ph.D. degree. This may be satisfied either by a formal minor in another department or by course work that is approved by the dissertation reading committee.

The final University oral examination is conducted by a committee consisting of a chair from another department and four faculty members of the department or departments with related interests. Usually, the committee includes the candidate's adviser and two faculty members chosen to read and sign the candidate's dissertation. The examination consists of two parts. The first is open to the public and is scheduled as a seminar talk, usually for one of the regular meetings of a seminar series. The second is conducted in private and covers subjects closely related to the dissertation topic.

A student wishing to complete the Ph.D. requirements in four years should ordinarily complete the M.S. by the Spring Quarter of the first year, pass the qualifying examination by the Autumn Quarter of the second year and complete the course work, demonstrate feasibility of research methods, and obtain approval of the dissertation proposal by the end of the third year.

COMBINED PH.D./M.D. DEGREE PROGRAM

Students interested in a career oriented towards biomechanical research and clinical medicine can pursue the combined Ph.D./M.D. degree program.

The Ph.D. degree is administered by the Department of Mechanical Engineering of the School of Engineering. To be formally admitted as a Ph.D. degree candidate in this combined degree program, the student must apply through normal department channels and must have earned an M.S. in Mechanical Engineering, an M.S. in Biomechanical Engineering, or a comparable master's degree. Students must pass the Department of
Mechanical Engineering Ph.D. qualifying examination and pursue a doctoral thesis in a biomechanical engineering area.

The M.D. degree is administered by the School of Medicine. Students must apply separately through regular channels for admission to the M.D. program and satisfactorily complete 204 units in courses and clerkships approved for credit toward the M.D. degree. Of these, 72 quarter units must be in clerkships. For further information on the M.D. program, consult the School of Medicine Catalog.

For students fulfilling the full M.D. requirements who earned their master's level engineering degree at Stanford, the Department of Mechanical Engineering may waive its normal department requirement that the 36 units applied towards the Ph.D. degree (beyond the master's degree level) be formal course work. Consistent with the University Ph.D. requirements, the department may instead accept 36 units consisting of courses, research, or seminars that are approved by the student's Ph.D. thesis reading committee and the department chair. For further information, consult the manager of Student Services.

Ph.D. MINOR

Students who wish a Ph.D. minor in ME should consult the ME Student Services office. The minor in ME may be obtained by completing 20 units of approved graduate-level ME courses or by completing 9 units of graduate-level courses and passing the departmental qualifying oral examination in two appropriate areas identified by the minor adviser.

Courses approved for the minor must form a coherent program and must be selected from those satisfying requirement '2' for the M.S. in Mechanical Engineering.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

PRIMARILY FOR UNDERGRADUATES

Note 1.—The following are especially suitable for freshmen.

10. Introduction to Engineering Analysis—The foundation and tools for subsequent engineering courses. Integrated approach to the fundamental scientific principles that are the cornerstones of engineering analysis: conservation of mass, atomic species, charge, momentum, angular momentum, energy, and production of entropy expressed in the form of balance equations on carefully defined systems, and incorporating simple physical models. Emphasis is on setting up analysis problems arising in engineering. Topics: simple analytical solutions, numerical solutions of linear algebraic and laboratory experiences.

4 units, Spr (Staff)

30. Engineering Thermodynamics—(Enroll in Engineering 30.)


Limited enrollment Spring Quarter. When possible, register for Winter Quarter. Prerequisites: 10, Engineering 14 and 30.

4 units, Win (Cappelli)

Spr (Santiago)

70N. Stanford Introductory Seminar: The Aerodynamics of Sports Balls—Preference to freshmen. The aerodynamics of the ball play a major role in many sports, e.g., the curve and knuckle ball in baseball, the spiral of a correctly thrown football, the effect of top spin in tennis, and the effect of dimples on a golf ball. The complex aerodynamics can be understood by application of basic concepts and experimental techniques. Simple, intuitive application of the basic principles precede lab and field experiments to verify their intuition. Lab experiments involve flow visualization in a wind tunnel; field experiments may involve tests in throwing, hitting, or kicking various balls and interacting with local teams. Teams of two to three prepare a written report discussing the importance of aerodynamics in a particular sport.

3 units, Spr (Mungal)

71Q. Stanford Introductory Seminar: The Burning of Fossil Fuels, Global Warming, and the Environment—Preference to sophomores. Combustion has been humankind's primary energy source. The role it plays as a future energy source and the environmental and economic consequences of this. Issues: projections of energy utilization and energy sources into the future (and the associated uncertainties), the environmental effects of combustion (including air quality and global warming), strategies to reduce the environmental effects of combustion, and the role of regulations in driving combustion technology and the use of fossil fuels. Structured presentations, open discussion, directed readings. Outside speakers; visit to the campus combustion laboratory. Project with oral/written reports.

3 units (Bowman) not given 1999-2000

72N. Stanford Introductory Seminar: The Jet Engine—Preference to freshmen. The basics of how a jet engine works and the technologies and analytical techniques required to understand them. Brief coverage of dynamics, thermodynamics, turbomachinery, combustion and pollution formation, advanced materials, cooling technologies, and control systems. Field trips. Prerequisites: high school physics and an interest in how mechanical things work.

3 units, Aut (Eaton)

99. Mechanical Dissection—Series of mechanical dissection labs to resolve common questions of everyday products and provide confidence in "hands-on" skills. Students choose a current product, track its history, obtain samples (current and "antique"), disassemble, and explore functions. Formal and informal presentations. Lab. Enrollment limited to 20. Prerequisite: keen sense of curiosity.

3 units (Sheppard) not given 1999-2000

100A-B. Mathematical and Computational Methods for Engineers—(Enroll Engineering 155A-B.)

101. Visual Thinking—Lecture/lab. Visual thinking and language skills are developed and exercised in the context of solving design problems. Exercises for the mind's eye. Quickly executed diagrammatic, orthographic, perspective, and three-dimensional sketching with emphasis on fluent and flexible idea production. The relationship between visual thinking and the creative process. Enrollment limited to 60.

3 units, Aut, Win, Spr (Staff)

102. Integration, Prototyping, Design, and Evaluation—The integration of human values, technology, and manufacturing towards engineering solutions to design problems. Emphasis is on the development and timely evaluation of potential candidates through the use of methodology, computers, and rapid prototyping techniques. Lecture and lab enrollment limited to 30.

3 units, Aut (Milroy)
103. Manufacturing and Design—(Graduate students register for 303.) Emphasis is on prototype development techniques as an intrinsic part of the design process. The fundamentals of machining, welding, and casting, introduced in lecture and supported by lab experience. Manufacturing processes through lecture, films, and field trips. Design aspects are developed in an individual term project chosen, designed, and fabricated by students. Limited enrollment with consent of instructor. Corequisite, unless student has prior drafting experience: 103D. Corequisite for Mechanical Engineering and Product Design undergraduate majors for WIM: Engineering 102M. (WIM)

4 units, Aut (Beach)
Win (Milroy)

103D. Engineering Drawing and Design—The fundamentals of engineering drawing including orthographic projection, dimensioning, sectioning, exploded and auxiliary views, and assembly drawings. Designed to accompany 103. Homework drawings are of parts fabricated by the student in the shop. Major assignments in 103 are supported by material in 103D and assignment dates are sequenced on the assumption that the student is enrolled in both courses simultaneously. No prior knowledge of drafting required.

1 unit, Aut, Win (Milroy)

104. Dynamic Behavior—(Enroll in Engineering 104.)

105. Feedback Control Design—(Enroll in Engineering 105.)

106. Vehicle Dynamics and Control—(Graduate students register for 227.) The application of the principles of dynamics, kinematics, and control theory to the design and analysis of ground vehicle behavior. Simplified models of ride, handling, and braking, their role in developing intuition, and their limitations in engineering design. Suspension design fundamentals. Multibody dynamics approaches to vehicle modeling. Performance and safety enhancement through automatic control systems such as anti-lock braking, active suspensions, and stability control. Prerequisite: 161 or Engineering 104.

3 units, Spr (Gerdes)

106D. Vehicle Dynamics and Control Laboratory—(Graduate students register for 227D.) Demonstration of handling fundamentals, suspension set-up, and controller design using scale cars.

1 unit, Spr (Gerdes)

109. Computer Aided Design of Model Yachts—(Graduate students register for 209.) Hands-on introduction to the art and science of engineering and manufacturing. Students design and construct free sailing model yachts to a high standard of craftsmanship using Computer Aided Design and Manufacturing (CAD/CAM). Includes: sailing theory (aerodynamics and hydrodynamics of sail boats); model yacht design (nomenclature, scaling issues, lofting, history of rating rules, yacht aesthetics, tradeoffs between speed and control); the use of design and manufacturing systems (MaxSurf, Vellum, and laser-cuter); necessary construction techniques (hull fixture, planking, fiberglassing, casting ballast, sewing sails, finishing, and rigging); and sailing technique (tuning for performance). Field trips. Enrollment limited to 33.

4 units, Spr (Faste) alternate years, not given 2000-01

110. Design Sketching—Freehand sketching, rendering, and design development. Work is guided by instructors. Concurrent assignments in 115 and 116B,C provide subject matter, but the class is open to anyone wishing to improve freehand drawing skills. (AU)

1 unit, Win, Spr (Staff)

110B. Advanced Design Sketching—Freehand sketching, rendering, design development, and some computer use. Work is guided by instructors. Concurrent assignments in 116A provide subject matter. Prerequisite: 110A or consent of instructor based on drawing skill. (AU)

1 unit, Aut (Staff)


3 units, Aut (Pinsky)

112. Mechanical Systems Design—Objectives: provide students familiarity with the function of basic machine elements (e.g., gears, bearings), the trade-offs between various classes of machine elements, performance characteristics of various machine elements, and systems level design; and to provide experience in working in teams, selecting machine classes in synthesis-type problems, iterative design including prototyping, communicating ideas in graphical, textual, and oral forms, and design critiquing. Lecturers, labs. Prerequisites: 111, 103.

4 units, Win (Gerdes)

113. Mechanical Engineering Design—Objective: create designs and models of new mechanical devices. Design is studied as an activity and experienced by students as they work on a team design project obtained from industry and other sponsoring organizations. Prerequisites: 101, 103, 111, 112.

3 units, Spr (Staff)

115. Human Values in Design—Active encounters with human values in design. Lectures survey the central philosophy of the product design program, emphasizing the relation between technical and human values, the innovation process, and design methodology. Lab exercises include development of simple product concepts visualized in rapidly executed three-dimensional mockups. Prerequisite: 101.

3 units, Win (Kelley)

116A. Advanced Product Design: Formgiving—(Graduate students register for 316A.) Small- and medium-scale design projects are carried to a high degree of aesthetic refinement. Emphasis is on generating the appropriate forms to the task and setting. Prerequisites: 115, Art and Art History 160.

3 units, Spr (Kelley)

116B. Advanced Product Design: Conceptualization—(Graduate students register for 316B.) Exploration of the human needs that leads to conceptualization of future products, environments, systems, and services. Field work in public and private settings; appraisal of personal values; readings on social issues; and need-finding for a corporate client. Emphasis is on developing the flexible thinking skills that enable the designer to navigate the future.

3 units, Win (Faste)

116C. Advanced Product Design: Implementation—(Graduate students register for 316C.) Summary project utilizing the knowledge, methodology, and skills obtained in 115A,B, and 116A,B. Students implement design concept and present it to a professional jury. Prerequisite: 116B.

3 units, Spr (Staff)

117. Introduction to Sensors—(Graduate students register for 220.) Sensors are widely used in scientific research and as an integral part of commercial products and automated systems. The basic principles for sensing displacement, force, pressure, acceleration, temperature, optical radiation, nuclear radiation, and other physical parameters. Performance, cost, and operating requirements of available sensors. Elementary electronic circuits which are typically used with sensors. Lecture demonstration of a representative sensor from each category elucidates operating principles and typical performance. Lab experiments with off-the-shelf devices.

3-4 units, Spr (Kenny)
118. Introduction to Mechatronics—(Graduate students register for 318.) Open to undergraduate and graduate students. Introduces the technologies involved in mechatronics (Intelligent Electro-Mechanical Systems) and the techniques necessary to apply this technology to mechatronic system design. Topics: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Lab component of structural assignments. Large and open-ended team project. Limited enrollment. Prerequisites: Engineering 40, Computer Science 106, or equivalent.
4 units, Win (Kenny, Ohline)

120. History and Philosophy of Design—Major schools of 19th- and 20th-century design (Arts-and-Crafts Movement, Bauhaus, Industrial Design, and post-modernism) are analyzed in terms of their continuing cultural relevance. The relation of design to art, technology, and politics; readings from principal theorists, practitioners, and critics; recent controversies in industrial and graphic design, architecture, and urbanism. Enrollment limited to 40.
3-4 units, Aut (Adams)

121N. Stanford Introductory Seminar: Problem Solving and Creativity—Preference to freshmen. The nature of problem-solving and creativity, and various modes of thinking. The similarities and differences between different academic disciplines and different professions.
3 units, Aut (Adams)

122N. Stanford Introductory Seminar: Designing the Human Experience—An Exploration into the Theory and Practice of Design Thinking—Preference to freshmen. Readings, discussion, and projects explore the proposition that design education is for everyone.
3 units, Win (Leifer)

123N. Stanford Introductory Seminar: Stuff—Preference to freshmen. The advancement of human society largely depends on the "stuff" available for housing, transportation systems, industrial products, defense systems, etc. Frequently, "human made stuff" gets exposed to unfriendly environments such as high temperatures, corrosive liquids, and gases. The most extreme conditions occur in aircraft engines. A trip to an airline maintenance facility provides insight to what environmental conditions advanced turbine blades are required to suffer. How engineers prevent the premature "death" of turbine blades to avoid major catastrophes.
3 units, Aut (Prinz)

128. Design for Appropriate Technology—(Graduate students register for 328.) Lecture/lab. Design products for developing countries and markets, with emphasis on culturally sensitive need determination; local material, process, and maintenance limitation; and information transfer. Weekly labs reinforce lecture topics. Team design projects explore solutions to real-world needs.
3 units, Spr (Milroy, Spivack)

130. Internal Combustion Engines—Internal combustion engines including conventional and turbocharged spark ignition, and diesel engines. Lectures: basic engine cycles, engine components, methods of analysis, transmission technology, efficiency, performance, and methods of engine testing. Lab involves hands-on experience with engines and test hardware. Limited enrollment. Prerequisites: Engineering 30, 33, 131A (or concurrent enrollment in 131A), or equivalent.
3 units, Aut (Edwards)

131A. Heat Transfer—(Graduate students register for 250.) First of three-quarter sequence on the basic thermal sciences. The principles of heat transfer by conduction, convection, and radiation are introduced with specific examples from the engineering of practical devices and systems. Topics: transient and steady conduction, conduction by extended surfaces, boundary layer theory for forced and natural convection, boiling, heat exchangers, and graybody radiative exchange. Prerequisites: sites: 33, Engineering 30. Recommended: intermediate calculus, ordinary differential equations.
5 units, Aut (Goodson)

131B. Fluid Mechanics: Compressible Flow and Turbomachinery—Introduction to engineering applications involving compressible flow; aircraft propulsion, rocket propulsion, power generation; application of mass, momentum, energy and entropy balance to compressible flows; variable area isentropic flow, normal shock waves, adiabatic flow with friction, flow with heat addition, Operation of flow systems: the propulsion system. Introduction to turbomachinery: pumps, compressors, turbines. Angular momentum analysis of turbomachine performance, centrifugal and axial flow machines, effect of blade geometry, dimensionless performance of turbomachines; hydraulic turbines; steam turbines; wind turbines. Compressible flow turbomachinery: the aircraft engine. Prerequisite: 131A.
3 units, Win (Squires)

131C. Thermodynamics—Continuation of 131B. The basic principles and laws of thermodynamics as applied to systems consisting of pure substances and to systems consisting of gas mixtures. Non-reacting and chemically reacting mixtures. The application of thermodynamic principles to energy conversion systems illustrates procedures for thermodynamic analysis and performance optimization. Prerequisite: Engineering 30 or equivalent.
3 units, Spr (Mitchell)

132. Thermosciences Laboratory—The utility of experimentation in thermosciences, introducing modern lab techniques, e.g., A/D converters for digital data acquisition. Two major experiments are performed, drawn from all areas of thermosciences. Experimental design project spans course. Emphasis is on communication of results through written and oral reports and in evaluation of data using formal methods of uncertainty analysis. Enrollment limited to 30 preregistered students. Lab. Students may alternatively enroll in 254. Prerequisites: 33, 131A, and Engineering 30.
3 units, Win (Stall)

133Q. Stanford Introductory Seminar: Experimental Fluid Mechanics—Preference to sophomores. Group research project using a wind tunnel to investigate a problem of current interest. Students design and fabricate the test model then acquire data using flow visualization and quantitative instrumentation systems. Computerized data acquisition techniques are introduced and used on the project. Lab.
3 units (Eaton) not given 1999-2000

142A. Introduction to Computational Mechanics I—See 232A.
142B. Introduction to Computational Mechanics II—See 232B.
142C. Introduction of Computational Mechanics III—See 232C.

161. Dynamic Systems—Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, and frequency analysis. Demonstrations and laboratory examples. Prerequisites: background in dynamics and calculus, e.g., Engineering 15 and Mathematics 43; and familiarity with differential equations, linear algebra, and basic electronics.
4 units, Aut (Mitiguy, Richard)

180. Skeletal Development and Evolution—(Graduate students register for 280.) The development, adaptation, repair, and aging of the vertebrate skeleton is considered from an evolutionary perspective. Emphasis is on the interacting influences of mechanobiology and molecular genetics.
3 units, Spr (Carter)
Biomechanics of Movement—(Graduate students register for 381.) Review of experimental techniques used to study human and animal movement, including motion capture systems, EMG, force plates, medical imaging, and animation. Mechanical properties of muscle and tendon and quantitative analysis musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation.

3 units, Aut (Delp)

Biomineralization—The process of formation and adaptation of mineralized structures formed by organisms, principally animal skeletons. Emphasis is on the interacting influences of phylogenetic history, material constraints, mechanical factors, and other ecological and physiological considerations. Skeletal formation processes and the skeletal microstructure and ultrastructure of every animal phylum. Evolutionary aspects of body plan design among the major animal phyla with skeletons.

2 units, Spr (Constantz)

Cardiovascular Biomechanics—(Graduate students register for 284.) Biomechanical principles are developed and applied to the cardiovascular system. The relevance of mechanics in the study of cardiovascular function is examined from a historical perspective. Cardiovascular system anatomy, tissue mechanics, and blood rheology. Lumped parameter models, pulse wave propagation models. Womersley theory, finite element methods of blood flow, pulsatile flow in deformable vessels, and cardiac fluid dynamics. Problems in modeling blood within the context of predictive methods in surgical simulation and planning.

3 units, Spr (Taylor)

Engineering Problems and Experimental Investigation—Directed study and research for undergraduates on a subject of mutual interest to student and staff member. Student must find faculty sponsor and have approval of the adviser.

1-5 units, any quarter (Staff)


1-3 units, Spr (Milroy)

UNDERGRADUATE AND GRADUATE

The following are especially suitable for advanced undergraduates and graduates and may be used to satisfy the M.S. requirement, item '3' above, approved electives.

Hardware and Design
103. Manufacturing and Design
105. Feedback Control Design—(Enroll in Engineering 105)
113. Engineering Design
161. Dynamic Systems
250. Heat Transfer

PRIMARILY FOR GRADUATES
ENGINEERING MATHEMATICS AND COMPUTATION

200A,B,C are intended for students in the master’s program with some proficiency in undergraduate engineering mathematics and computing. Students enrolling in this sequence should have had some exposure to elementary linear algebra (for example, elementary operations with matrices), ordinary differential equations (for example, Mathematics 130), partial differential equations, and computer programming. Students who do not meet these guidelines should be prepared to devote additional remedial time to these courses or consider satisfying their requirements through Mathematics 113 and 131, and Computer Science 137.

200A. Mathematical and Computational Methods in Engineering—The theory of linear algebra; basis, linear independence, column space, null space, rank. Emphasis is on computer solutions of the linear system of algebraic and differential equations. Roundoff errors, pivoting, and ill-conditioned matrices. Quadratic forms, norm and condition numbers, projection and least-squares, operation counts, eigenvalues, eigenvectors, and their computation. The canonical diagonal form, functions of a matrix. Unitary, Hermitian, and normal matrices. Principal stresses and axes. Recommended: familiarity with computer programming; Mathematics 103, 130, or equivalent.

3 units, Aut (Gao)

200B. Mathematical Methods in Engineering—Geometric interpretation of partial differential equations (PDEs), characteristics, solution of first-order equations, characteristics and classification of second-order PDEs, separation of variables, special functions, eigenfunction expansions, Fourier integrals and transforms, Laplace transforms, method of characteristics, analytic and numerical techniques, self-similarity. Prerequisite: 200A.

3 units, Win (Staff)


3 units, Spr (Ferziger)


206. Introduction to Symmetry Analysis—(Enroll in Aeronautics and Astronautics 218.)

DESIGN AND CONTROLS

207A,B. Integrated Design for Marketability and Manufacturing (IDMM)—Integrated market research, product design, prototype manufacture, pricing, and product management. New product launching, with emphasis on compressed development cycle time and cross functional staffing. Teams of MBAs and engineers compete for simulated sales and profitability. Innovative use of market research as a design tool, immersion in hands-on manufacturing process, product definition communication, and sales. Instructors specify the product market in which all teams compete. IDMM aims to graduate leaders in product development. Limited enrollment. Enroll both quarters.

4 units, Aut, Win (Beach, Srinivasan)


3 units, Spr (Milroy)

215. The Designer in Society—Open to all graduate students. Participants' career objectives and psychological orientation are compared with existing social values and conditions. Emphasis is on assisting individuals in assessing their roles in society. Readings on political, social, and humanistic thought related to technology and design. Term project. Attendance mandatory. Enrollment limited to 24.

3 units, Win (Roth)

216. Introduction to Aircraft Design, Synthesis, and Analysis—(Enroll in Aeronautics and Astronautics 241A.)

217A. Design for Manufacturability: Product Definition—Systematic methodologies to define, develop, and produce competitive products. Methods cover characterization of user values, design for manufacturability, and environmental compatibility. 217A addresses the key issues for product competitiveness. Students teams identify opportunities for improvement and develop a comprehensive product definition. Topics: design for value, functional analysis, quality function deployment, value engineering, design for assembly, product line structuring, process and material selection, design for productability, failure modes and effects analysis (FMEA), design for serviceability, environmental product design, and organization issues for simultaneous engineering. Enrollment limited to 40. No maximum enrollment for Stanford Instructional Television Network (SITN) students. Minimum enrollment of two per viewing site; single student site by prior consent of instructor.

4 units, Win (Ishii, Martin)

217B. Design for Manufacturability: Quality by Design—Building on the product definition process covered in 217A, focuses on the implementation of competitive product design. Student groups apply structured methods to optimize the design of an improved product, and plan for its manufacture, testing, and service. The project deliverable is a comprehensive product and process specification. Topics: concept generation and selection (Pugh's Method), FMEA applied to manufacturing process, design for robustness, Taguchi Method, SPC and six sigma process, tolerance analysis, flexible manufacturing, product testing, rapid prototyping. Enrollment limited to 40, not including SITN students. Minimum enrollment of two per SITN viewing site; single student site by prior consent of instructor. Prerequisite: 217A.

4 units, Spr (Ishii, Martin)

217C. Manufacturing Systems Design—(Enroll in Industrial Engineering 225.)

218A. Smart Product Design Fundamentals—Introduction. Lecture, lab, and design project based series on programmable electromechanical systems design. Topics: transistors as switches, basic digital and analog circuits, boolean algebra, combinational and sequential logic, operational amplifiers, comparators, software design, programming in FORTH and "C." Team project. Enrollment in 218B,C is contingent on completing 218A or passing a Smart Product Design Fundamentals proficiency examination given at the start of Autumn Quarter. Lab fee. Limited enrollment.

5 units, Aut (Carreyer)

218B. Smart Product Design Applications—Intermediate level in the series of programmable electromechanical systems design, introduced in the context of lab assignments and integrated into a team project. Topics: user I/O, timer systems, interrupts, signal conditioning, software design for embedded systems, sensors, actuators, noise, and power supplies. Team project. Lab fee. Limited enrollment. Prerequisite: completion of 218A or passing of the Smart Product Design Fundamentals proficiency examination.

5 units, Win (Carreyer)

218C. Smart Product Design Practice—Advanced level in the series on programmable electromechanical systems design. Topics: interprocessor communication, system design with multiple microprocessors, architecture and assembly language programming for the PIC microcontroller, design with programmable logic, understanding and controlling the embedded software tool chain, A/D and D/A techniques, electronic manufacturing technology. Lab fee. Limited enrollment. Team project. Prerequisite: completion of 218B.

5 units, Spr (Carreyer)

218D. Smart Product Design Projects—Industrially sponsored project course is the culmination of the Smart Product Design sequence. Students take an industrial project that requires the application and extension of the knowledge gained in the prior three quarters, including prototyping of a final solution with hardware, software, and professional documentation and presentation. Lectures extend the students' knowledge of electronic and software design, and electronic manufacturing techniques. Topics: chip level design of microprocessor systems, real-time operating systems, alternate microprocessor architectures, PCB layout and fabrication.

4 units, Aut (Carreyer)

219. Introduction to Robotics—(Enroll in Computer Science 223A.)

220. Introduction to Sensors—See 117.

221. Materials Selection in Design—(Enroll in Material Science and Engineering 270.)

222. Kinematic Synthesis of Mechanisms—The rational design of linkages. The problem of determining linkage proportions to fulfill various design requirements, treated analytically. Path-curvature analysis, and circle and center-point theory.

3 units, Win (Roth)

224. Precision Engineering—Advances in engineering are often enabled by more accurate control of manufacturing and measuring tolerances. Concepts and technology enable precision such that the ratio of overall dimensions to uncertainty of measurement is large relative to normal engineering practice. Typical application areas: non-spherical optics, computer information storage devices, and manufacturing metrology systems. Application experience is gained through the design and manufacture of a precision engineering project, emphasizing the principles of precision engineering. Lectures, structured labs, and field trips Undergraduate prerequisite: consent of instructors.

4 units (Beach, DeBra) not given 1999-2000

225A. Control System Design and Simulation—(Enroll in Engineering 206.)

225B. Analysis and Control of Nonlinear Systems—(Enroll in Engineering 209.)

226A. Modern Control Design I—(Enroll in Engineering 207A.)

226B. Modern Control Design II—(Enroll in Engineering 207B.)

227. Vehicle Dynamics and Control—See 106.

227D. Vehicle Dynamics and Control Laboratory—See 106D.

228. Introduction to Control Design Techniques—(Enroll in Engineering 205.)
MECHANICS OF SOLIDS

229. Physical Solid Mechanics—Introduces the theoretical foundation for the solid state materials including crystalline, amorphous, and alloy materials from the atomic structural viewpoint. Topics: crystal structures of materials, dynamics (phonons) of crystals, electro-optical structures of crystals; amorphous materials (structure, dynamics, and electro-optical properties); mechanical properties of defect-free crystals; role of effects in materials strength; electromechanical and electro-opto-mechanical couplings in materials.
3 units (Cho) not given 1999-2000

230. Advanced Kinematics—Kinematics from mathematical viewpoints. Introduction to algebraic geometry of point, line, and plane elements. Emphasis is on basic theories which have potential application to mechanical linkages, computational geometry, and robotics.
3 units, Aut (Roth)

3 units, Aut (Heegaard)

3 units, Win (Heegaard)

232A. Introduction to Computational Mechanics I—(Undergraduate register for 142A.) Overview of modern computational methods for solving problems primarily arising in the mechanics of solids. Basic concepts of the finite element method (FEM) and boundary element method (BEM). Basic equations of linear solid mechanics including variational formulations. Elastic bars (elasticity in one-dimension), steady heat conduction (diffusion), and plane elasticity (plane stress, plane strain, axisymmetric elasticity). Students develop a finite element code in Matlab using the PDE Toolbox pre- and post-processor, solve problems, and visualize results at every stage. Introduction to simulation-based design methodologies.
4 units, Win (Pinsky)

4 units, Spr (Pinsky)

232C. Introduction to Computational Mechanics III—(Undergraduate register for 142C.) Introduction to: nonlinear analysis, the constitutive modeling for nonlinear and time-dependent materials and finite element implementation, contact mechanics and the basics of finite element implementation. Use of and experiments with commercial codes as part of computer-aided design. Selected special topics.
4 units, Spr (Pinsky)

3 units (Hughes) alternate years, given 2000-01

234B. Finite Element Methods in Fluid Mechanics—Continuation of 234A.
3 units (Hughes) alternate years, given 2000-01

234C. Finite Element Methods in Fluid Mechanics—Continuation of 234B.
3 units (Hughes) alternate years, given 2000-01

3 units (Hughes) alternate years, not given 2000-01

3 units, Win (Hughes) alternate years, not given 2000-01

3 units, Spr (Hughes) alternate years, not given 2000-01

237. Free and Forced Motion of Structures—(Enroll in Aeronautics and Astronautics 244A.)

3 units, Aut (Cho)

238B. Analysis of Continuum Mechanics—Quantum mechanics and interatomic potentials; crystal lattices; hyperelasticity; Cauchy-Born Elasticity; the Virial Theorem and statistical mechanics of elasticity; continuum analysis of atomistic simulations; atomic J-integral concept.
3 units (Cho, Gao) not given 1999-2000

3 units, Win (Gao)


3 units, Spr (Gao)


3 units (Gao) given 2000-01

241A. Theory of Plates—Analysis of stress, deformation in plates bent by transverse loads. Application to circular, rectangular, other shapes. Vibrations, buckling. Prerequisite: 111 or Civil Engineering 114.

3 units (Steele) not given 1999-2000

241B. Theory of Shells—Axisymmetric deformation of shells of revolution. Asymptotic expansions, direct and bending stress. Application to design of domes, pressure vessels, expansion joints and pressure sensing devices. Use of asymptotic solutions for "very large finite element computation." Prerequisite: 111 or Civil and Environmental Engineering 114.

3 units (Steele) not given 1999-2000


3 units, Spr (Steele)

243. Micromechanics—(Enroll in Material Science and Engineering 350.)

3 units, Win (Gao)

244. Atomistic Simulations of Materials—Fundamental concepts and the practical techniques of atomistic simulations for engineering and science graduate students. The fundamental concepts of molecular dynamics (MD) and Monte Carlo (MC) simulations are introduced based on the finite difference method. Practical computational techniques of MD and MC simulations. The strength and weakness of atomistic simulations under the light of the accuracy of interatomic potentials. Standard methods of simulation analysis in connection with numerical data analysis and statistical mechanics. Advanced simulation techniques (generalized MD and smart MC simulations, etc.).

3 units, Win (Cho)


3 units, Win (Nelson)

246. Techniques of Failure Analysis—Enroll in Aeronautics and Astronautics 252.)

247A. Microstructure and Mechanical Properties—(Enroll in Materials Science and Engineering 251.)


3 units, Spr (Nelson)

249A. Quantum Simulations—Molecules and Surfaces—Quantum atomistic simulations of molecules and surfaces to predict atomic structure, properties, reactions mechanisms and kinetics. Review of quantum mechanics. Electronic structure calculations: Hartree Fock, configuration interaction, many body perturbation theory, and density functional theory wave functions, property calculations: energy, forces, structure, electronic and vibrational spectra. Applications to semiconductor processing, surface science, biochemistry, catalysis, polymers, environmental chemistry and combustion.

3 units, Win (Musrave)


3 units, Spr (Cho)

HEAT TRANSFER, FLUID MECHANICS, AND HIGH TEMPERATURE GAS DYNAMICS

250. Heat Transfer—For graduate students; see 131A.

3 units, Aut

251A. Fluid Mechanics—Exact and approximate analysis of fluid flow covering kinematics, global and differential equations of mass, momentum, and energy conversation. Forces and stresses in fluids, Euler's equations and the Bernoulli theorem applied to inviscid flows. Vorticity dynamics. Topics in irrotational flow: stream function and velocity potential for exact and approximate solutions; superposition of solutions; complex potential function; circulation and lift. Some boundary layer concepts.

3 units, Aut (Lele)

251B. Fluid Mechanics—Laminar viscous fluid flow. Brief review of governing equations, boundary conditions, and constitutive laws. Exact solutions for parallel flows. Creeping flow limit, lubrication theory, and boundary layer theory including free-shear layers and approximate methods of solution; boundary layer separation. Introduction to stability theory and transition to turbulence. Prerequisite: 251A.

3 units, Win (Lele)

252A. Radiative Heat Transfer—The fundamentals of thermal radiation heat transfer; blackbody radiation laws; radiative properties of non-black surfaces; analysis of radiative exchange between surfaces and in enclosures; combined radiation, conduction, and convection; radiative transfer in absorbing, emitting, and scattering media. Advanced material for students with interests in heat transfer, as applied in high-temperature energy conversion systems. Take 252B.C for depth in heat transfer.
Prerequisites: graduate standing and undergraduate course in heat transfer. Recommended: computer skills.


3 units, Aut (Mitchell)


3 units, Spr (Eaton)


3 units (Edwards) not given 1999-2000

**254. Computers and Instrumentation in the Fluid Mechanics Laboratory**—Use of computers including interfacing of analog and digital instruments, experimental control, sampling strategies, and data reduction techniques. Instrumentation including hot-wire, laser-Doppler and particle imaging anemometers. Lab. Prerequisite: previous experience with computer programming.

3 or 4 units, Win (Santiago)

**255. Compressible Flow**—Recommended for students with little experience in compressible flow. Introduction to compressible flow. Sound waves and normal shock-waves. Quasi-one-dimensional steady flows in variable area ducts with friction, heating, and cooling; unsteady one-dimensional flow, two-dimensional supersonic flow; oblique shock waves, Prandtl-Meyer expansions, detonation waves. Method of characteristics.

3 units, Win (Bowman)

**256. Turbomachinery, Fluid Dynamics, and Design**—Theory, performance, and design of turbomachines (turbines, pumps, compressors, wind turbines, etc.). Turbomachines function as the result of the dynamic interaction of a moving fluid with a bladed rotor. Problems sets, and a final design project such as the specification of blading for a compressor or a turbine stage to meet prescribed performance criteria. Prerequisites: 251A or equivalent, plus one-dimensional flow of a perfect gas as presented in 131B or equivalent.

3 units (Staff) not given 1999-2000

**257. Fluid Flow in Microdevices**—Introduction to the effects of physics-chemical forces on the fluid flow of micron-scale flow devices. Basic descriptions of creeping flow, charge double-layers, and electrochemical transport (e.g., Nernst-Planck equations) lead to a study of the hydrodynamics of solutions of charged and uncharged particles. Device applications of interest include microsystems that perform capillary electrophoresis, drug dispersion, and hybridization assays. Emphasis is on bioanalytical applications where electrophoresis, electro-osmosis, and Brownian motion effects are important. Prerequisite: consent of instructor.

3 units, Aut (Santiago)

**258. Heat Transfer in Microdevices**—Application-driven introduction to the thermal design of electronic circuits, sensors, and actuators that have dimensions comparable to or smaller than one micrometer. Impact of thin-layer boundaries on thermal conduction and radiation. Convection in microchannels and microscopic heat pipes. Thermal property measurements for microdevices. Emphasis on Si and GaAs semiconduc-
tor devices and layers of unusual, technically-promising materials, e.g., chemical-vapor-deposited (CVD) diamond. Final project can be based on student research interests. Prerequisite: consent of instructor.

3 units, Spr (Goodson)

**259A. Numerical Methods in Fluid Mechanics**—(Enroll in Aeronautics and Astronautics 214A.)

**259B. Numerical Computation of Compressible Flow**—(Enroll in Aeronautics and Astronautics 214B.)

**259C. Numerical Computation of Viscous Flow**—(Enroll in Aeronautics and Astronautics 214C.)

**261A. Statistical Theory and Modeling for Turbulent Flow**—Averaging and correlations, vorticity and vortex stretching, and the energy cascade. Reynolds stresses; introduction to transport equations. Length scales and spectra; "universal" scaling of small eddies. Law of the wall, local equilibrium, and eddy viscosity. Properties of boundary layers and other "thin" shear layers; complex flows. Introduction to prediction methods; local equilibrium, stress-transport, and eddy-viscosity transport models. Prerequisite: 251B.

3 units (Staff) not given 1999-2000

**261B. Advanced Topics in Turbulence**—Topics vary each year and may include: spectral representation, rapid distortion theory, Cayley-Hamilton theorem and constitutive modeling of turbulence, turbulent dispersion, stochastic differential equations, Reynolds average and modeling for reacting flows, vortical structures (topology), intermittency, proper orthogonal characteristic eddy decomposition, chaos, Lyapunoff exponents, fractals, large eddy simulations, subgrid closure, and geophysical turbulence.

3 units (Staff) not given 1999-2000

**262A. Physical Gas Dynamics**—Concepts and techniques for description of high-temperature and chemically reacting gases from a molecular point of view. Introductory kinetic theory, chemical thermodynamics, and statistical mechanics as applied to properties of gases and gas mixtures. Transport and thermodynamic properties, law of mass action, and equilibrium chemical composition. Maxwellian and Boltzmann distributions of velocity and molecular energy. Examples and applications from areas of current interest, e.g., combustion and materials processing.

3 units, Aut (Cappelli)

**262B. Nonequilibrium Processes in High-Temperature Gases**—Introduction to chemical kinetics and energy transfer in high-temperature gases. Collision theory, transition state theory, and unimolecular reaction theory. Vibration-translation energy transfer. Prerequisite: 262A.

3 units, not given 1999-2000

**263. Partially Ionized Plasmas and Gas Discharges**—Introduction to partially ionized gases and the nature of gas discharges. Topics: the fundamentals of plasma physics emphasizing collisional and radiative processes, electron and ion transport, ohmic dissipation, oscillations and waves, interaction of electromagnetic waves with plasmas. Applica-
240. Optics—Introduction to classical and modern physics of light. Prerequisites: 271 or consent of instructor.
3 units, Win (Sivaraman)

241. Advanced Experimental Methods—Advanced laboratory methods for photonics, nonlinear optics, and wave phenomena. Prerequisite: 240 or consent of instructor.
3 units, Spr (Goykhman)

301. Medical Device Forum—Invited speakers discuss engineering, medical, legal, and business issues associated with the development of medical devices. (AU)
1 unit, Win (Delp, Andriacchi)

4 units, Win (Delp, Andriacchi)

3 units, Spr (Heegard)

304. Cardiovascular Biomechanics—See 184.

305. Tissue Engineering—Tissue engineering is an expanding discipline that applies biological and engineering principles to create substitutes or replacements for defective tissues or organs. The principles of cell biology provide a foundation for using engineering approaches to generate tissue structure and function. Emphasis is on how scaffolds, smart polymers, and mechanical forces can be used to reproduce the physical environment that acts, at the whole organ system level, to maintain specialized cellular function through molecular and genetic mechanisms.
3 units, Win (Theocharis)

306. Neuromuscular Biomechanics—The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive technology for persons with physical disabilities.
3 units, Spr (Delp)

307. Biomechanics and Ecological Physiology of Intertidal Communities—(Enroll in Biological Sciences 277H.)
3 units, Win (Carter, Taylor)

291. Advanced Applied Mechanics—Advanced topics in the mechanics of fluids, solids, and structures. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Win (Bowman)

292. Computational Fluid Dynamics—Advanced methods in computational fluid dynamics. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Spr (Heegaard)

293. Advanced Fluid Dynamics—Advanced topics in fluid dynamics. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Win (Ferziger)

294. Advanced Materials Mechanics—Advanced topics in the mechanics of materials. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Aut (Ferziger)

295. Advanced Continuum Mechanics—Advanced topics in continuum mechanics. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Win (Hanson)

296. Advanced Tensor Analysis—Advanced topics in tensor analysis. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Aut (Hanson)

297. Advanced Solid Mechanics—Advanced topics in solid mechanics. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Spr (Valero-Cuevas)

298. Advanced Fluid and Heat Transfer—Advanced topics in fluid and heat transfer. Prerequisites: 262A and/or 264. Recommended: 269A.
3 units, Win (Hanson)

THERMODYNAMICS AND ENERGY CONVERSION

270. Engineering Thermodynamics—Thermodynamic analysis of engineering systems emphasizing systematic methodology for application of basic principles. Introduction to availability analysis. Thermodynamics of gas mixtures and reacting systems. Modern computational equations of state. Thermodynamics of condensed phases, including solutions. Prerequisites: undergraduate background in engineering thermodynamics and computer skills.
3 units, Aut (Bowman)

271. Combustion Fundamentals—Heat of reaction, adiabatic flame temperature, and chemical composition of products of combustion; kinetics of combustion and pollutant formation reactions; conservation equations for multi-component reacting flows; propagation of laminar premixed flames and detonations. Prerequisite: 262A or 270, or consent of instructor.
3 units, Win (Mitchell)

272. Combustion Applications—The role of chemical and physical processes in combustion; ignition, flammability, and quenching of combustible gas mixtures; premixed turbulent flames; laminar and turbulent diffusion flames; combustion of fuel droplets and sprays. Prerequisite: 271.
3 units, Spr (Bowman)

BIOMECHANICAL ENGINEERING


281. Orthopaedic/Cardiovascular Bioengineering and Medicine—Engineering approaches are applied to the musculoskeletal and cardiovascular system within the context of surgical and medical care. Introduction to fundamental anatomy and physiology. The material and structural characteristics of hard and soft connective tissues and organ systems and the role of mechanics in normal development and pathogenesis. Engineering methods are used in the evaluation and planning of medical procedures, surgery, and devices.
3 units, Aut (Carter, Taylor)

282A. Biomechanical Engineering R&D I—Interdisciplinary approaches are used in formulating research and development project proposals associated with patient care. Possible topics: fracture plate and fixation, neuromuscular coordination, artificial joint replacement, rehabilitation devices, cardiovascular devices. Attendance at orthopaedic and rehabilitation grand rounds. Lab. Limited enrollment.
4 units, Win (Delp, Andriacchi)

282B. Biomechanical Engineering R&D II—Research and development projects are executed with the guidance of project coaches. Oral presentations and written proposals, papers, and reports. Attendance at orthopaedic and rehabilitation grand rounds. Prerequisite: consent of instructor.
4 units, Spr (Andriacchi)

3 units, Spr (Heegard)

284. Cardiovascular Biomechanics—See 184.

285. Tissue Engineering—Tissue engineering is an expanding discipline that applies biological and engineering principles to create substitutes or replacements for defective tissues or organs. The principles of cell biology provide a foundation for using engineering approaches to generate tissue structure and function. Emphasis is on how scaffolds, smart polymers, and mechanical forces can be used to reproduce the physical environment that acts, at the whole organ system level, to maintain specialized cellular function through molecular and genetic mechanisms.
3 units, Win (Theocharis)

286. Neuromuscular Biomechanics—The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive technology for persons with physical disabilities.
3 units, Spr (Delp)

287. Biomechanics and Ecological Physiology of Intertidal Communities—(Enroll in Biological Sciences 277H.)
3 units, Win (Carter, Taylor)

DIRECTED STUDY AND SEMINARS

288. Biomechanical Engineering Seminar—Invited speakers present research topics at the interfaces of biology, medicine, physics, and engineering. (AU)
1 unit, Win (Alexander)
Spr (Valero-Cuevas)

289. Medical Device Forum—Invited speakers discuss engineering, medical, legal, and business issues associated with the development of medical devices. (AU)
1 unit, Win (Taylor)
290. Thermosciences Research Project Seminar—Review of work in a particular research program and presentations of other related work. (AU)
   1 unit, Aut, Win, Spr (Staff)

291. Engineering Problems—Directed study for graduate engineering students on subjects of mutual interest to student and staff member. May be used to prepare for experimental research during a later quarter under students on subjects of mutual interest to student and staff member. May be used to prepare for experimental research during a later quarter under (AU)
   1-5 units, any quarter (Staff)

291X. Teaching Participation—Credit is given for assisting a professor in the teaching of a mechanical engineering course. Consent of supervising instructor required.
   1-3 units, Aut, Win, Spr (Staff)

292. Experimental Investigation of Engineering Problems—Graduate engineering students undertake experimental investigation under guidance of staff member. Previous work under 291 may be required to provide background for experimental program. Faculty sponsor required.
   1-5 units, any quarter (Staff)

293. Interdisciplinary Interaction Design—(Same as Computer Science 447.) Small teams develop innovative technology prototypes that combine product and interaction design. Focus is on software and hardware interfaces, interaction, design aesthetics, and some underpinnings of successful design: a reflective, interactive design process, group dynamics of effective interdisciplinary teamwork, and working with users. Prerequisite: 247A.
   3-4 units, Spr (Kelley, Winograd)

293X. Human-Computer Interaction: Interaction Design Studio—(Enroll in Computer Science 247A.)

294. Design Forum—Invited speakers address issues of interest to designers. Brief presentation followed by open discussion. Spring Quarter emphasis on manufacturing and design. (AU)
   1 unit, Aut, Win (Gerdes)
   Spr (Beach)

295. Seminar in Solid Mechanics—Problems in all branches of solid mechanics. All Ph.D. candidates in solid mechanics are normally expected to attend. (AU)
   1 unit, Aut, Win, Spr (Staff)

296. Manufacturing Systems Engineering Forum—Invited speakers address issues of interest to design and manufacturing engineers. Brief presentations are followed by open discussion. Sponsored by Stanford Engineering Club for Automation and Manufacturing. (SECAM) (AU)
   1 unit, Aut, Win, Spr (Beach)

297. Design Theory and Methodology Forum—A mixture of research reports, literature reviews, and designer interviews promote rigorous examinations of the cognitive basis for designer behavior and design tool development. (AU)
   1 unit, Aut, Win, Spr (Leifer, Mabogunje)

298. Seminar in Fluid Mechanics—(Enroll in Engineering 298.)

299. Practical Training—Educational opportunities in high-technology research and development labs in industry. Qualified graduate students engage in internship work and integrate that work into their academic program. Following internship, work students complete a research report outlining their work activity, problems investigated, key results, and any follow-on projects they expect to perform. Meets the requirements for Curricular Practical Training for Students on F-1 visas. Student is responsible for arranging own employment. Register under adviser’s section number.
   1 unit (Staff)

   2-15 units, any quarter (Staff)

301. Thesis—Dissertation for the degree of Ph.D.
   2-15 units, any quarter (Staff)

303. Manufacturing and Design—(Same as 103.)

ADVANCED MATHEMATICS AND COMPUTATION ANALYSIS

   3 units (Durbin) not given 1999-2000

   3 units, Aut (Moin)

DESIGN

309. Finite Element Analysis in Mechanical Design—Part I: basic concepts of finite elements, with applications to problems confront the mechanical design. Linear static, modal, and thermal formulations are emphasized; nonlinear and dynamic formulations are introduced. Students implement simple element formulations to obtain a deeper understanding of the essential features of this numerical technique. Part II: application of a commercial finite element code in analyzing design problems. Issues: solution methods, modeling techniques features of various commercial codes, code problem definition. Individual projects focus on the interplay of analysis and testing in product design/development. Prerequisite: ability to program, Mathematics 103, or equivalent. Recommended: 111, or equivalent in structural and/or solid mechanics; some exposure to principles of heat transfer.
   3 units, Spr (Sheppard)

310A. Tools for Team-Based Design—(Same as Engineering 310A.)
   For graduate students; open to limited SITN/global enrollment. Project-based, exposing students to the tools and methodologies useful for forming and managing an effective engineering design team in a business environment, including product development teams that may be spread around the world. Topics: personality profiles for creating teams with balanced diversity; computational tools for project coordination and management; real time electronic documentation as a critical design process variable; and methods for refining project requirements to ensure that the team addresses the right problem with the right solution. Computer-aided tools are employed for supporting geographically distributed teams. The final project analyzes a set of industry-sponsored design projects for consideration in 310B,C. The investigation includes benchmarking and meetings with industrial clients. The deliverable is a detailed document with specifications for the project and the optimal design team that should work on the project in subsequent quarters.
Limited enrollment, consent of instructor for off-campus (global) registrants.

4 units, Aut (Cutkosky)

310B, C. Design Project Experience with Corporate Partners—(Same as Engineering 310B, C.) Two-quarter project for graduate students who already have some design experience and want in-depth involvement in an entrepreneurial design team with real world industrial partners. The products developed are part of the student's portfolio. For some projects, 217 and 218 may be prerequisites or co-requisites (see http://me310.stanford.edu for admission guidelines). Each team functions like a small start-up company, working closely with a technical advisory board, consisting of the instructional staff and a coach. Teams use computer-aided tools for project management, communication, and documentation, and are provided a budget for direct expenses including hiring technical assistants and conducting tests. Teams interact with corporate liaisons weekly via site visits, video conferencing, email, fax, and phone. Hardware demonstrations, peer reviews, scheduled documentation releases, and an intense team environment provide the mechanisms and culture for design information sharing. Enrollment by consent of instructor and depends on the results of a pre-enrollment survey in December and the recommendations made by project definition teams in 310A.

4-5 units, Win, Spr (Cutkosky)

311. Engineering: Women's Perspective—Master's and Ph.D.-level seminar series driven by student interests. Possible topics: time management, career choices, health and family, diversity, professional development, and personal values. Graduate students share experiences and examine scientific research in these areas. Guests speakers from academia and industry, student presentations with an emphasis on group discussion. (AU)

1 unit, Win, Spr (Sheppard)

313. Ambidextrous Thinking—Visual and kinesthetic skills are developed and exercised in solving design problems. Quickly executed perspective, orthographic, diagrammatic, and three-dimensional sketches are emphasized in conjunction with fluent and flexible idea production. Exercises to appreciate and develop the entire body's role in creative thinking. Enrollment limited to 60.

3 units, Aut (Faste)

314. Solid State Physics for Mechanical Engineering—Introductory overview of the principles of statistical mechanics, quantum mechanics, and solid-state physics. Provides graduate mechanical engineering students with the understanding needed to work on devices or technologies which rely on solid-state physics.

3 units (Kenny) alternate years, given 2000-01

316A. Advanced Product Design: Formgiving—See 116A. Prerequisites: 313, 303; art.

3 units, Win (Burnett)

316B. Advanced Product Design: Conceptualization—See 116B. Prerequisite: consent of instructor.

316C. Advanced Product Design: Implementation—Prerequisite: 316B.

317. Total Product Integration Engineering—Advanced version of 217A B. Enrollment limited 12. Prerequisites: 217A B and at least two years of full-time industry experience or consent of instructor.

318. Introduction to Mechatronics—See 118.

319. Robotics and Vision Lab—For graduate students with some familiarity in robotics who want project experience with robotic and vision systems. Current topics in robotics and machine vision with applications to flexible, automated manufacturing; emphasis is on integrated problems and techniques for fine motion control, calibration, acquisition of sensory data, and programming. Cell level topics: architectures and strategies for cell control. Research issues: dextrous manipulation and languages for high-level task specification. Typical projects: robotic deburring, assembly using force feedback and/or vision, part inspection, and cell control. Short assignments provide practical experience with various equipment. Enrollment limited to 30. Prerequisites: 219 or equivalent, some familiarity with programming.

3 units, Spr (Milroy)

327B. Introduction to Computer Vision—(Enroll in Computer Science 223B.)

328. Design for Appropriate Technology—See 128.

ADVANCED MECHANICS OF SOLIDS

349. Engineering Quantum Mechanics—Basic quantum mechanics topics necessary for engineering graduate students to understand the atomic, electronic, and, optical properties of diverse material systems and to fundamental underlying principles of microscopic measurement processes (e.g., STM, MFM, TEM, SNOM, etc.). Topics: electronic bound state, collision theory, symmetry in quantum mechanics, approximation methods, identical particles and spin, electromagnetic field, and relativistic wave equations.

3 units, Sum (Cho)

ADVANCED FLUID MECHANICS

351A. Advanced Fluid Mechanics—For advanced students specializing in fluid mechanics. Topics: kinematics (analysis of deformation, critical points and flow topology, Helmholtz decomposition); constitutive relations (viscous and visco-elastic flows, non-inertial frames); vortex dynamics; circulation theorems, vortex line stretching and rotation, vorticity generation mechanisms, vortex filaments and Biot-Savart formula, local induction approximation, impulse and kinetic energy of vortex systems, vorticity in rotating frame. Prerequisite: graduate-level courses in compressible and viscous flow.

3 units (Staff) not given 1999-2000

351B. Advanced Fluid Mechanics—Waves in fluids: surface waves, internal waves, inertial and acoustic waves, dispersion and group velocity, wave trains, transport due to waves, propagation in slowly varying medium, wave steepening, solitons and solitary waves, shock waves. Stability of fluid motion: dynamical systems, bifurcations, Kelvin-Helmholtz instability, Rayleigh-Benard convection, energy method, global stability, linear stability of parallel flows, necessary and sufficient conditions for stability, viscosity as a destabilizing factor. Focus is on flow instabilities. Prerequisites: graduate-level courses in compressible and viscous flow.

3 units (Lele) not given 1999-2000


3 units (Staff) not given 1999-2000

OTHER

381. Biomechanics of Movement—See 181.


396. Product Realization Lab: Special Project—Material varies each year, emphasizing design and technique in either foundry work, machining projects, or wood construction.

1 unit, Spr (Milroy)
459. Frontiers in Interdisciplinary Biosciences Literature—(Same as Chemical Engineering 459.) Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

SCIENTIFIC COMPUTING AND COMPUTATIONAL MATHEMATICS PROGRAM

Director: Gene H. Golub
Associate Director: Walter Murray
Core Faculty: Gene Golub (Computer Science), Robert Dutton (Electrical Engineering), Joseph B. Keller (Mathematics, emeritus), Walter Murray (Engineering-Economic Systems and Operations Research), Joseph Oliger (Computer Science), George Papanicolaou (Mathematics)
Affiliated Faculty: Khalid Aziz (Petroleum Engineering), Joel Ferziger (Mechanical Engineering), George M. Hornsby (Chemical Engineering), Thomas J. Hughes (Mechanical Engineering), Thomas Kailath (Electrical Engineering), T. P. Liu (Mathematics)

The Scientific Computing and Computational Mathematics Program (SC/CM) is interdisciplinary and leads to the M.S. and Ph.D. degrees. It is designed for students interested in studying and developing computational tools in those aspects of applied mathematics central to modeling in the physical and engineering sciences. Graduates of this program are expected to be able to deal with a scientific problem from its formulation, moving through its mathematical analysis to algorithm development and implementation. The symbiosis of applied mathematics and numerical computing is stressed.

The program prepares students for research in the rapidly expanding field of supercomputing.

GRADUATE PROGRAMS

MASTER OF SCIENCE

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees" section of this bulletin. A candidate must complete a program of 46 units of courses numbered 100 or greater. In addition, a number of courses at the 200 level or above are required. At least 36 of these units must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. The core curriculum is common to all degrees offered by the program, but is adapted according to the interests and prior education of the student. Deviations from the core curriculum must be justified in writing and approved by the student's adviser and the SC/CM Committee. Courses that are waived rather than taken may not be counted towards the master's degree. The student must fulfill credit requirements in each of the categories listed below.

CORE CURRICULUM

1. Mathematics (18 units): students are required to take Mathematics 220A,B, C. Nine additional units in math are required with at least 6 units at the 200 level. Suggested courses are Mathematics 173, 205A,B,C, 224, 230, 236, 237, 256A,B,C, 274, 276A,B; Statistics 300A,B,C, 305, 306A,B, 310A,B,C. Other courses can be substituted with consent of the adviser and the SC/CM Committee. Students should take those courses most suitable to their areas of specialization.

2. Numerical Analysis (12 units): students are required to take Computer Science (CS) 237A,B,C and 3 units of one of the advanced courses in numerical analysis: CS 335, 336, 337, 339; Mechanical Engineering (ME) 233B, 235A,B,C; Statistics 327.

3. Computer Science (6-9 units): students can take a selection of courses from CS 109A,B, 212, 248, 260. This must include a course at the 200 level.

4. Application Area (9 units): students must take a focused program in an applications area such as fluid mechanics, operations research, or statistics. Courses must be at the 200 level or higher, and the program of concentration must be approved by the adviser and committee. The following courses meet the requirements: Aeronautics and Astronautics 210A,B, 214A,B,C; Civil and Environmental Engineering 212; Electrical Engineering 363, 364, 365, 378A,B; ME 238A,B, 251A,B, 269.

5. Seminar (1 unit): students are required to regularly attend the Scientific Computing/Computational Mathematics seminar for one quarter. The seminar is held weekly during the academic year.

DOCTOR OF PHILOSOPHY

The University's basic requirements for the Ph.D. degree (residence, dissertation, examination, and so on.) are discussed in the "Graduate Degrees" section of this bulletin. The following are the program's requirements:

1. Plan and successfully complete a coherent program of study covering the basic areas of Scientific Computing and Computational Mathematics. It must at least satisfy the requirements for the M.S. degree in SC/CM. It is important that the student be able to exhibit depth in some area of application. The student's adviser has the primary responsibility for the adequacy of the program, which must meet the approval of the SC/CM Committee.

2. To be admitted to candidacy for the Ph.D. degree, a student must have successfully completed 27 units of graduate courses (200 level and above) with at least a GPA of 3.0. In addition, a student must pass a qualifying examination and give a presentation on his or her chosen research area. The qualifying examination must be taken within one year of admission into the Ph.D. program, and the research presentation must be completed within one year of successfully passing the Ph.D. qualifying examination. Detailed information about the scope of the Ph.D. qualifying examination may be obtained from the program.

3. Beyond the requirements for candidacy, the student must complete a focused course of study of at least 48 units. The program should be
designed to develop a deep, focused background in the research area to be pursued in the dissertation. Approval of the program must be obtained from the SC/CM Committee.

4. In addition, the student must have an adequate knowledge of a coherent area of application and must complete at least 12 units in that area.

5. The most important requirement for the Ph.D. is the dissertation. Within a reasonable period after passing the qualifying examination, the student must obtain the agreement of a faculty member to be the dissertation adviser. A reading committee must be selected before the student is admitted to Terminal Graduate Registration (TGR), and this committee should be frequently consulted by the student before the University oral examination. Upon completion of a draft of the dissertation, the student must pass a University oral examination in defense of the dissertation.

Ph.D. MINOR

Students wishing to obtain a Ph.D. minor in the Scientific Computing and Computational Mathematics Program should consult the department office for designation of a minor adviser. A minor in SC/CM may be obtained by completing 20 units of course work, including the sequences Mathematics 220A,B,C and Computer Science 237A,B,C; a GPA of 3.0 (B) or better must be maintained in these courses.

The student’s Ph.D. reading committee and University oral committee must include one faculty member who is associated with the SC/CM program.

COURSES

137. Introduction to Scientific Computing—(Enroll in Computer Science 137.) Prerequisites: Computer Science 106A; Mathematics 103 or 113 or equivalents.
   4 units, Aut (Oliger)
   Spr (Golub)

138. Matlab and Maple for Science and Engineering Applications—
   (Enroll in Computer Science 138.)
   4 units, Win (Moler)

220A,B,C. Partial Differential Equations of Applied Mathematics—
   (Enroll in Mathematics 220A,B,C.) Prerequisite: some familiarity with differential equations and functions of a complex variable.
   220A. 3 units, Aut (Liu)
   220B. 3 units, Win (Liu)
   220C. 3 units, Spr (Chou)

237A,B,C. Advanced Numerical Analysis—(Enroll in Computer Science 237A,B,C.)

237A. Numerical Linear Algebra—Prerequisites: Computer Science 106A, 137; Mathematics 103 or 113.
   3 units, Aut (Golub)

237B. Numerical Solution of Initial Value Problems—Prerequisites: Mathematics 130, 131.
   3 units, Win (Oliger)

237C. Numerical Solution of Boundary Value Problems—Prerequisites: Mathematics 130, 131.
   3 units, Spr (Wan)

238. Parallel Methods in Numerical Analysis—(Enroll in Computer Science 238.) Prerequisite: Mechanical Engineering 200A or Computer Science 237A, or consent of instructor.
   3 units, Win (Alonso, Wan)

336. Advanced Methods in Matrix Computation—(Enroll in Computer Science 336.)
   3 units (Golub) not given 1999-2000

337. Numerical Methods for Initial Boundary Value Problems—
   (Enroll in Computer Science 337.)
   3 units, Spr (Oliger)

339. Topics in Numerical Analysis—(Enroll in Computer Science 339.)
   3 units (Staff) alternate years, given 2000-01

340. SCCM Consulting Workshop
   1-3 units, any quarter (Wan)

398. Curricular Practical Training—Provides students with on-the-job training under the guidance of experienced, on-site supervisors. Students must register the quarter after their training. Students receive credit and a grade after submitting a concise report detailing work activities, problems worked on, and key results. Prerequisite: written consent of adviser.
   1 unit, any quarter (Staff)

399. Independent Project
   any quarter (Staff)

499. Advanced Reading and Research—Prerequisites: majoring in Scientific Computing and Computational Mathematics; consent of instructor.
   any quarter (Staff)

530. Applied Mathematics/Scientific Computing Seminar—(Enroll in Computer Science 530.)
   1 unit, Aut, Win, Spr (Staff)

   1 unit, Aut, Win, Spr (Golub)
The School of Humanities and Sciences includes the departments of Anthropological Sciences, Applied Physics, Art and Art History, Asian Languages, Biological Sciences (and the Hopkins Marine Station), Chemistry, Classics, Communication, Comparative Literature, Cultural and Social Anthropology, Drama, Economics, English, Food Research, French and Italian, German Studies, History, Linguistics, Mathematics, Music, Philosophy, Physics, Political Science, Psychology, Religious Studies, Slavic Languages and Literatures, Sociology, Spanish and Portuguese, and Statistics.

The school also includes 16 interdepartmental degree programs: African and Afro-American Studies; American Studies; Comparative Studies in Race and Ethnicity; East Asian Studies; Human Biology; Feminist Studies; Interdisciplinary Studies in Humanities; International Policy Studies; International Relations; Latin American Studies; Mathematical and Computational Science; Modern Thought and Literature; Public Policy; Russian and East European Studies; Science, Technology, and Society; Symbolic Systems; and Urban Studies.

In addition, the school sponsors programs that do not currently grant degrees: African Studies, Astronomy, Black Performing Arts, Ethics in Society, History and Philosophy of Science, Jewish Studies, Medieval Studies, Overseas Studies, the Social Science History Institute, and Undergraduate Research Opportunities.

Faculty and academic staff of the School of Humanities and Sciences are listed under the respective departments or programs.

**DEGREES OFFERED**

Candidates for the degree of Bachelor of Arts, Bachelor of Science, Bachelor of Arts and Sciences, Master of Arts, Master of Fine Arts, Master of Science, Doctor of Musical Arts, or Doctor of Philosophy should consult appropriate sections of the announcements following. They should consult also the department or program in which they intend to specialize.

**PROGRAM IN AFRICAN AND AFRO-AMERICAN STUDIES**

*Director:* John R. Rickford  
*Associate Director:* Diann W. McCants  
*Advisory Committee:* David Abernethy (Political Science), Clay Carson (History), Sally Dickson (Multicultural Development Office, African and Afro-American Studies Committee Chair), Sandra Drake (English), Paulla Ebron (Cultural and Social Anthropology), Christina Erwin (African and Afro-American Studies), Morris Graves (Associate Dean of Students), Elaine C. Ray (Assistant Director, University Communications), Michael Thompson (History)

**UNDERGRADUATE PROGRAMS**

**BACHELOR OF ARTS**

The African and Afro-American Studies (AAAS) program covers a vast and varied field, including: (I) the history, literature, culture and social science of African Americans as a central component of American culture; and (II) the history, literature, culture, and social science of the peoples of Africa and the Black Diaspora. AAAS is an indispensable subject for those interested in the cultural, economic, historical, political, or social study of the United States.

To investigate the rich and varied human tapestry which AAAS spans, students are encouraged to use interdisciplinary methods drawn from anthropology, art, art history, economics, languages, linguistics and literature, music, philosophy, political science, psychology, religion, and sociology, among others. A degree in AAAS prepares students for the many work positions requiring a broad liberal arts perspective as well as those requiring the specialized knowledge which AAAS offers. Students in AAAS receive training that is especially valuable for graduate study and/or careers in such fields as business, comparative literature, creative writing, education, journalism, law, linguistics, medicine, performing arts, politics, social sciences, social work, and urban studies. The program emphasizes creative scholarship and research through various means, as follows.

*The AAAS Major—All majors and double majors are expected to complete a total of 60 units, of which 25 units must be selected from the...*
A BAR core courses (AAAS 105 is mandatory). Students must also enroll in two Comparative Studies in Race and Ethnicity (CSRE) core introductory courses and complete a CSRE senior seminar (a writing intensive course of 5 units) before graduating. Additionally, 20 units are to be selected from areas I (Afro-American Studies) or II (Africa and the Black Diaspora) or a special program, area III, devised by the student. No more than two courses of a general nature (for example, Sociology 145, which deals with race and ethnicity, but without a primary African or African American focus) may be counted towards the major. Honors students should choose option III. All majors must include at least one course from area I and II. Each of these options consolidates as well as broadens the work of the core. Students who choose option III may devise a program with a special theme. This choice allows the student to focus 20 units on developing previous work in the major or exploring new areas. In organizing this plan, the student works with an adviser on the chosen theme and must have prior written approval from the director of the program.

Directed Reading—AAAS 190A, B, C allows students to focus up to 15 units of work on a special topic of interest. In organizing this plan, the student consults with the program director and one more faculty member specializing in the area or discipline.

CORE COURSES

The core consists of 25 units:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAAS 103A: African and Afro-American Lecture Series (Aut)</td>
<td>1-3</td>
</tr>
<tr>
<td>AAAS 103B: African and Afro-American Lecture Series (Win)</td>
<td>1-4</td>
</tr>
<tr>
<td>AAAS 103C: African and Afro-American Lecture Series (Spr)</td>
<td>1-3</td>
</tr>
<tr>
<td>AAAS 104. African and Afro-American Learning Expedition: Jamaica</td>
<td>1</td>
</tr>
<tr>
<td>Comp. Lit. 170B: Introduction to African Systems of Thought</td>
<td>4</td>
</tr>
<tr>
<td>English 68B/168B: Introduction to African-American Literature</td>
<td>3 or 5</td>
</tr>
<tr>
<td>French &amp; It. 133. Literature and Society: Introduction to Francophone Literature from Africa and the Caribbean</td>
<td>4</td>
</tr>
<tr>
<td>Hist. 148. Introduction to African History</td>
<td>5</td>
</tr>
<tr>
<td>Hist. 148C. Africa in the 20th Century</td>
<td>5</td>
</tr>
<tr>
<td>Hist. 150A. African-American History to the 20th Century</td>
<td>5</td>
</tr>
<tr>
<td>Linguistics 73. African-American Vernacular English</td>
<td>5</td>
</tr>
<tr>
<td>Pol. Sci. 118A. Political Change in Tropical Africa</td>
<td>5</td>
</tr>
<tr>
<td>Psych. 174. African American Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

(AREA I) AFRO-AMERICAN HISTORY, LITERATURE, CULTURE, AND SOCIETY

Area I majors choose 20 units.

AFRICAN AND AFRO-AMERICAN STUDIES

<table>
<thead>
<tr>
<th>Course No. and Subject Quarter</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>103A. African and Afro-American Lecture Series</td>
<td>A</td>
</tr>
<tr>
<td>103B. African and Afro-American Lecture Series—Jamaica and the Caribbean</td>
<td>W</td>
</tr>
<tr>
<td>103C. African and Afro-American Lecture Series</td>
<td>S</td>
</tr>
</tbody>
</table>

SOCIAL SCIENCES

Area I minors must choose at least two courses below.

Anthropological Sciences:
105. Race, Gender, and Biology

Economics:
116. American Economic History

Education:
141. Race, Education, and the Media
150X. Understanding Racial and Ethnic Identity
179X. Urban Youth and their Institutions
193C. Peer Counseling: The American Community
201A. History of African American Education through 1940
201B. Education for Liberation
203X. Education and Inequality in American Culture
381. Multicultural Issues in Higher Education

Cultural and Social Anthropology:
10. From the Age of Exploration to the Present: Europe and the U.S.
15. Africa and the Diaspora
88. Theories of Race and Ethnicity: A Comparative Perspective
150. Comparative Cultural Studies
156. Youth Cultural Formations: Race, Class, Gender
225. Navigating Diaspora

Linguistics:
64. Development of Englishes Around the World
73. African American Vernacular English

Political Science:
180. Courts, Color, and the Constitution
181. Seminar: African Americans and the Political System
196. Issues of Race in American Politics
197P. Seminar: Political Beliefs and Values of Black Americans
296. Seminar: Racial and Ethnic Politics in the U.S.

Psychology:
174. African American Psychology
175. Seminar on Topics in Identity Development
180. Social Psychological Perspectives on Stereotyping and Prejudice

Sociology:
145. Race and Ethnic Relations
149. The Urban Underclass

HUMANITIES
20B. Advanced Jazz Theory
20C. Jazz Arranging and Composition
161B. Jazz Ensemble

Philosophy:
77. The Ethics of Social Decisions: Racism, Poverty, and Environmental Justice
77. Philosophical Issues Concerning Race and Racism

Religious Studies:
2N. Stanford Introductory Seminar: Prophecy and Politics in America—The Religious Thought of Abraham Joshua Heschel and Martin Luther King, Jr.
163. Religion and Ethnicity

Area II majors choose 20 units.

AFRICAN AND AFRO-AMERICAN STUDIES

Area II majors choose 20 units.

SOCIAL SCIENCES

Area II majors choose 20 units.

AFRICAN AND AFRO-AMERICAN STUDIES

105. Introduction to African and Afro-American Studies (required)

HUMANITIES

Area II minors must choose at least two courses below.

Comparative Literature:
103. Egyptian East/Egyptian West
170E. Introduction to African Systems of Thought

Drama (Dance):
43. Afro-Brazilian and Afro-Peruvian Dance
143. Afro-American Roots of American Concert Dance

English:
161E. Modern African Writing in English
197T. Literature of South Africa

French and Italian:
133. Literature and Society in Africa and the Caribbean

History:
48Q. Stanford Introductory Seminar: South Africa—Contested Transitions
50N. Stanford Introductory Seminar: The Black Atlantic
61. The Constitution and Race
64. Introduction to Race and Ethnicity in the American Experience
147A. African History in Novels and Film
147B. The Idea of Africa among African Americans
148. Introduction to African History
144C. Africa in the 20th Century
150. African-American History to the 20th Century
246B. Undergraduate Colloquium: Mau Mau Uprising in 1950s Kenya
246S. Undergraduate Colloquium: Popular Culture in Africa
247/547. Greater East Africa and its Historical Writing
247A. Undergraduate Colloquium: African Identity in a Changing World
247B. Undergraduate Colloquium: Health and Society in Africa
247C. Undergraduate Colloquium: Africa and African Americans since World War II
247S. Undergraduate Research Seminar: The Great Mau Mau Rebellion in 1950s Kenya
248A. Undergraduate Colloquium: The End of Slavery in Africa and the Americas
248D. Law and Colonialism in Africa
248S. Undergraduate Research Seminar: Colonial States and Societies in Africa
249. Undergraduate Colloquium: Religions, Cultures, and History in West Africa and the African Americas
249A. Undergraduate Colloquium: The Issue of Greatness in Black History
249B. Undergraduate Colloquium: Black Visual Arts and Black History
255A. Culture and Ideologies of Race
259. Undergraduate Colloquium: Race and Ethnicity in the United States and South Africa

Language Center:
102A,B,C. Beginning Hausa
103A,B,C. Beginning Hausa
106A,B,C. Beginning Swahili
107A,B,C. Intermediate Swahili
108A,B,C. Advanced Swahili
111A,B,C. Beginning Chichewa
133A,B,C. The African Evening Forum

Overseas Studies—Parts:
131X. France, Africa, and Global Politics

Religious Studies
110. Islam in the Modern World

Spanish and Portuguese
135. Caribbean Cultural Perspectives
210E. Anglophone Caribbean Literature
275. Market and Culture in the Caribbean
277. Race and Nation in Cuba

SENIOR SEMINAR

All AAAS majors must take at least two quarters of the CSRE Senior Seminar (see complete description of the seminar in the "Comparative Studies in Race and Ethnicity" section of this bulletin).

MINORS

Students who minor in AAAS must complete either (1) a total of six courses of 3 or more graded units, or (2) a minimum of 25 graded units from the list of AAAS core courses listed above. The courses must include AAAS 105 and at least one course from the social sciences and one from the humanities. Students should develop a coherent theme in their course selections, in consultation with the program director or associate director.

AAAS stresses academic advising. The director or associate director advises all AAAS students, including majors, minors, and double majors. Additionally, majors and double majors have the opportunity to participate in individual and group mentoring activities offered by CSSE. The program prides itself on its responsiveness to student concerns, and its guiding Advisory Committee includes both faculty and student representation.

HONORS

Majors who have maintained a cumulative 3.3 grade point average (GPA) or higher may apply for the honors program. The honors essay or project is intended to enable students to synthesize several of the skills they have acquired and to produce a document or project demonstrating some measure of competence in their specialty. The honors project essay must be discussed with and approved by the major adviser and the program director. A student may receive 5-15 units for the honors project. All students completing an honors project must participate in at least two quarters of the CSRE Senior Seminar.
runaways from slavery still live. Journal of notes and reflections on the
expedition required for credit. Prerequisite: 103B for 4 units.

1 unit, Spr (Rickford, McCants)

5 units, Spr (McCants)

190A,B,C. Directed Reading
5-15 units, Aut, Win, Spr (Staff)

199A,B,C. Honors Project
5-15 units, Aut, Win, Spr (Staff)

AFFILIATED DEPARTMENT OFFERINGS
See the respective department listings for course descriptions and General Education Requirements (GER) information.

CLASSICS
105. The History and Culture of Egypt
4-5 units, Spr (Manning)

DRAMA
156. Contemporary Ethnic Drama
4 units (Elam) alternate years, given 2000-01

163. Performance and America
4 units, Aut (Elam)

DANCE
43. Afro-Brazilian and Afro-Peruvian Dance
1 unit, Aut (Cashion)

44. Jazz Dance I
1 unit, Aut, Win, Spr (Kramer)

143. Afro-American Roots of American Concert Dance
2 units, Win (Moses)

144. Jazz Dance II
1 unit, Aut, Spr (Moses)

ENGLISH
159. 19th- and 20th-Century African-American Poets
not given 1999-2000

161E. Modern African Writing in English
not given 1999-2000

168B. Introduction to Afro-American Literature
5 units, Spr (Rampersad)

HISTORY
48Q. Stanford Introductory Seminar: South Africa—Contested Transitions
3 units, Win (Samoff)

50S. Sources and Methods Seminar: Race and Popular Culture (in Black and White)
5 units (M. Thompson) not given 1999-2000

61. The Constitution and Race
5 units (Rakove) not given 1999-2000

64. Introduction to Race and Ethnicity in the American Experience
5 units, Win (Castillo)

147A. African History in Novels and Film
5 units, Aut (Jackson)

147B. The Idea of Africa among African Americans
5 units (Jackson) not given 1999-2000

148. Introduction to African History
5 units (Jackson) not given 1999-2000

148C. Africa in the 20th Century
5 units, Spr (Lane)

150A. African-American History to the 20th Century
5 units, Aut (M. Thompson)

150B. Introduction to African-American History: The Modern Black Freedom Struggle
5 units, Spr (Carson)

200M. Undergraduate Directed Research: Martin Luther King, Jr. Papers Project
units by arrangement (Carson)

246S. Undergraduate Research Seminar: Popular Culture in Africa
5 units (Jackson) not given 1999-2000

247. Undergraduate Colloquium: Greater East Africa and its Historical Writing—(Same as 347.)
5 units, Spr (Jackson)

247C. Undergraduate Colloquium: Africa and African Americans since World War II
5 units, Aut (Jackson)

247S. Undergraduate Research Seminar: The Great Mau Mau Rebellion in 1950s Kenya—(Same as 447.)
5 units, Win (Jackson)

248A. Undergraduate Colloquium: The End of Slavery in Africa and the Americas
5 units (R. Roberts) not given 1999-2000

248S. Undergraduate Research Seminar: Colonial States and Societies in Africa
5 units (R. Roberts) not given 1999-2000

253. Undergraduate Colloquium: Topics in African American History—The Great Migration
5 units (M. Thompson) not given 1999-2000

255A. Undergraduate Colloquium: Culture and Ideologies of Race
5 units, Win (M. Thompson)

LINGUISTICS
73. African American Vernacular English
4-5 units, Win (Rickford)

MUSIC
18. Jazz History
18B. Bebop to Present (1940-)
3 units, Spr (Staff)
African Studies

Emeriti: Paul F. Basch (Medicine), James L. Gibbs, Jr., Raymond D. Giraud, Joseph H. Greenberg, Bruce F. Johnston, Hans M. Weiler, Sylvia Wynter

Chair: Richard Roberts

Professors: David B. Abernethy (Political Science), Jean-Marie Apostolidis (French and Italian), Russell Berman (Comparative Literature, German Studies), Joan Bresnan (Linguistics), Martin Carnoy (Education), Walter P. Falcon (Institute for International Studies), George M. Fredrickson (History), William B. Gould (Law), William R. Leben (Linguistics), Valentin Mudimbe (French and Italian, Comparative Literature), Scott R. Pearson (Food Research Institute), Richard Rendell (Art and Art History), John Rickford (Linguistics, African and Afro-American Studies), Richard Roberts (History), Pan A. Yotopoulos (Food Research Institute)

Associate Professors: Sandra E. Drake (English), Akhil Gupta (Cultural and Social Anthropology), Kennell A. Jackson, Jr. (History), David Katzenstein (School of Medicine), Bruce Luigignan (Electrical Engineering), Elisabeth Mudimbe-Boyoi (French and Italian, Comparative Literature)

Assistant Professors: Paulla A. Ebron (Cultural and Social Anthropology), Karen Mundy (School of Education)

Senior Lecturer: Khalil Barthoun (Linguistics)

Lecturer: John Mugane (Special Language Program)

Consulting Professor: Joel Samoff (Center for African Studies)

Curators: Peter Duignan (Senior Fellow, emeritus, Hoover Institution), Karen Fung (Deputy Curator, Hoover Institution), Thomas Seligman (Director, Stanford Museum of Art and Lecturer, Department of Art and Art History)

Senior Research Fellows: Larry Diamond (Hoover Institution), Stephen Sedman (CISAC)

The Committee on African Studies coordinates an interdisciplinary program in African Studies for undergraduate and graduate students from various departments. Under special arrangement with the Stanford/Berkeley Joint Center for African Studies, it is possible to incorporate courses from both institutions into one's program. Contact the center at (650) 723-0295 for a listing of courses offered at University of California at Berkeley.

Courses in African Studies are offered by departments and programs throughout the University. A sampling of these is listed at the end of this section. Each year the committee sponsors a seminar to demonstrate to advanced undergraduate and graduate students how topics of current interest in African Studies are approached from different disciplinary perspectives. Each week's presentation is conducted by a different professor in African Studies; the first hour is a lecture, followed by a one-hour seminar discussion.

Course offerings in African languages are also coordinated by the Committee on African Studies. Along with regular courses in several levels of Swahili and Arabic, the committee arranges with the Special Language Program in the Stanford Language Center to offer instruction in other African languages. In recent years, the Special Language Program has offered courses in Fulani, Hausa, Maninka, Northern Sotho, Shona, Swahili, and Wolof.

The Committee on African Studies does not sponsor degree programs, but undergraduates and graduate students can specialize in African Studies under a number of arrangements listed below.

UNDERGRADUATE PROGRAMS

Undergraduates may choose an African Studies focus among several alternatives:

1. A major in a traditionally defined academic department (for example, Anthropological Sciences, Cultural and Social Anthropology, History, Political Science, and so on). These departments afford ample opportunity to enroll in courses outside the major, leaving the student free to pursue the interdisciplinary study of Africa.

2. Interdepartmental majors, such as African and Afro-American Studies or International Relations, which offer coordinated and comprehensive interdisciplinary course sequences, permitting a concentration in African Studies.

3. An individually designed major in African Studies. Under the supervision of a faculty adviser and two other faculty members, the student can plan a program of study focused on Africa that draws courses from any department or school in the University. If approved by the Dean's Advisory Committee on Individually Designed Majors, the program becomes the curriculum for the A.B. degree.

Undergraduates can study for a year in Africa. In recent years, students have been able to enroll at the University of Cape Town, South Africa; University of Ghana at Legon; University of Nairobi, Kenya; and at Université du Benin, Togo. Students should check with the Overseas Studies office to see what arrangements are currently available.

MINORS

The Committee on African Studies awards a minor in African Studies. Students majoring in any field qualify for this minor by meeting the following requirements:

1. Taking a minimum of 25 units of African-related courses.

2. Having at least one quarter exposure to an African language. Africa is a linguistically heterogeneous region and most Africans are multilingual. Learning an African language is an excellent way to learn about African cultures, and the Center for African Studies and the Special Languages Program may arrange instruction in any of several dozen languages spoken in West, East, Central, and Southern Africa.

3. Completing one introductory course that deals with more than one region of Africa.

4. Writing a 25-35 page research paper. This paper may be an extension of a previous paper written for an African Studies course.

5. Designate a focus of study (either disciplinary or regional) through a three course concentration.

Upon satisfactory completion of all requirements, final certification of the minor is made by the Center for African Studies and appears on the student’s transcript. For more information, call the Center for African Studies at (650) 723-0295 or see the center’s website, http://www-leland.stanford.edu/dept/AFR/.
GRADUATE STUDY

For those who wish to become specialists in African Studies at the graduate level, African Studies can be designated a field of concentration within the regular master's and doctoral programs of some academic departments. Students in the departments of Anthropological Sciences, Cultural and Social Anthropology, History, Political Science, and Sociology, and in the School of Education, may declare African Studies as the area of specialization for their master's and Ph.D. thesis work. Some other departments, programs, and institutes such as International Policy Studies and the International Comparative Education Program also permit students to specialize in African Studies. Stanford enrolled graduate students who are U.S. citizens and permanent residents interested in area language studies in Africa may request a Foreign Language and Area Studies (FLAS) Fellowship application from the FLAS Fellowships coordinator at (650) 723-0295. The academic year FLAS application deadline is mid-January. For summer FLAS applications, the deadline is mid-April, and students need not be enrolled at Stanford to apply.

COURSES


5 units (R. Roberts) not given 1999-2000

249B. Everyday Life in Contemporary Africa—Often, our understanding of today's Africa is in an outdated framework. What is the experience of lived history in contemporary Africa? Themes: the culture of communication (language, film, radio, TV, records); the citizen and the state; women and men; the culture of money, success, and poverty; and today's rural and urban life. Aim is to locate the ordinary people on a grid of choices and outcomes.

5 units (Jackson, Leben)

AFFILIATED DEPARTMENT OFFERINGS

See the respective department listings for course descriptions and General Education Requirements (GER) information.

AFRICAN AND AFRO-AMERICAN STUDIES

103. African and Afro-American Studies Lecture Series

1-3 units, Aut, Win, Spr (Staff)

105. Introduction to African and Afro-American Studies

5 units, Spr (McCants)

ANTHROPOLOGICAL SCIENCES

6. Human Origins—(Same as Human Biology 6.)

5 units, Win (Klein)

20N. Stanford Introductory Seminar: Modern Human Origins

3 units (Klein) not given 1999-2000

CULTURAL AND SOCIAL ANTHROPOLOGY

1. Social and Cultural Anthropology

5 units, Win (Mankekar)

89B. Comparative Race and Inequality

5 units, Win (Tunstall)

90. Theory in Cultural and Social Anthropology

5 units, Win (Ebron)

133A,B,C. Ethics of Development in a Global Environment (EDGE)

1-4 units, Aut, Win, Spr (Lusignan, Gupta)

251. Comparative Cultural Studies

5 units, Aut (Rosaldo)

DRAMA

DANCE

43. Afro-Brazilian and Afro-Peruvian Dance

1 unit, Aut (Cashion)

143. African-American Roots of American Concert Dance

2 units, Win (Moses)

EDUCATION

202. Introduction to Comparative and International Education

4-5 units, Aut (Carney, Chabbott)

306A. Education and Economic Development

5 units, Win (Carney)

306B. Seminar: The Politics of International Cooperation in Education

3-4 units, Spr (Mundy)

405. Education and Political Change

4-5 units (Mundy) not given 1999-2000

407X. Aid and Education: The Africa Case

4 units (Mundy) not given 1999-2000

FOOD RESEARCH

103. The World Food Economy

5 units, Win

119. Development and Population Interactions in the Third World

5 units, Win (Yotopoulos)

FRENCH AND ITALIAN

133. Literature and Society: Introduction to Francophone Literature from Africa and the Caribbean

4 units, Win (Apostolides)

259E. Michel Foucault and the Archaeology of Knowledge—(Same as Comparative Literature 259E.)

3-5 units, Aut (Mudimbe)

358E. The Practice of Sociology and the Humanities: An Analysis of Pierre Bourdieu's Work

4 units, Aut (Mudimbe)

HISTORY

48Q. Stanford Introductory Seminar: South Africa—Contested Transitions

3 units, Win (Samoff)

148. Introduction to African History

5 units (Jackson) not given 1999-2000

148C. Africa in the 20th Century

5 units, Spr (Lane)

150A. African-American History to the 20th Century

5 units, Aut (Thompson)

247S/447S. Undergraduate/Graduate Colloquium: The Great Mau Mau Rebellion in 1950s' Kenya

5 units, Win (Jackson)

246D. Undergraduate Colloquium: The Social History of Southern Africa

5 units, Aut (Jackson)

212
246S/446. Undergraduate/Graduate Research Seminar: Popular Culture in Africa
5 units (Jackson) not given 1999-2000

247/347. Undergraduate/Graduate Colloquium: Greater East Africa and its Historical Writing
5 units, Spr (Jackson)

247A. Undergraduate Colloquium: African Identity in a Changing World
5 units (R. Roberts) not given 1999-2000

247B. Undergraduate Colloquium: Health and Society in Africa
5 units (R. Roberts) not given 1999-2000

247C. Undergraduate Colloquium: Africa and African Americans since World War II
5 units, Aut (Jackson)

248A/348A. Undergraduate/Graduate Colloquium: The End of Slavery in Africa and the Americas
5 units (R. Roberts) not given 1999-2000

248D/348D. Undergraduate/Graduate Colloquium: Law and Colonialism in Africa
5 units (R. Roberts) not given 1999-2000

306B. Design and Methodology for International Field Research
1 unit, Win (R. Roberts)

347B. Graduate Core Colloquium in African History: The Colonial Period
4-5 units (R. Roberts) not given 1999-2000

349. Graduate Core Colloquium: Precolonial Africa
4-5 units, Spr (Jackson)

LANGUAGE CENTER

SPECIAL LANGUAGE PROGRAM

100A, B, C. Beginning Amharic
100A. 3 units, Aut (Staff)
100B. 3 units, Win (Staff)
100C. 3 units, Spr (Staff)

102A, B, C. Beginning Hausa
102A. 3 units, Aut (Staff)
102B. 3 units, Win (Staff)
102C. 3 units, Spr (Staff)

106A, B, C. Beginning Swahili
106A. 4 units, Aut (Staff)
106B. 4 units, Win (Staff)
106C. 4 units, Spr (Staff)

107A, B, C. Intermediate Swahili
107A. 4 units, Aut (Staff)
107B. 4 units, Win (Staff)
107C. 4 units, Spr (Staff)

108A, B, C. Advanced Swahili
108A. 4 units, Aut (Staff)
108B. 4 units, Win (Staff)
108C. 4 units, Spr (Staff)

111A, B, C. Beginning Chichewa
111A. 3 units, Aut (Staff)
111B. 3 units, Win (Staff)
111C. 3 units, Spr (Staff)

120A, B, C. Beginning Arabic
120A. 4 units, Aut (Staff)
120B. 4 units, Win (Staff)
120C. 4 units, Spr (Staff)

121A, B, C. Intermediate Arabic
121A. 4 units, Aut (Staff)
121B. 4 units, Win (Staff)
121C. 4 units, Spr (Staff)

122A, B, C. Advanced Arabic
122A. 4 units, Aut (Staff)
122B. 4 units, Win (Staff)
122C. 4 units, Spr (Staff)

133A, B, C. African Evening Forum
133A. 1-4 units, Aut (Staff)
133B. 1-4 units, Win (Staff)
133C. 1-4 units, Spr (Staff)

LINGUISTICS

206. Phonology
4 units, Win (Leben)

208A. Phonology Seminar: Tone and Pitch Accent Systems
1-4 units, Aut (Leben)

POLITICAL SCIENCE

25. Colonialism and Nationalism in the Third World
5 units (Abernethy) given 2000-01

116L. Comparative Democratic Development
5 units, Spr (Diamond)

118A. Political Change in Tropical Africa
5 units, Win (Abernethy)

118B. The Politics of Race and Class in Southern Africa
5 units (Abernethy) given 2000-01

142S. Seminar: Advanced Study in the United Nations and the Wars of the 1990s
5 units (Sedman) not given 1999-2000

222D. Human Rights Issues in Sub-Saharan Africa
3-5 units, Spr (Abernethy, Diamond)

AMERICAN STUDIES

Administrative Committee: (Chair) Barton J. Bernstein (History); Rudy Busto (Religious Studies, on leave), Albert Camarillo (History), Gordon Chang (History), Joseph Corn (American Studies Program Coordinator), Wanda Corn (Art and Art History), Jay Fliegelman (English), George Fredrickson (History), Richard Gillam (American Studies Program Coordinator), Judith Goldstein (Political Science), Alexander Nemerov (Art and Art History), Horace A. Porter (En-
The American Studies program is administered through the office of Interdisciplinary Studies in Humanities; see http://www.stanford.edu/group/HSP/AmStud/.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The purpose of the American Studies program is to provide students with a comprehensive and critical interdisciplinary understanding of the American experience. The program builds on a series of core courses emphasizing intellectual and cultural as well as historical and legal analysis. American Studies is also a broadly multicultural major that gives serious curricular attention to issues of diversity, especially as raised by distinctions of race, class, ethnicity, and gender. All majors take an intensive seminar, "Perspectives on American Identity," that explores the tension between commonality and difference, and society and group, from a variety of disciplinary perspectives. The program stresses the study of multiculturalism in depth as well as breadth by requiring students to take at least two approved classes focusing specifically on race and ethnicity. Majors who take five or more such courses have the option of graduating with a race and ethnicity specialization in American Studies.

All American Studies majors work closely with a faculty coordinator to develop an independent study plan consisting of 14 (or more) courses totaling at least 60 units. All are to be taken for a letter grade. Study plans must emphasize one of four general concentrations or areas of interest: (1) History and Society; (2) Literature and Thought; (3) Visual and Material Culture; and (4) Politics, Policy, and Economics.

Concentration Requirements—All majors must take a total of 11 courses in four areas of concentration: (1) History and Society; (2) Literature and Thought; (3) Visual and Material Culture; and (4) Politics, Policy, and Economics. These 11 courses, in all cases, include American Studies 150, and History 165A and 165B, plus courses to satisfy the race and ethnicity requirement (described in the section below). In addition, majors must meet the following minimum distribution requirements: five courses sufficient to provide a solid grounding in a chosen area of concentration; six courses in the other three areas; and at least one course in each area.

Seminar Requirements—All majors must take American Studies 200, Perspectives on American Identity, plus a second seminar (or colloquium) requiring a substantial paper. Neither American Studies 200 nor the second seminar count towards the 11-course concentration requirement described above. However, students who complete more than these two required seminars may count such additional seminars towards their 11-course concentration requirement. Most courses that fulfill the second seminar requirement are so noted in the updated list available at the program office. There may be other courses that fulfill this requirement; students should consult the chair or one of the program coordinators in such cases. Seminars taken under the aegis of the Stanford-in-Washington program may also fulfill the second seminar requirement.

Race and Ethnicity Component—This requirement may be fulfilled in one of the following two ways:

1. Normally, students take American Studies 164, Race and Ethnicity in the American Experience, and a second race and ethnicity course approved by the program. In this case, the second race and ethnicity course counts towards the 11-course concentration requirement described above. However, students who complete more than these two required seminars may count such additional seminars towards their 11-course concentration requirement. Most courses that fulfill the second seminar requirement are so noted in the updated list available at the program office. There may be other courses that fulfill this requirement; students should consult the chair or one of the program coordinators in such cases. Seminars taken under the aegis of the Stanford-in-Washington program may also fulfill the second seminar requirement.

2. Alternatively, students may take three approved race and ethnicity classes dealing with at least two different racial/ethnic groups. In this option, two of these three courses count towards the 11-course concentration requirement.

A list of courses satisfying the race and ethnicity component in American Studies may be obtained from the program administrator.

Optional Specialization in Race and Ethnicity—Students who take at least five approved race and ethnicity courses graduate with an American Studies specialization in race and ethnicity. This is noted on the final undergraduate transcript.

Students wishing to earn an undergraduate minor in American Studies must complete seven courses for a minimum of 27 units.

All students take the pre/core course, American Studies 130, English 121, American Literature and Culture to 1855 (5 units), as an introduction to the critical study of American literature and culture.

Students also complete two of the following five courses in American history (10 units) to provide a historical foundation:

American Studies 164/History 64, Race and Ethnicity in the American Experience

History 165A, Colonial and Revolutionary America

History 165B, 19th-Century America

History 165C, The United States in the 20th Century

History 172A, America since 1945

In addition, students choose four elective courses appropriate to their particular interests from courses listed under American Studies (12-20 units). These courses should be selected with one of two goals in mind:

(a) to give the student a breadth of exposure to various issues in American Studies; and to give the student an opportunity to study an area of American Studies in depth (for example, technology in America, race and ethnicity in America, American art and material culture).

(b) to give the student an opportunity to study an area of American Studies in depth (for example, technology in America, race and ethnicity in America, American art and material culture).

All courses counted toward the minor in American Studies must be taken for a letter grade. No course counted toward the minor can also count toward a student's major.

HONORS PROGRAM

Preferably during the junior year and no later than the third quarter before graduation, majors with demonstrated interest and ability in American Studies may apply to seek honors by writing a senior thesis for 10 to 15 units of credit. This application is to include the topic and a proposed outline of the senior thesis and should be signed by a Stanford faculty member who is willing to direct the student's thesis during the ensuing year. The program may approve the application or request resubmission with revisions. The finished essay must be submitted six weeks before the date of graduation. Units for the honors program must be in addition to the 60-unit major. The final grade for the essay is assigned by the chair based on the evaluations of both the primary thesis adviser and a second reader appointed by the program.

AMERICAN STUDIES HOUSE

This undergraduate residence in Governor's Corner offers educational opportunities in American Studies to majors whether they are residents or not. Residents are assigned through the draw for undergraduate housing.

COURSES

See departmental listings for complete descriptions and University General Education Requirements (GER) notations. Some courses may require prerequisites that do not apply toward the major. See the Time Schedule each quarter for changes in listings. An up-to-date list is available in the program office.

CORE

AMERICAN STUDIES

105. American Literature and Culture to 1855—(Same as English 121.) Reading texts from Cotton Mather to Melville, examines the major issues in early American cultural and literary history. Developments in the fine and domestic arts, methodological issues associated with the enterprise called 'American Studies.' (Literature and Thought) GER 3a (DR: 7)

5 units, Win (Fliegelman)

151. The Transformation of American Thought and Culture, 1865 to the Present—Persistent strains and tensions in American intellectual life and culture over the past 125 years. Readings include autobiographies, novels, documentary works, and historical and theoretical analy-
ses that bear on issues of technology and culture, consumerism, mass society, gender, sexuality, violence, political extremism, and power. (History and Society, or Literature and Thought) GER:3a (DR:8)

5 units, Win (Gillam)

152. American Spaces: An Introduction to Material Culture and the Built Environment—(Same as History 152.) American history through the evidence of things, e.g., spaces, buildings, and landscapes of the "built environment." How to "read" such artifacts using methods and theories from anthropology, cultural geography, history, and other disciplines. (Visual and Material Culture) GER:3b (DR:9)

"built environment." How to "read" such artifacts using methods and the evidence of things, e.g., spaces, buildings, and landscapes of the nation's major minority populations. Focus is on the past two centuries. (Fulfills Race and Ethnicity Requirement; does not count toward concentration.) GER:3b,4b (DR:3 or 9)

5 units, Aut (Friedman)

RACE AND ETHNICITY

Note—Students must take a second course in Race and Ethnicity besides 164, selected from the list available in the program office. This second course counts in one of the concentrations.

164. Introduction to Race and Ethnicity in the American Experience—(Same as History 64.) How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation's major minority populations. Focus is on the past two centuries. (Purpills Race and Ethnicity Requirement; does not count toward concentration.) GER:3b,4b (DR:3 or 9)

5 units, Win (Castillo)

SEMINAR ON AMERICAN IDENTITY


5 units, Aut (J. Corn)

Spr (Gillam)

HISTORY AND SOCIETY

114. Visions of the 1960s—Preference to sophomores. Introduction to the ideas, sensibility, and (to a lesser degree) the politics of the American 1960s. Topics: the early '60s vision of a "Beloved Community," varieties of racial, generational, and feminist dissent, the meaning of the "counterculture," and current interpretive perspectives on the 1960s. Attention to film, music, and articles and books. GER:3a (DR:7 or 8)

5 units, Aut (Gillam)

151. The Transformation of American Thought and Culture, 1865 to the Present—See "Core Lectures."

179. Introduction to American Law—(Same as Law 106, Political Science 182F.) American law for undergraduates. The structure of the American legal system, including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; the relationship between the American legal system and American society in general. (History and Society; or Politics, Policy, and Economics) GER:3b (DR:9)

5 units, Aut (J. Corn)

141B. History of Film: The Second 50 Years

142. Broadcasting in America

160. The Press and the Political Process

CULTURAL AND SOCIAL ANTHROPOLOGY

33. Inventing the Savage

EDUCATION

201. History of Education in the United States

HISTORY

115. Technology and Culture in 19th-Century America

150A. African-American History to the 20th Century

150B. Introduction to African-American History: The Modern Black Freedom Struggle

165A. Colonial and Revolutionary America—Required for the American Studies major.

165B. 19th-Century America—Required for the American Studies major.

165C. The United States in the 20th Century

172A. The United States since 1945

173C. Introduction to Feminist Studies

247C. Undergraduate Colloquium: Africa and African Americans since World War II

250C. Undergraduate Colloquium: Thomas Jefferson and His World

252. Undergraduate Colloquium: Decision-Making in International Crises—The A-Bomb, the Korean War, and the Cuban Missile Crisis

255A. Undergraduate Colloquium: Culture and Ideologies of Race

265. Undergraduate Colloquium: Topics in Mexican American History

262S. Undergraduate Research Seminar: Science and High Technology in Silicon Valley, 1930-1980

272A. Undergraduate Colloquium: War and Society, 1941-1968

274A. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in late 20th-Century America

283A. Undergraduate Colloquium: Slavery and Race Relations in the Americas
LINGUISTICS
146. Language and Gender

PSYCHOLOGY
174. African American Psychology

SOCIOMETRY
118. Social Movements and Collective Action

138/238. American Indians in Comparative Historical Perspective
139/239. American Indians in Contemporary Society
145. Race and Ethnic Relations
149. The Urban Underclass
150. The Family

SCIENCE, TECHNOLOGY, AND SOCIETY
101. Science, Technology, and Contemporary Society

LITERATURE AND THOUGHT
114. Visions of the 1960s—See description under “History and Society.”

150. American Literature and Culture to 1855—(Same as English 121.) See “Core Lectures.”

151. The Transformation of American Thought and Culture, 1865 to the Present—See “Core Lectures.”

214. The American 1960s: Thought, Protest, and Culture

AFRICAN AND AFRO-AMERICAN STUDIES
105. Introduction to African and Afro-American Studies

COMPARATIVE LITERATURE
168. Introduction to Asian American Culture

CULTURAL AND SOCIAL ANTHROPOLOGY
104. Race and Language in the U.S.

DRAMA
65. American Musical Theater: Broadway/Hollywood
156. Contemporary Ethnic Drama
163. Performance and America

179B. Teatro America Workshop: The Theater of Native/Chicano America

180Q. Stanford Introductory Seminar: Noam Chomsky—The Drama of Resistance

ENGLISH
103B. The Literary History of American English

112. Masterpieces of American Literature

123D. The Multicultural Moment: American Literature from the Civil War to World War I

162G. Writing by 20th-Century Women of Color

164G. California Literary Imagination: The 19th Century

168B. Introduction to Afro-American Literature

175. Henry James

179H. Mark Twain and the Gilded Age

186B. Seminar: Melville

186P. Seminar: Representing Poverty in America, 1840-1940

186S. Seminar: Poe

LINGUISTICS
73. African American Vernacular English

MUSIC
18A. Ragtime to Bebop (1900-1940)
18B. Bebop to Present (1940-)

PHILOSOPHY
177. Philosophical Issues Concerning Race and Racism

SPANISH
132. Mexican and Chicano Cultural Perspectives

285E. Chicana Cultural Studies

VISUAL AND MATERIAL CULTURE
152. American Spaces: Introduction to Material Culture and the Built Environment—(Same as History 152.) See “Core Lectures.”

ART AND ART HISTORY
121. Abstract Expressionism

130A. American Art in the Gilded Age

130D/230D. American Art since 1945

134. History of Photography

140. Introduction to Film Studies

143. The Hollywood Musical

278. Seminar: The American College Campus

COMMUNICATION
1. Mass Communication and Society: Media Technologies, People, and Society

141B. History of Film: The Second 50 Years

DRAMA
65. American Musical Theater

156. Contemporary Ethnic Drama

163. Performance and America

179B. Teatro America Workshop: The Theater of Native/Chicano America

HISTORY
56S. Sources and Methods Seminar: Advertising and Consumer Culture in the United States

POLITICS, POLICY, AND ECONOMICS
179. Introduction to American Law—(Same as Law 106, Political Science 182F.) See “Core Lectures.”
COMMUNICATION
1. Mass Communication and Society: Media Technologies, People, and Society
125. Perspectives on American Journalism
137. U.S. Communication Policy
142. Broadcasting in America
160. The Press and the Political Process

ECONOMICS
116. American Economic History
157. Imperfect Competition
158. Antitrust and Regulation

EDUCATION
220B. Introduction to the Politics of Educational Analysis

HUMAN BIOLOGY
102B. Children, Youth, and the Law
125. Environmental Policy and Law
131. Natural Resources Policy

POLITICAL SCIENCE
1. Introduction to Political Science
10. American National Government and Politics
60. The American Dream
90N. Stanford Introductory Seminar: The Evolution of Voting Rights in the U.S.
101P. Politics and Public Policy—(Same as Public Policy 101.)
104. Seminar: Urban Policy
134B. America and the World Economy
158R. Children’s Citizenship: Justice across Generations
162. Seminar: Capitalism and Democracy
171. Judicial Politics and Constitutional Law: Civil Liberties
173M. Critical Overview of American Political History
174M. Seminar: The American Dream
176. Seminar: The Supreme Court
184W. Issues of Representation in American Politics
185. Seminar: Asian Americans in Politics
186. Urban Politics
196. Issues of Race in American Politics
197P. Seminar: Political Beliefs and Values of Black Americans

SCIENCE, TECHNOLOGY, AND SOCIETY
101. Science, Technology, and Contemporary Society
171. The Role of Technology in National Security

INDIVIDUAL WORK
195. Directed Research
1-5 units (Staff)
199. Directed Reading
1-5 units (Staff)

220. Student Initiated Course—American Studies majors have the opportunity to develop student-initiated courses and earn credit for their development, organization, and presentation. Such courses must have a faculty sponsor to assign grades, and must be approved by the chair or one of the program coordinators. See the program administrator for guidelines. Credit is assigned by the chair or one of the program coordinators on the recommendation of the faculty sponsor.
1-5 units, any quarter (Staff)

250. Senior Research Project—Research and writing of senior honors thesis under the supervision of a faculty member. The final grade for the thesis is assigned by the chair based on the evaluations of the primary thesis adviser and a second reader appointed by the program. Prerequisite: consent of chair.
1-15 units, any quarter (Bernstein)

ANTHROPOLOGICAL SCIENCES
Chair: William H. Durham
Associate Professors: James A. Fox, John W. Rick
Assistant Professor: Joanna L. Mountain
Lecturers: Hill Gates, Marie Jurecki-Tiller, Anne Maggioncalda, Peter Rosset
Acting Assistant Professor: Susan Charnley
Consulting Assistant Professor: Dominique Irvine
Visiting Professors: Ramachandra Guha, Christopher Wilson
Affiliated Faculty: Carol Boggs, L. Luca Cavalli-Sforza, David Cox, Marcus W. Feldman, Henry Orserly, Barbara Kenig, Ellen Porzig, Robert Sapolsky, Richard White

The Department of Anthropological Sciences (ANSI) takes as its subject matter the nature and evolution of our species. The department offers students training in archaeology, cultural anthropology, demography, ecology, environmental anthropology, evolutionary theory, genetics, linguistic anthropology, medical anthropology, paleoanthropology, and primatology. Specialties and interests of individual faculty members include applied anthropology, curing systems in western and non-western societies, ethics, gender, genetic and cultural evolution, historical linguistics and linguistic anthropology, human environments and adaptations, human origins, hunters and gatherers, materialism, molecular anthropology, social and psychological anthropology, and tools and technology. The department is united by a common interest in the interrelations of biology, culture, and environment, and by a commitment to a four-field, scientific approach to anthropology.

The departmental curriculum includes courses at three levels. These courses are designed to: (1) expose undergraduates to the theories, methods, and subsistence of the anthropological sciences; (2) provide undergraduate majors and minors with a program of work leading to the Bach-
The department offers an undergraduate Bachelor of Arts degree. Undergraduates may elect to specialize in any one of four concentration tracks: (1) Culture, Social Relations, and Language; (2) Archaeology and Evolutionary Studies; (3) Population and Environment; and (4) Medical Anthropology and Genetics. Within each of these concentration tracks, students work with their faculty advisor to design a course of study that includes at least one course from each of five areas of "Human Evolution Framework" (described in detail below): human nature and variation; human history and prehistory; human evolutionary processes and their interactions; cultural systems and cultural transmission; and laboratory and field methods. The framework is designed to ensure that students of all specializations receive a solid grounding in evolutionary thinking and analysis.

The department offers three graduate degrees: Master of Science, Master of Arts, and the Doctorate of Philosophy. The graduate curriculum encourages students to pursue individual interests and projects under the supervision of a faculty committee. The backbone of the graduate program is a department-wide Core Seminar devoted to ongoing discussion of issues and approaches in the anthropological sciences. An active Teaching Assistant Training Program, normally for students in the second year of the Ph.D. program, is an integral part of graduate training. The graduate program offers students a wide range of opportunities for training in theoretical and practical skills, including model-building, ethnographic methods, archaeological and osteological techniques, data analysis, computer imaging, laboratory methods in genetics, and a variety of field training options. At both the undergraduate and graduate levels, the curriculum emphasizes the use of scientific methodology.

The department also offers a variety of hands-on research and training opportunities, including research assistantships, internships on- and off-campus, an active undergraduate Honors program, and a series of Field Seminars with scholarships in the Amazon, the Andes, the African Southwest, Middle America, and Galapagos. Undergraduate and graduate students are encouraged to work with various faculty at their field sites each summer. The department maintains teaching and research collections in the Iris & B. Gerald Cantor Center for Visual Arts at Stanford University, featuring materials from the Americas, the Pacific Rim, and Africa. Each year, the department also awards a number of summer grants to undergraduates who are planning specialized study leading to Honors research in Anthropological Sciences. Awarded in Winter Quarter, these grants may be used for travel, language training, stipend, certain kinds of equipment and field assistance, and summer earnings offset. In addition, students have the opportunity to participate in ongoing historical archaeology conducted on campus.

Note—The degree programs in the Department of Anthropological Sciences became available in the Autumn Quarter of 1999-2000. Current students who enrolled in 1998-99 or in any previous year have the option of finishing their degrees under the guidelines and requirements of the former Department of Anthropology (see, for example, Stanford Bulletin 1998-99), or they may opt for the new guidelines and requirements outlined here. The choice of these options should be made in writing, with the faculty adviser’s approval, and filed with the Academic and Student Services Coordinator in the Anthropological Sciences office.

UNDERGRADUATE PROGRAMS

The Department of Anthropological Sciences offers a Bachelor of Arts degree together with an Honors program and a minor. The Anthropological Sciences programs include active undergraduate advising (described below).

BACHELOR OF ARTS

The A.B. degree program in Anthropological Sciences gives students an understanding of the breadth and depth of anthropological knowledge, as well as a series of intellectual and practical tools. Majors choose from one of four concentration tracks: Language, Culture, and Social Relations; Archaeology and Evolutionary Studies; Population and Environment; and Medical Anthropology and Genetics. The A.B. in Anthropological Sciences provides solid preparation for careers in anthropology, business, economic development, education, foreign service, health professions, international relations, law, or public policy.

With the addition of courses from the natural, physical, and mathematical sciences, the A.B. degree also provides preparation for further study in a broad variety of scientific areas, including earth sciences, ecology and evolutionary biology, environmental sciences, human genetics, medicine, and psychology. The department is developing a Bachelor of Science degree; and, currently provides guidance for undergraduate students who want to ensure a strong background in the natural and quantitative sciences, as they earn an undergraduate Anthropological Sciences degree (see the department Academic and Student Services Coordinator for details).

REQUIREMENTS

The department offers considerable flexibility in structuring an Anthropological Sciences major. In consultation with a faculty adviser, students develop a program that reflects their individual interests and needs. Majors in anthropological sciences meet with their advisers at least once every quarter. Each student’s progress toward fulfilling the major requirements is recorded in a departmental file. It is the student’s responsibility to see that this file is kept up to date.

All A.B. majors in the Department of Anthropological Sciences (ANSI) must fulfill the following requirements:

1. Course work equivalent to 65 units, with at least 45 units in Anthropological Sciences. The remaining 20 units may be taken in any of the related humanities, social science, and science departments and programs, including the Department of Cultural and Social Anthropology. Outside courses must form a coherent program of study and must be approved by the student’s adviser. Up to 10 of the 65 units may be in Directed Individual Study.
2. Complete ANSI 2A and 2B (Human Biology 2A and 2B), or three other "Introductory Courses" as listed below.
3. Complete at least one course in each of the four traditional subfields of anthropology: archeological, biological anthropology, linguistic, and sociocultural.
4. A letter grade of ‘B’ or better in the theory course, History of Theory in Anthropological Sciences (ANSI 190). This course fulfills the University’s Writing in the Major Requirement (WIM) and should be taken no later than the junior year.
5. Declare a concentration track and complete at least 30 units in that track. These 30 units should include at least one course from each of the five Human Evolution Framework (HEF) areas below, including lab and field methods. Note that some courses satisfy multiple areas of the HEF.
6. Complete at least one foreign language course at the second-year level with a letter grade of ‘B’ or better. This requirement may also be met by special examination, presentation of superior foreign language placement scores, or certification in writing from an appropriate department.
7. Complete at least one course in statistics (ANSI 192, Biological Sciences 141, Statistics 60, Psychology 60, or equivalent).

CONCENTRATION TRACKS

Concentration tracks, are designed to encourage students to acquire in-depth knowledge and training. Undergraduates in the major program may elect to specialize in one of the four tracks described below. Alternatively, students may design their own specialization(s) with the guidance of a faculty adviser. Each student is required to complete 30 units within the chosen track. With consent of their faculty adviser, students may replace one course with a relevant course offered by another department. The 30 units count towards the total of 65 units required for the major.

Culture, Social Relations, and Language (Track 1) – Emphasizes the unity and diversity of contemporary social, cultural, and linguistic systems. Course offerings include culture and social theory, family, gender...
kinship, linguistic anthropology, and political economy. Ethnographic
area studies are strongly encouraged for students who choose this track.

Archaeology and Evolutionary Studies (Track 2)—Features primate
evolution, human origins and prehistory, and the development of human
societies from early hunter-gatherers through complex civilizations.
Students choose from courses in anthropological genetics, archaeology,
evolutionary theory, historical linguistics, palaeoanthropology, and pri-
matology.

Population and Environment (Track 3)—Explores mutual relation-
ships between human populations and their environments. Biocultural
adaptations of human societies to diverse environments are examined,
as are the causes and consequences of human impact upon local and
global environments. Students choose from courses in behavioral ecology,
demography, ecological and environmental anthropology, and selected
area studies.

Medical Anthropology and Genetics (Track 4)—Examines human
biological and cultural variation from a variety of perspectives. Within
medical anthropology, the focus is on the social, cultural, and genetic
correlates of physical and mental health, as well as disease. In anthro-
ological genetics, students explore the extent, origins, and impact of vari-
ation among human genomes. Students choose from courses in epide-
miology, genetics, and medical anthropology.

HUMAN EVOLUTION FRAMEWORK (HEF)

Crossing-cutting these concentration tracks is an evolutionary frame-
work designed to familiarize students with the tools of analysis in anthro-
pological sciences. The department divides this framework into five
elemental components (HEF I-V) as outlined below. Regardless of the
concentration track, students are required to take at least one course in
each of these component areas. Many courses offered by the department
satisfy one or more of these requirements as shown by the HEF designa-
tions under “Courses” below.

Human Nature and Variation: Past and Present (HEF I)—
Biological nature and variation
Cultural nature and variation
Language capability and linguistic variation

Human universals, human differences

Human History and Prehistory: Inferring Events of the Past (HEF II)—
Population events: movements, splits, admixture, extinctions
Environmental events: changes in climate, resources, disease
Species events: adaptation, speciation, species extinction
Social and cultural events: changes in technology, settlement, language,
and social organization

Evolutionary Processes and their Interactions (HEF III)—
Molecular evolution, population genetics, and speciation
Cultural and linguistic evolution, ethnogenesis, social evolution
Causes and consequences of environmental change
Interactions of genetic, cultural, and social evolution

Cultural Systems and Cultural Transmission (HEF IV)—
Systemic properties of culture and language
Transmission of culture in space and time
Cultural ontology and socialization
Relationship between individual, society, and culture

Lab and Field Methods: Tools for the Anthropological Sciences (HEF V)—
Laboratory and field methods
Ethnographic methods
Data analysis
Computational models and methods

Declaring a Major—To declare an Anthropological Sciences major,
students should first discuss their ideas and plans with one or more de-
partment faculty, and with at least one peer adviser. When they have a
good working plan on paper (forms are available from the Academic and
Student Affairs Coordinator) for their course of study, they must then fill
out the Declaration of Major form in the Registrar’s Office, obtain the
signature of their student and faculty advisers, and contact the depart-
ment’s Academic and Student Services Coordinator who will review the
degree requirements and give general guidance. It may be helpful for
students to meet with the chair of the department’s Student Affairs Com-
mittee for initial academic advising and assistance in choosing an appro-
 priate adviser in the department. Students must complete the declaration
process (including the signature of their Anthropological Sciences ad-
viser) no later than the last day of the quarter, two quarters prior to de-
gree conferral (Autumn Quarter if Spring graduation is planned).

Undergraduates are actively encouraged to take advantage of fund-
 ing opportunities to carry out independent research. Funding for under-
graduate research is available from Undergraduate Research Opportu-
nities (URO) grants, affiliated area studies programs (for example,
Latin-American Studies), and the department’s own Undergraduate
Summer Research awards. Information and applications for the latter are
available from the Academic and Student Services Coordinator in the
department office.

Advising Program—The department puts high priority on under-
graduate advising. Each student works with one or more peer advisers, as
well as a faculty adviser, to design and carry out their Anthropological Sci-
ences major or minor. The advising program is built on a faculty men-
toring approach, and to help students develop a good working relation-
ship with at least one faculty member. Students are expected to meet
regularly, and for at least two hours per quarter, with their faculty advis-
er to discuss their progress and to review course selection, research op-
portunities, graduate or professional schools, and career planning. Peer
advisers are often the first step in seeking advice; they keep regular hours
in the peer advising office in the department.

MINORS

Declaring a Minor—The department offers flexibility in structuring
an Anthropological Sciences minor. In consultation with both peer and
faculty advisers, students develop a minor that reflects their individual
interests and needs. Prospective Anthropological Sciences minors should
request an Anthropological Sciences Minor Planning Form and Check-
list from the department’s Academic and Student Services Coordinator.
All minors in the Department of Anthropological Sciences must fulfill
the following four requirements:

1. Selection of an Anthropological Sciences faculty adviser and approval
   of the minor courses by both peer and faculty advisers.
2. Completion of 30 units of course work in Anthropological Sciences
   with a grade point average (GPA) of ‘B-’ or better. With the advis-
er’s approval, up to 10 of the required 30 units may be taken in Cul-
tural and Social Anthropology or other social science departments
   at Stanford. No more than 10 of the 30 units may be taken for an instruc-
tor-elect-satisfactory/No Credit grade. Student-elected Satisfactory/
   No Credit units are not allowed.
3. Completion of ANSI 2A and 2B (Human Biology 2A and 2B) or three
   courses from introductory offerings.
4. Completion of at least one course at the 100 level or higher.

HONORS

The Honors Program in Anthropological Sciences provides students
the opportunity to conduct original research under the guidance of a facul-
ty adviser. Candidates of sophomore and junior standing should sub-
mit an application to the student program coordinator no later than the
end of the fourth week of the Spring Quarter. It must include a brief state-
ment of a proposed honors project, a complete course of study within
Anthropological Sciences, a transcript, and written approval of a facul-
ty sponsor. The Student Affairs Committee reviews applications and
notifies accepted students.

Candidates whose applications to the honors program has been ap-
proved by the Student Affairs Committee must complete all of the require-
ments for their major and submit an honors thesis no later than three weeks
prior to the end of the quarter in which graduation is anticipated. The thesis
is read by the candidate’s adviser and a second reader.

Students interested in honors are especially encouraged to apply for
summer research funding through the department, through the office of
Undergraduate Research Opportunities (URO), and through various of
the area studies centers on campus (for example, Latin American Studies, African and Afro-American Studies, and so on). In most cases, honors students apply for such funding no later than Spring Quarter of their junior year.

COTERMINAL DEGREES

The Department of Anthropological Sciences accepts applications from Stanford undergraduate students to work toward coterminal A.M. or M.S. degrees. Undergraduate students with a grade point average (GPA) of 3.0 or higher may apply between their seventh and eleventh quarters, by submitting with their application a statement of purpose, at least one writing sample (preferably a research paper), and three letters of reference. The GRE is not required. Requirements for coterminal degrees are described under "Graduate Programs" below.

GRADUATE PROGRAMS

University requirements for the degrees of Master of Arts, Master of Science, and Doctor of Philosophy are described in the "Graduate Degrees" section of this bulletin.

The department offers three graduate degrees: Master of Science, Master of Arts, and Doctorate of Philosophy. The graduate curriculum encourages students to pursue individual interests and projects under the supervision of a faculty committee. Specific details of the graduate programs in Anthropological Sciences are outlined in the departmental Graduate Handbooks (available in the department office).

MASTER OF ARTS

The Department of Anthropological Sciences offers the A.M. degree to four groups of students: Stanford undergraduates who enroll in the coterminal program; Stanford graduate students taking advanced degrees in other departments or schools at Stanford; Ph.D. students in Anthropological Sciences who fulfill the A.M. requirements in the course of their work toward the Ph.D. degree, and students who apply from outside of Stanford for entry into the terminal A.M. program.

REQUIREMENTS

1. Graduate enrollment at Stanford for at least three quarters of full tuition.
2. At least 45 units of course work for a letter grade (in addition to any pertinent undergraduate courses), with at least 30 units in Anthropological Sciences. The remaining 15 units may be taken from related humanities, social science, and science departments and programs, including the Department of Cultural and Social Anthropology. Outside courses must be approved by the student's adviser and must form a coherent program of study. No more than 10 of the 45 units may be in Directed Individual Study. Students must maintain a grade point average (GPA) of 'B' or better.
3. At least four graduate-level courses, other than "Special Courses," in Anthropological Sciences, all for a letter grade. The remaining units may be made up of courses selected in consultation with the student's faculty adviser.
4. Enroll in the departmental Core Seminar (ANSI 290) each quarter while in residence.
5. Students must submit a professional-quality field or library research paper to be read and approved by at least two department faculty members.

MASTER OF SCIENCE

The Department of Anthropological Sciences offers the M.S. degree to four groups of students: Stanford undergraduate science majors who enroll in the coterminal program; Stanford graduate students taking advanced degrees in other departments or schools at Stanford; Ph.D. students in Anthropological Sciences who fulfill the M.S. requirements in the course of their work toward the Ph.D. degree, and students who apply from outside of Stanford for entry into the terminal M.S. program. Students applying to the M.S. program must have a B.S. degree.

REQUIREMENTS

1. Graduate enrollment at Stanford for at least three quarters of full tuition.
2. At least 45 units of course work for a letter grade (in addition to any pertinent undergraduate courses), with at least 30 units in Anthropological Sciences. The remaining 15 units must be taken from earth science, natural science, statistics, computer science, chemistry, engineering, math, or physics. Outside courses must be approved by the student's adviser and must form a coherent program of study. No more than 10 of the 45 units may be in Directed Individual Study. Students must maintain a GPA in master's work of 'B' or better.
3. The Scientific Process in Anthropology (ANSI 291), and Data Analysis in the Anthropological Sciences (ANSI 292), both for a letter grade. Units earned in these courses count toward the 45-unit M.S. requirement.
4. Students must take at least four graduate-level courses, other than "Special Courses," in Anthropological Sciences, all for a letter grade. The remaining units may be made up of courses selected in consultation with the student's faculty adviser.
5. Enroll in the departmental Core Seminar (ANSI 290) each quarter while in residence.
6. Students must submit a professional-quality field or library research paper to be read and approved by at least two department faculty members.

DOCTOR OF PHILOSOPHY

Prospective graduate students should request application materials from Graduate Admissions in the Registrar's office. The deadline for applications is January 1. The Graduate Record Exam (GRE) is required. Successful applicants for the Ph.D. program may enter only in Autumn Quarter.

REQUIREMENTS

Requirements 1-9 must be completed within the first two years:
1. Within the first two years, complete 67 units of course work for a letter grade, while maintaining a grade point average (GPA) of 'B+' or better. Of these 67 units, at least 40 units must come from graduate-level courses within the department. The remaining 27 units may include advanced undergraduate courses as well as courses from related humanities, social science, and science departments and programs, including the Department of Cultural and Social Anthropology. Outside courses must form a coherent program of study and be approved by the student's adviser.
2. Enroll in the departmental Core Seminar (ANSI 290) each quarter while in residence (except for students in the second year of the program, who are working as TAs or RAs and thus have a 9-unit course limit). Units for ANSI 290 count toward the unit requirements for the Ph.D.
4. Complete ANSI 291, The Scientific Process in Anthropology, and 292, Data Analysis in the Anthropological Sciences, both for a letter grade; on petition to the Student Affairs Committee, one or both of these requirements can be fulfilled by equivalent undergraduate or master's course work.
5. Submit an acceptable, substantial, professional-quality, research paper in the Spring Quarter of the first year.
6. Serve as a teaching assistant for three undergraduate courses. In preparation for this responsibility, students are expected to take part in the departmental Teaching Assistant Training Program organized each year. (Students can petition to substitute an internship or research assistantship for one quarter as a TA).
7. For those whose native language is English, pass an examination in a language other than English that will either serve as a field or research language. For those whose native language is not English, satisfac-
tory command of English must be demonstrated by successful completion of the course and research requirements of the first two years of graduate study.

8. Recruit the special examination committee and schedule examinations by the end of the second year.

9. Petition for and advance to candidacy by the end of the second year. After successful completion of the first two years of the program, and after an accepted petition for doctoral candidacy, advanced graduate students are required to complete the following:

1. Pass a special examination (written and oral). This examination fulfills the requirement of the University oral examination and may be scheduled at any time during the third year that is directly following admission to candidacy.

2. Submit the Doctoral Dissertation Reading Committee form before approval of TGR status or before scheduling a University oral examination that is in defense of a dissertation. The reading committee is to be recruited no later than the end of the third year.

3. Take at least one quarter of Proposal Writing (ANSI 294) and prepare a dissertation proposal to be approved by the dissertation reading committee before the end of the Spring Quarter of the third year. If necessary, obtain Human Subjects clearance.

4. Take at least one quarter of Dissertation Writing (ANSI 298) and complete an approved dissertation based on independent research.

5. Give a public presentation of the dissertation in the department.

Financial Support—The department endeavors to provide needed financial support (through fellowships, teaching and research assistant-\(\)ship, and tuition grants) to all students admitted to the Ph.D. program who maintain satisfactory progress. First-year students in the Ph.D. program who have not entered with outside funding are required to apply for such funding during their first quarter. See Guide to the Ph.D. Program in Anthropological Sciences and the department website (http://www.stanford.edu/dept/anthsci) for details.

## COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

Undergraduate Anthropological Sciences courses 130 and above are organized by concentration tracks, 1 to 4 (see above). (HEF) designations indicate the given course satisfies requirement I, II, III, IV, or V of the Human Evolution Framework, also described above. A course may satisfy more than one HEF requirement.

### NUMBERING SYSTEM

Anthropological Sciences courses are numbered according to the following scheme:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course Title</th>
<th>Units</th>
<th>Delivery</th>
<th>Code</th>
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<tbody>
<tr>
<td>01-99</td>
<td>Introductory Courses</td>
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<tr>
<td>01-19</td>
<td>General Introductory Courses</td>
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<tr>
<td>20-29</td>
<td>SIS Courses (freshmen preference)</td>
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<tr>
<td>30-39</td>
<td>SIS Seminars and Dialogues (sophomore preference)</td>
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<tr>
<td>100-129</td>
<td>Culture, Social Relations, and Language</td>
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<tr>
<td>100-109</td>
<td>Culture and Social Relations</td>
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<td>110-119</td>
<td>Language</td>
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<tr>
<td>120-124</td>
<td>Area Studies: The Americas</td>
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<tr>
<td>125-129</td>
<td>Area Studies: Asia</td>
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<td>130-149</td>
<td>Archeology and Evolutionary Studies</td>
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<tr>
<td>130-139</td>
<td>Evolutionary Studies</td>
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<tr>
<td>140-149</td>
<td>Archeology</td>
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<tr>
<td>150-169</td>
<td>Population and Environment</td>
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<tr>
<td>150-159</td>
<td>Population/Demography</td>
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<td>160-169</td>
<td>Environment/Ecology</td>
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<tr>
<td>170-189</td>
<td>Medical Anthropology and Genetics</td>
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<tr>
<td>170-179</td>
<td>Medical Anthropology</td>
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<tr>
<td>180-189</td>
<td>Anthropological Genetics</td>
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<tr>
<td>190-199</td>
<td>Special Courses</td>
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<tr>
<td>200-299</td>
<td>Graduate-level Courses</td>
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### INTRODUCTORY

Intended to serve as an introduction to the methods, theories, and substance of Anthropological Sciences, introductory courses are for both majors and non-majors. ANSI 2A and 2B (Human Biology 2A and 2B) provide a good introduction to the major; alternatively, a student may take three other Introductory Courses numbered from 3 to 40.

2A. Genetics, Evolution, and Ecology—(Enroll in Human Biology 2A.)

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<th>Units</th>
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<tr>
<td>5</td>
<td>Aut (Durham, Boggs)</td>
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2B. Culture, Evolution, and Society—(Enroll in Human Biology 2B.)

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<th>Units</th>
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<tr>
<td>5</td>
<td>Aut (Klein, Wolf)</td>
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3. Introduction to Prehistoric Archaeology—Aims, methods, and data in the study of human society’s development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development are examined for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each. GER:3b,4a (DR: 2 or 9)

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<th>Units</th>
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<tr>
<td>3-5</td>
<td>Aut (Rick)</td>
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4. Language and Culture—Language variants (dialects, registers, jargons, writing, and non-verbal systems) and their use. Language classification and human prehistory. Linguistic determinism, relativism, encodability, and the cultural origins of vocabulary and grammar. The structure of discourse, including conversation, narrative, and poetry. Language, gender, and power. Style, style, theory, and ideology in language use. Emphasis is on the comparative reading of monographic studies of language and culture in particular societies.

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<tr>
<td>4-5</td>
<td>Aut (Fox)</td>
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6. Human Origins—The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C. Emphasis is on broad evolutionary trends and on the natural selective forces behind them. GER:2a (DR:5)

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<tr>
<td>5</td>
<td>Win (Klein)</td>
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7. Marriage and Kinship—Surveys the variation in human kinship systems, asking whether or not they can be understood as evolutionary products, and considers the contribution to be made by a Marxist perspective. Eurasia and Africa are contrasted with Europe and E. Asia.

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<th>Units</th>
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<tr>
<td>5</td>
<td>Win (Wolf)</td>
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<tr>
<td>5</td>
<td>Win (Mountain)</td>
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</table>

9. Human Environments and Adaptations—Analyzes the relationship between diverse human populations and their environments. Theo-
ries for how environments influence human behavior and culture, and for how human populations shape their environments. Emphasis is on present-day environmental problems and the human dimensions. How the social and cultural processes can cause environmental problems (e.g. deforestation, soil erosion, habitat degradation), and help to serve them.

3-5 units (Staff) not given 1999-2000

10. Plagues and Peoples—Introduction to the principles of medical anthropology through an examination of major human infectious diseases. Focus is on the cultural constructions of health, cultural contexts of disease, and the social implications of medical intervention.

5 units (Staff) not given 1999-2000

STANFORD INTRODUCTORY SEMINARS (SIS)

The SIS program within the Department of Anthropological Sciences provides opportunities for first- (N) and second-year (Q) students to work closely with faculty. Units for these courses count towards the Anthropological Sciences major requirements.

20N. Stanford Introductory Seminar: Modern Human Origins—Preference to freshmen. Analysis of the data and theories bearing on the origins of anatomically modern humans between 100,000 and 50,000 years ago. Emphasis is on the two major contending theories: that modern humans originated recently or less simultaneously from non-modern humans in many regions of Africa and Eurasia; or that modern humans originated exclusively in Africa and spread from there. How paleoanthropologists test these theories against the empirical data of genetics and the fossil record. GER:2a (DR:5)

3 units (Klein) not given 1999-2000

21N. Stanford Introductory Seminar: The Use of Knowledge—Case Studies in Applied Anthropology—Preference to freshmen. Using anthropological case studies, asks the question, “Knowledge for What?” The relationship between the academic and the “real” world. Are we producing knowledge for its own sake, or with a use in mind? What basic research questions may lie behind starting with “real” world problems or possible applications of knowledge? Case studies involve anthropology and medicine, public health, cultural survival and identity, law and industry.

3 units (Barnett) not given 1999-2000

22N. Stanford Introductory Seminar: Genes, Peoples, and Diversity—Preference to freshmen. The impact of genetic information on: the understanding of human history, the practice of medicine, and on human society and culture. Patterns of genetic variation and how these patterns correlate with other dimensions of human diversity. The ethical issues associated with genetic information and medical genetics. Attempts to predict future patterns of genetic variation. GER:2a (DR:5)

3 units (Mountain) not given 1999-2000

23N. Stanford Introductory Seminar: Maya Mythology Multimedia Project—Preference to freshmen. Lectures, discussions, and hands-on work in the development of an ongoing world-wide-web project. The mythology, calendars, and astronomy of the ancient and modern Maya, emphasizing the relationships between the Quiché mythological text, Popul Vuh, and Maya hieroglyphic texts, art, colonial documents, and modern ethnography. Optional field seminar to the Maya heartland (limited capacity, at extra expense).

3 units (Fox) not given 1999-2000

24N. Stanford Introductory Seminar: Chinese Women and Girls—Preference to freshmen. Chinese girls and women inhabit a strongly patriarchal culture in which, paradoxically, women wield substantial power. This paradox is explored as it appears to feminists from the West, Taiwan, and China. Readings from ethnographies of China and Taiwan, and theoretical explorations of gender and gender relations. GER:3b (DR:9)

3 units (Gates) not given 1999-2000

27N. Stanford Introductory Seminar: Archaeology and Computers—Preference to freshmen. The increasing role that computers play in anthropological sciences, with emphasis on archaeology. The use of computer technology in fieldwork for mapping, site location, and remote detection, including hands-on work with archaeological data and images.

3 units (Rick) not given 1999-2000

31Q. Stanford Introductory Seminar: Earthquakes and Archaeology—(Enroll in Geophysics 50Q.)

3 units. Win (Nur)

CULTURE, SOCIAL RELATIONS, AND LANGUAGE

In addition to the courses listed directly below, ANSI courses 165 and 170, listed in other concentration tracks, also count towards the Track concentration.

CULTURE AND SOCIAL RELATIONS

102. Women, Fertility and Work—Is gender culturally or biologically determined or both? The arguments for sociobiological and cultural determinist explanations of the differences between women and men are compared, emphasizing their intersection in work. Case studies: gatherer/hunter, horticultural (Melanesian), southern Chinese, and Anglo-American societies. (HEF I, IV) GER:4c (DR:*)

5 units (Gates) not given 1999-2000

103. Theory and Method in Cultural Evolution—(Graduate student register for 203.) The concept of culture as used in anthropology, and the ways in which culture is socially conveyed and manipulated. The capacity for “descent with modification” in cultural systems. Critical examination of transmission forces, direct and indirect bias, epigenetic theory, cultural selection, gene-culture coevolution, and ethnogenesis. (HEF III, IV)

5 units (Durham) not given 1999-2000

105. Race, Gender, and Biology—Critically evaluates the biological arguments for the explanation of race and gender inequality in human societies. The history of the issues, examining the arguments of proponents (to the effect that race and sex role differences are rooted in evolutionary biology) and the arguments of their critics. Recent arguments, including those of sociobiology and its critics, because of their influence on contemporary social thought. (HEF I)

5 units (Durham) not given 1999-2000

106. Human Origins in Science and Myth—A comparison of peoples’ accounts of their own and others origins, with inferences made from comparative biological, linguistic, and cultural data. Functional, psychological, historical, folkloristic, and literary interpretations of myths and other narratives of origin. The scientific account as narrative. The intellectual accomplishments of supposedly primitive and advanced cultures, asking whether their cognitive models of space, time, and the cosmos justify such differentiation. (HEF IV)

5 units, Win (Fox)

LANGUAGE

110. Introduction to Language Change—Variation and change as the natural state of language. Differentiation of languages and dialects over time. Determination and classification of historical relationships among languages, and reconstruction of ancestral stages. Types, rates, and explanations of change. Parallels with cultural and genetic evolutionary theory; and, implications for the description and explanation of language in general. Language as a window on prehistory: contact, migrations, and the vocabulary of ancient institutions. (HEF II, III)

5 units (Fox) not given 1999-2000

111. Language and Prehistory—Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparisons for...
of linguistic and biological classifications. Semantic reconstruction, proto-vocabularies, and culture. (HEF II, III)
3 units, Spr (Fox)

112. Human Diversity: A Linguistic Perspective—(Enroll in Human Biology 118.) HEF I, II
3 units, Spr (Ruhlen)

119. Linguistic Field Methods—Practical training in the collection and analysis of linguistic data from native speakers. Research goals, ethics, working in the community, technical equipment, and analytical strategies. Emphasis is on the use of computers in the collection, analysis, and preparation of materials useful to the subject community. Prerequisite: introductory linguistics. (HEF V)
5 units (Fox) not given 1999-2000

AREA STUDIES: THE AMERICAS

120. Native American Cultures of North America—Introduction to the diverse cultures of indigenous peoples in N. America before the European conquest. Lectures, readings, and films on the precontact situation, postcontact changes (including government policies), influences of Indian culture on American society and culture, and the contemporary situation of native peoples. An antidote to TV and Western movie stereotypes. (HEF IV) GER:4b (DR:3)
5 units (Barnett) not given 1999-2000

121. Native Peoples and Cultures of the Southwest—The development of the rich, varied cultures of the American southwest from the earliest prehistory to postmodern times. Emphasis is on the interaction of cultures and their responses to changes in social and natural environments. Recommended: background in Native American cultures, literature, and archaeology. (HEF IV)
5 units (Barnett, Rick) not given 1999-2000

122. The Maya—Introduction to the archaeology and culture of the ancient and modern Maya. Archaeological and historical data and classification of periods and variation in Maya culture. The natural world of the Maya: environmental, food, agriculture, technology, and medicine. The life cycle and daily life, power and social structure, language and writing, mythology, time, astronomy, religion, and art. The Spanish conquest and the colonial Maya. The Maya in the modern world system. (HEF II, IV)
5 units, Win (Fox)

123. Environmental Issues in the Americas—Focus is on the local impacts of major environmental problems in the Americas. Case studies: deforestation of tropical rainforest in the Amazon; co-management of marine fauna in the Arctic; forestry management in Mexico and N. America; and pollution, toxic waste, and environmental justice in the U.S. (HEF III)
5 units (Staff) not given 1999-2000

124. Perspectives on Sustainable Development in Latin America—(Same as Latin American Studies 195.) Cross-disciplinary examination of perspectives for “sustainable development” in rural areas of Latin America. Interactions between poverty, development, environmental degradation, and approaches to growth and stability in agroecology, agroforestry, small farm development, and conservation biology. Limited enrollment. HEF III
5 units, Win (Rosset)

AREA STUDIES: ASIA

125A. 20th-Century Chinese Societies—Nationalist China, the Peoples’ Republic of China, Taiwan, and the loosely-knit networks of the overseas Chinese are examined through the anthropological methods used in exploring complex societies. Emphasis is on political-economic, demographic, social organizational, gender/kinship, ideological, and transformative aspects of Chinese populations after the 1949 revolution. (HEF IV) GER:4a (DR:2)
5 units (Gates) not given 1999-2000

125B. Late Imperial China—Chinese civilization in the late imperial era (960-1911) in its spatial, temporal, structural, institutional, and ideational complexity. Thematic foci: frontiers and empire building, the making of Han Chinese and “barbarians,” migrations, colonization, urban and rural living, imperial state and local government, commerce and petty capitalism, kinship and family, gender and marriage, food, money, population, and popular religion. (HEF IV) GER:4a (DR:2)
5 units, Aut (Chau)

ARCHEOLOGY AND EVOLUTIONARY STUDIES

In addition to the courses listed directly below, ANSI courses 111, 112, 122A, 180, and 181, listed in other concentration tracks, also count towards the Track 2 concentration.

EVOLUTIONARY STUDIES

130. Modern Human Origins—Analysis of the data and theories bearing on the origins of anatomically modern humans between 100,000 and 50,000 years ago. Emphasis is on the two major competing theories: that modern humans originated more or less simultaneously from non-modern humans in many regions of Africa and Eurasia, or that modern humans originated exclusively in Africa and spread from there, largely replacing non-modern humans elsewhere. (HEF I, II)
5 units (Klein) not given 1999-2000

131A. Primate Evolution—The fossil, molecular, and anatomical data on primate origins, from their mammalian ancestors to the origin of the hominids. The adaptive radiations of lemurs, lorises, tarsiers, New World Monkeys, Old World Monkeys, lesser apes, and great apes. The functional anatomy of primates in relation to habitat and social ecology. (HEF II, II)
5 units, Win (Maggioncalda)

131B. Primate Societies—Introduction to primatology. Survey of the living primates, primate evolution, distribution, and taxonomy. Life history patterns, dominance hierarchies, reproductive strategies, and social structures. Focus is on cultural behaviors, including tool manufacture and use, language and communication, hunting and warfare, and political behavior. Analysis of current conservation issues. (HEF II) GER:2a (DR:5)
5 units, Spr (Maggioncalda)

131C. Methods in Primatology—Individually-directed work with non-human primates on campus and at the California Regional Primate Research Center (CRPCC). Introduction to observation methods, data collection, and data analysis, including laboratory hormone assay techniques. (HEF V)
3-5 units (Maggioncalda) not given 1999-2000

132. Hormones and Behavior—(Same as Human Biology 112.) Seminar on primate socioendocrinology. The endocrine correlates of behavior and the behavioral correlates of changes in hormone levels. In-depth analysis of pheromones and other socioendocrine signals and their role in suppression of growth, development and/or reproduction. Investigation of the relationship between social rank and endocrine physiology. The evolutionary significance of interactions between social behavior and hormones. Prerequisites: 2A, 2B, 102, or Biological Sciences 150. (HEF I)
5 units, Aut (Maggioncalda)

133A. Beginning Osteology—(Same as Human Biology 180.) Graduate students register for 233A.) Introduction to the study of the human skeletal system. The biology of the bone: growth and development, structure, and function. Identification of the different bones in the human skeletal system. Methods for assessing age, sex, and the biological
affinity of bones from archaeological and paleontological contexts. (HEF I, V) GER:2A (DR:5)
5 units, Aut (Maggioncalda)

133B. Advanced Osteology—(Graduate students register for 233B.) Analysis of human bone remains from archaeological and paleontological sites. In-depth analysis of fragmentary skeletal remains from an archaeological site prior to their reburial. Morphometric measurements and observations of various skeletal elements, and assessment of age, sex, and pathological condition of individual specimens. Cultural influences on skeletal variability, and the assessment of prehistoric population dynamics. (HEF II, V)
5 units, Win (Jurecki-Tiller)

134. Human Behavioral Biology—(Enroll in Biological Sciences 150/250.)
6 units, Spr (Sapolsky) alternate years, not given 2000-01

135. Human Nature in Evolutionary Perspective—Examines selected examples of human behavior (incest avoidance, aggression, attachment, color symbolism, interpretation of facial expressions, etc.), considering the extent to which they are products of our evolutionary heritage. Prerequisites: 2A, 2B, upper-division standing. (HEF I)
5 units (Wolf) not given 1999-2000

136. The Human Hand: Evolution, Ontogeny, and Influence—(Enroll in Human Biology 101.)
3 units (Porzig)

137. Darwin, Evolution, and Galapagos—(Same as Human Biology 161.) Seminar on Darwinian theory as applied to the evolution of flora and fauna on the Galapagos Islands. Darwin’s observations in Galapagos, and their role in the formulation of his theory of evolution; recent research in Galapagos and its implications for our understanding of evolution today. The impact of human activity in Galapagos and emerging conservation issues. Lectures, discussions, and optional field trip to Galapagos (at extra expense, limited capacity). Enrollment limited to 40. (HEF III)
5 units, Win (Durham)

139A. An Undergraduate Course in Anatomy—(Enroll in Surgery 101.)
7 units, Win (Dolph, Glasgow)

139B. An Undergraduate Course in Anatomy—(Enroll in Surgery 101A.)
5 units, Spr (Dolph)

ARCHEOLOGY

140. Stone Tools in Prehistory—(Graduate students register for 240.) Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts. Prerequisites: 3 or 6 or other instructor-approved, previous archaeology course work. (HEF II)
5 units, Spr (Rick)

141. Hunter-Gatherers in Archaeological Perspective—The organization and subsistence of band-level hunter-gatherers as approached through archaeological investigations. Modern hunter-gatherers provide background for prehistoric groups. The archaeological record of Africa, Europe, and the New World provides examples of how archaeological data reconstructs the cultural systems of extinct hunter-gatherers. (HEF II)
5 units (Rick) not given 1999-2000

142. Incas and their Ancestors: Peruvian Archaeology—The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C. The domestication of indigenous societies, which provided the economic foundation for monumental cities and beautiful ceramics and textiles. Cultural evolution, and why and how major transformations occurred. (HEF II, III) GER:4a (DR:2)
5 units, Spr (Rick)

149. Archaeological Field Methods—Hands-on archaeological field research in the local area. The practical working methodology of the archaeologist through excavation and site survey, with training in registration, preservation, and analysis of archaeological data. (HEF V)
5 units (Rick) not given 1999-2000

POPULATION AND ENVIRONMENT

In addition to the courses listed directly below, ANSI courses 123, 124, 133B, and 141, listed in other concentration tracks, also count towards the Track 3 concentration.

POPULATION/DEMOGRAPHY

150. Population and Society—The relationship between social structure (marriage, kinship, and political organization) and population dynamics (fertility, mortality, and migration) in a range of societies. The differences between hunter/gatherers and agriculturalists, and between peoples of Europe and Asia. (HEF II, IV)
5 units (Wolf) not given 1999-2000

151. Demography in Anthropology—The study of vital rates in human populations and their social and cultural contexts. Analysis of population dynamics in small, non-state societies as contrasted with population dynamics in large industrial states. Emphasis is on the cause of high rates of fertility, mortality, and migration. Introduces demographic methods. (HEF II, V)
5 units (Staff) not given 1999-2000

153. The Population Question: From Malthus to Rio—The relationship between the vital rates of human populations (fertility, mortality, and migration) and the social and ecological problems of poverty, hunger, and environmental degradation. To what extent is population growth (and attendant vital rates) the cause of these social ills? To what extent is population growth their consequence? What are the main interactions among social, cultural, ecological, and demographic variables? (HEF II)
3-5 units (Durham) not given 1999-2000

154. The Limits to Growth—The past, present, and future of human population growth. Critically evaluates estimates of global and regional carrying capacity and their assumptions, including estimates based upon food, water, energy, and security considerations. Issues raised by inequality, over-consumption, and the role of culture in the history of human populations. The major choices humanity faces in the decades ahead. (HEF II)
3-5 units (Staff) not given 1999-2000

156. Colloquium on Population Studies—(Enroll in Biological Sciences 146.)
1 unit, Win (Feldman)

157. The Role of Population in Developing Countries—(Enroll in Human Biology 137.)
4 units, Win (Wilson)


160. Development and Environment—The cultural and environmental impacts of development projects, focusing on the local level impact of government initiatives to encourage economic development. The role of NGOs in negotiating development priorities and environmental protections. (HEF II)
5 units (Staff) not given 1999-2000

161. Conservation and Development Issues in the Amazon—The prospects for achieving the dual goals of biodiversity conservation and community development in Amazonia. Case studies of recent efforts at biodiversity conservation, including national parks, biosphere reserves, pharmaceutical prospecting, ecotourism, extractive reserves, and agroforestry projects. The costs and benefits of conservation. To whom do these costs and benefits accrue? Critically evaluates Integrated Conservation-Development Projects (ICDPs) in the Amazon today. Optional field trip over Spring Break (at added expense, limited capacity) to selected ICDPs in the Peruvian Amazon. (HEF II)
5 units (Durham) not given 1999-2000

162. Indigenous Peoples and Environmental Problems—The social and cultural consequences of contemporary environmental problems. The impact of market economies, “development” efforts, and conservation projects on indigenous peoples, emphasizing the Amazon, E. Africa, Alaska, and Central America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas. (HEF II, IV)
3-5 units (Durham, Charnley) not given 1999-2000

163. Community-Based Conservation—Community-based participatory models for conservation that represent alternatives to conventional top-down approaches. Case studies: pollution control in the U.S., wildlife conservation in Africa, and protection of tropical rainforests in Latin America. The strengths and weaknesses of alternative approaches to conservation, and the potential for community-based models to make a difference. (HEF II)
5 units (Charnley) not given 1999-2000

164. Ecological Anthropology—(Same as Human Biology 134.) The relationships between human social systems and their environments. How do environments influence the nature and form of human social systems found within them? How do human social systems influence the properties and dynamics of their environments? How can we best conceptualize and understand human social systems, environment, and the links between them? Case studies of human societies in the Arctic, Amazon, E. Africa, the Alps, and Papua New Guinea. (HEF III)
5 units, Spr (Durham, Charnley)

165. Human Ecology of the Amazon—Introduces the various ecosystems of the Amazon and their human inhabitants. The biotic and antibiotic factors shaping human adaptation to the region. Ethnographic literature is used to explore subsistence patterns and the resource use of Native Amazonians. Current changes in these economies and life-ways due to acculturation and market forces, and the implications for conservation. (HEF IV)
5 units, Win (Lu)

166. Indigenous Forest Management—(Enroll in Human Biology 172.) (HEF IV)
5 units (Irvine) not given 1999-2000

167. Social Policy for Sustainable Resource Use—(Graduate students register for 267.) Explores the social elements of sustainable resource use by examining the case of forest product certification, a voluntary policy tool intended to provide incentives for sustainable forest use. How social standards are being developed, drawing on the literature about tenure and the institutional aspects of sustaining forests over the long term. Case studies of local participation in policy development, and the effectiveness of certification as an incentive. Prerequisite: consent of the instructor.
5 units, Win (Irvine)

168. Ecology and Equity—Comparative, cross cultural perspective on the global environmental debate. The origins, articulations, and resolutions of environmental conflicts, drawing on cases and movements from a wide variety of societies. Strategies and limits of deep ecology, ecofeminism, alternative technology, Gandhism, and other approaches. (HEF II)
5 units, Win (Guha)

MEDICAL ANTHROPOLOGY AND GENETICS

In addition to the courses listed directly below, ANSI courses 133B and 151, listed in other concentration tracks, also count towards the Track 4 concentration.

MEDICAL ANTHROPOLOGY

170. Medical Anthropology—(Graduate students register for 270.) For students with interests in health care. Introduction to curing systems in Western and in non-Western cultures; problems of adapting modern medicine to diverse cultures; explication of the social and cultural correlates of physical and mental health and disease (social epidemiology). (HEF IV) GER:3b (DR:9)
5 units, Aut (Barnett)

171. Aging: From Biology to Social Policy—What can we expect when we join the ranks of the elderly? What are the biological processes that contribute to aging and are they the same across all populations and cultures? What are the cultural, social, and economic consequences of a large portion of the elderly? What implications do they have for social policy? Readings, lectures, and films. Students are assisted in research and working with the elderly. (HEF I) GER:3b (DR:9)
5 units, Spr (Barnett)

172. Evolutionary Medicine—(Graduate students register for 272.) Seminar on understanding human health and disease from an evolutionary perspective. Topics: Darwinian medicine, genes and disease, aging, infectious diseases, mental illness, and cancer. Prerequisites: 2A, 2B, upper division standing; or consent of the instructor. (HEF III)
5 units, Spr (Cronin)

173. Disease, Health, and Culture Change—Humans buffer themselves against the consequences of ill health through their capacities for storing and transmitting knowledge, and for dividing the labor of subsistence in flexible ways. Class, ethnic, and sex/gender differences are examined to access the significance of disease and health as factors in cultural evolution. Prerequisites: 2A, 2B; or consent of the instructor. (HEF III)
5 units (Gates) not given 1999-2000

175. The Anthropology of Death and Dying—(Enroll in Cultural and Social Anthropology 143.)
5 units, Spr (Koenig)

ANTHROPOLOGICAL GENETICS

180. Human Evolutionary Genetics—(Graduate students register for 280.) The evolution of modern humans as inferred from available genetic data. Quantitative methods used to analyze mitochondrial DNA and allele frequencies. Inference of human migrations and expansion. Genetic support for models of the evolution of modern humans. Comparison of genetic data with archaeological and linguistic data. Emphasis is on critical reading of the literature. Prerequisite: 2A, 2B; or equivalents. Recommended: introductory statistics. (HEF II, III)
4-5 units (Mountain) not given 1999-2000
181. Genes and Culture through Time and Space—Exploration, through the use of computer modeling, of the parallels and interactions between human history, genes, and culture. When do we observe similarities between genetic and cultural patterns? What are the uses of models? Does greater complexity always improve a model? What are the advantages and disadvantages of simulation? Is it easier to predict genetic or cultural patterns? When do they influence one another? Students generate hypotheses, run simulations necessary to test these hypotheses, and analyze the output of the simulations. Prerequisites: 2A, 2B; or consent of instructor. (HEF III, V) 5 units (Mountain) not given 1999-2000

189. Research Methods in Anthropological Genetics—(Graduate students register for 289.) Practical training and experience in the molecular biology and data analysis techniques currently applied in anthropological genetics. Collection of samples; DNA extractions; polymerase chain reaction (PCR); gel electrophoresis; DNA sequencing. Basic techniques in the analysis of population genetic data. Prerequisites: 2A, 2B; or consent of instructor. (HEF V) GER:2a (DR:5) 5 units, Win (Klein)

SPECIAL COURSES

190. History of Theory in the Anthropological Sciences—Required of all majors. Seminar on foundational texts in anthropology, from Darwin and Marx to Geertz and Sahlin. Emphasis is on the materialist and evolutionary theories of culture. Presentations by members of the faculty. GER:3b (DR:9) (WIM) 5 units, Aut (Gates)

192. Data Analysis in the Anthropological Sciences—(Graduate students register for 292.) The univariate, multivariate, and graphical methods used for analyzing data in anthropology. Statistical techniques applied to the analysis of both cross-cultural data and data from field research. Emphasis on the use of microcomputer software and the interpretation of output. Prerequisites: 2A, 2B; or consent of instructor. (HEF V) GER:2a (DR:5) 5 units, Spr (Klein)

193. Prefield Research Seminar—Prepares for field or laboratory research. Students develop testable hypotheses and realistic data collection procedures, reviewing common data collection techniques including participant-observation, interviewing, surveys, and sampling procedures as appropriate. Emphasizes theory-guided empirical work. Prerequisites: 2A, 2B; or equivalents; and declared concentration track. (HEF V) 5 units, Spr (Staff)

194. Postfield Research Seminar—Undergraduates analyze and write about material gathered during summer fieldwork. Emphasizes writing and revising as key steps in analysis and composition. Students critique classmates’ work and revise their own writing in light of others’ comments. (HEF V) 5 units, Aut (Staff)

195. Research Project—Independent research conducted under faculty supervision, normally taken junior or senior year in pursuit of an honors project. May be taken for more than one quarter for credit. Prerequisite: completed application to the honors program. 1-10 units, any quarter (Staff)

196. Honors/Masters Writing Workshop—For students in the process of writing honor’s or master’s papers. Techniques for interpreting data, organizing bibliographic material, writing, editing, and revising. Preparation of papers for conferences and publications in anthropology. 2-6 units, any quarter (Staff)

197. Internship in Anthropological Sciences—Provides undergraduates with the opportunity to pursue the area of specialization in an institutional setting (e.g., a laboratory, a clinic, a research institute, or a government agency, etc.). 4-5 units, any quarter (Staff)

198. Museum Methods—Individually directed work on anthropology collections. Introduction to the computerized storage and retrieval system, cataloging, exhibit techniques. Can be taken for one or two quarters by arrangement with instructors. (HEF V) 1-4 units, any quarter (Rick)

199. Directed Individual Study—(Graduate students register for 299) Opportunity for advanced students to explore special areas of interest. 1-10 units, any quarter (Staff)

GRADUATE

These courses are intended for graduate students. However, advanced undergraduates may be admitted with consent of the instructor.

201A. History of Anthropological Theory, 18th and 19th Centuries—Comparative analysis of the major 18th- and 19th-century social theorists (Boas, Darwin, Freud, Marx, Morgan, Tylor, Weber) and a historical examination of their contributions to the rise of anthropology. 5 units, Aut (Wolf)

201B. History of Anthropological Theory, 20th Century—Continuation of 201A, focusing on institutionalization of the discipline and the emergence of the four field boundaries. Comparison of the development of anthropology in N. America, Germany, England, and France. 5 units, Win (Wolf)

202. Political Economy and Gender Theory—Evolutionary theory as it relates to the emergence of varied political economies. Readings: Marx, Sahlin, Geertz, and Bloch. Recommended: working knowledge of Darwinian theory. 5 units (Gates) not given 1999-2000

203. Theory and Method in Cultural Evolution—Graduate section; see 103. 5 units (Durham) not given 1999-2000

204. Culture and Politics in South Asia—Seminar on the ethnographies of S. Asia, a region unparalleled in its ecological and cultural diversity, in its range and intensity of social conflict, and in its cultural expressions. Themes: nationalism, religious violence, class conflict, and the fate of indigenous peoples. A close look at S. Asian ethnographies and exemplary models, to guide future student research. 5 units, Win (Guha)

205. Applied Anthropology—Anthropologists apply their knowledge and skills to a variety of problems: developing and evaluating medical care delivery systems and educational programs at home and abroad, assisting in the transfer of technological innovations and predicting and measuring their impact; serving as planners, administrators, and advisers for developing programs. The substance of such programs, the utility of anthropological theory and research approaches in solving contemporary problems, and the ethics of professional practice. 5 units (Barnett) not given 1999-2000

208. Models and Imaging in Anthropological Computing—Develop skills in working with digital imagery relevant to anthropology, using ANSI microcomputers. Hands-on seminar in which some specific background information and methodology is made available, and a sharing of skills goes on between participants and instructor. 3 units, any quarter (Rick)

209. Research Methods in Cultural Anthropology—Introduction to basic cultural field methods: interviewing; observation; taking notes; linguistic elicitation; mapping; film, video, digital and tape recording; archival documents and historical materials; questionnaires, surveys, and statistics. The ethnica field research (prefield, field, and postfield); the relationship of methods to research problems and data

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212. Linguistic Anthropology—Seminar on language in its cultural contexts. Topics similar to those in ANSI 4, but reading emphasis is on journal articles rather than monographs.
5 units (Fox) not given 1999-2000

213. Topics in Linguistic Anthropology—Seminar on key issues in the relationships between language and culture. Possible topics: the study of terminological systems (ethnoscience); society, culture, and cognition as reflected in vocabulary; semantic analysis and universals of terminological systems; vocabulary size, abstraction, and the issue of primitiveness in culture; and variation, tropes, and strategy in the use of terminology, with attention to systemic change. Emphasis is on the terminologies of identity (kinship, names, body-parts) and environment (ethnobotany, ethnozoology, ethnomedicine, color).
5 units (Fox) not given 1999-2000

214. Readings in Linguistic Anthropology—Readings and discussion of one or two major (and related) works on language in its cultural context.
1-2 units, Spr (Fox)

219. Linguistic Field Methods—Graduate section; see 119.
5 units, by arrangement (Fox)

220. China for Social Analysts—The analytic constructs for the holistic study of 19th- and 20th-century China. See instructor for reading list.
5 units (Gates) not given 1999-2000

230. Genetics and Modern Human Origins—Graduate seminar focusing on when and where modern humans originated. Did the most recent common ancestors of modern humans exist 1 million or 50,000 years ago? Where did they live, and what other hominid groups existed? Does the available genetic data enable us to distinguish between the competing theories of the origin of modern humans? What kinds of data are necessary for testing these hypotheses? How much can genetic data tell us about our origins? What is the impact of conclusions regarding our origins? Emphasis is on critical reading and discussion of recent literature.
5 units, Aut (Mountain)

232. Human Evolutionary Anatomy—Focus is on the basis for reconstructing the form, adaptation, and life style of prehistoric humans; the interpretation of their skeletal remains. Integrating features: musculature, body size, stance, brain size, organization, activity patterns, sexual dimorphism, and speech potentiality. GER:2a
5 units (Staff) not given 1999-2000

238. Human Evolutionary Systematics—Recent development and debates in the application of evolutionary systematics specifically to the human fossil record; the utility of cladistic vs. phenetic methods, especially at the species and subspecies level; trait definition and conceptualization; and the utility of heterochronic and functional information in phylogenetic reconstruction.
4-5 units (Staff) not given 1999-2000

239. Evolutionary Anthropology: Theory and Methods—The history of evolutionary theory from the 19th century to present, emphasizing anthropological applications. The theory and methods behind classical evolutionary anthropology, unilinear and multilinear evolution, functionalism and neoevolutionism, sociobiology, evolutionary psychology, and dual inheritance theory. Prerequisite: graduate standing or consent of the instructor.
5 units (Durham) not given 1999-2000

240. Stone Tools in Prehistory—Graduate section; see 140. GER:2B
5 units, Spr (Rick)

242. Beginnings of Social Complexity—Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America.
5 units, Win (Rick)

247. Animal Bones for the Archaeologist (Faunal Analysis)—Seminar focuses on the vertebrate skeleton and methods for reconstructing past environments and ecology from assemblages of fossil bones. Emphasis is on how bones from ancient archaeological sites are used to reconstruct their human environments and ecology. Enrollment limited.
5 units (Klein) not given 1999-2000

248. Dating Methods in Archeology and Paleoanthropology—Seminar on the primary geochronological methods used to date archeological and human fossil sites and to calibrate major transitions in human evolution. The fundamental principles of radiometric, paleomagnetic, and thermoluminesence techniques; extensive use of real archaeological samples. Field trips to U.S. Geological Survey and Lawrence Livermore Laboratory. Prerequisite: knowledge of algebra. Recommended: basic chemistry.
5 units (Klein, Bischoff) not given 1999-2000

250. Advanced Ecological Anthropology—Seminar on the role of ecological models in the analysis of culture and social systems. Early efforts linking environments and social systems, such as cultural ecology, multilinear evolution, neo-functionalism, systems ecology. Current theory and research trends, including evolutionary ecology, indigenous resource management, and historical ecology. Case studies: agricultural involution in Java, ritual regulation in New Guinea, demographic change in the Swiss Alps, peasant ecology in Central America, and indigenous resource management in Amazonia.
5 units (Staff) not given 1999-2000

251. Anthropological Solutions to Environmental Problems—The actual and potential role of anthropology in helping solve major environmental problems. Case studies: anthropologists and human rights in Central America; anthropologists and indigenous peoples in Brazilian rainforests; anthropologists and development interests in Indonesia, Australia, and sub-Saharan Africa. Emphasis is on the role of culture and social variables in the design of successful solutions to environmental problems.
5 units (Staff) not given 1999-2000

252. Political Ecology—Seminar on the causes and consequences of environmental degradation in diverse social and ecological settings. Emphasis is on the role of political and economic forces in ecological change, including forces that promote differential access to resources
within and between local populations. Case studies: tropical deforestation, rangeland degradation, soil erosion, drought, and famine.

5 units (Durham) not given 1999-2000

266. Human Evolutionary Ecology—How theories and models from evolutionary ecology can elucidate patterns of human adaptation and behavior. Review of various models from optimal foraging theory; analysis of prey and patch choice, mobility, group size, and subsistence risk. Case studies on human populations living in arctic, tropical, and arid environments.

5 units, Spr (Lu)

267. Social Policy for Sustainable Resource Use—Graduate section; see 167.

5 units, Win (Irvine)

269. Research Methods in Ecological Anthropology—The methods utilized in ecological and environmental anthropology. Topics: survey techniques for agricultural and demographic data, mapping and field measurement, energy flow, time allocation, and transect and quadrant sampling.

5 units (Staff) not given 1999-2000

270. Advanced Medical Anthropology—Students work on a predetermined research problem of their choice in medical anthropology and as it progresses, present their work for supportive discussion and assistance. Prerequisite: 140 or consent of instructor. GER: 3b (DR: 9)

5 units, Win (Barnett)

272. Evolutionary Medicine—Graduate section; see 172.

5 units, Spr (Cronin)

275. The Anthropology of Death and Dying—(Graduate section see 175.)

5 units, Spr (Koenig)

280. Human Evolutionary Genetics—Graduate section; see 180.

4-5 units (Mountain) not given 1999-2000

281. Genes and Human Behavior—Graduate seminar focusing on the extent to which genes have been linked to human behavior. The methods used for inferring a genetic basis of human behavior: primate studies; twin studies; medical research. Emphasis is on critical evaluation of research in this area.

5 units (Mountain) not given 1999-2000


2 term units (Greely, Cox) not given 1999-2000

289. Research Methods in Anthropological Genetics—Graduate section; see 189.

5 units, Spr (Mountain)

290. Graduate Core Seminar—Required of all graduates in residence. Year-long seminar on topics and issues in anthropological sciences. First quarter emphasis is on the current and future research efforts of departmental faculty. Topics for subsequent quarters include: aggression; race, gender, and inequality; anthropology and evolutionary theory; disease; and demography.

1-5 units, Aut, Win, Spr (Staff)

291. The Scientific Process in Anthropology—Graduate seminar on the use of the scientific method in anthropological research. Published papers from various subfields illustrate effective research design, the formulation and testing of hypotheses, and the comparative methods. Field exercises in interviewing, observation, and the taking and use of field notes. The ethics of field research and procedures for maintaining physical and mental health in the field.

5 units, Win (Barnett, Staff)

292. Data Analysis in the Anthropological Sciences—Graduate section; see 192.

5 units, Spr (Klein)


2-3 units, Win, Spr (Mountain)

294. Proposal Writing Seminar—Required of all ANSI Ph.D. students. Hands-on practical training in grant writing methods. Students draft research prospectus based on their own interests and proposed project, and work closely with their advisers and other faculty.

5 units, any quarter (Staff)

295. Research in Anthropological Sciences—Supervised work with an individual faculty member on the student research project. May be taken for more than one quarter.

5 units, any quarter (Staff)

296. Graduate Internship—Provides graduates with the opportunity to pursue their area of specialization in an institutional setting (e.g., laboratory, clinic, research institute, government agency, etc.).

4-5 units, any quarter (Staff)

297. Teaching Assistantship—Supervised experience as assistant in one undergraduate course.

5 units, any quarter (Staff)

298. Dissertation Writing Seminar—Required of all ANSI Ph.D. students. Students work closely with their advisers and committee members to write a draft of their dissertation.

5 units, any quarter (Staff)

299. Directed Individual Study—(Graduate section; see 199.) Opportunity for advanced students to explore special areas of interest.

5 units, any quarter (Staff)

APPLIED PHYSICS

Emeriti: (Professors) Marvin Chodorow, C. Chapin Cutler, Theodore H. Geballe, W. Conyers Herrig, Peter A. Sturrock; (Professors Research) Bertram A. Auld, H. John Shaw, Herman Winick; (Courtesy) Gordon S. Kino, William E. Spicer

Chair: Aharon Kapitulnik (Autumn); Robert L. Byer (Winter, Spring)


Associate Professors: Charles M. Marcus, Zhi-Xun Shen

Assistant Professors: Martin Greven, Kathryn A. Moier

Professor (Research): Helmut Wiedemann

Associate Professor (Research): Martin M. Fejer

Courtesy Professors: Bruce M. Clemens, James S. Harris, Lambertus Hesselink, David A. B. Miller, Douglas D. Osheroff, Shoucheng Zhang

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and natural phenomena. These areas include condensed matter physics, materials physics, biophysics, solid state and quantum electronics, atomic physics and lasers, accelerator physics and synchrotron radiation, and space science and astrophysics. Student research is supervised by the faculty members listed above and also by various members of other departments such as Electrical Engineering, Materials Science and Engineering, Physics and occasionally Biological Sciences, Chemistry, and faculty of the Medical School who are engaged in related research fields. Research activities are carried out in research laboratories and centers on campus and at the Stanford Linear Accelerator Center.

The number of graduate students admitted to Applied Physics is limited. Applications should be received by January 1, 2000. Graduate students normally enter the department only in Autumn Quarter.

UNDERGRADUATE PROGRAM

MINORS

Applied Physics currently does not offer an undergraduate major. The following minor program is intended for undergraduate non-physics science and engineering majors seeking to broaden and deepen their knowledge of modern physics, with an applied flavor. The minor consists of three required 4-unit courses, covering quantum mechanics and statistical physics, and a minimum of three breadth courses. The total number of units required for the minor is not less than 21 units and not more than 36 units.

Required Applied Physics courses are:

<table>
<thead>
<tr>
<th>Course No. &amp; Subject</th>
<th>Units</th>
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<tbody>
<tr>
<td>150. Applied Quantum Mechanics I</td>
<td>4</td>
</tr>
<tr>
<td>151. Applied Quantum Mechanics II</td>
<td>4</td>
</tr>
<tr>
<td>152. Applied Statistical Mechanics</td>
<td>4</td>
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</tbody>
</table>

Breadth Applied Physics courses (choose a minimum of three) are:

<table>
<thead>
<tr>
<th>Course No. &amp; Subject</th>
<th>Units</th>
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<tbody>
<tr>
<td>138. Matlab and Maple for Science and Engineering Applications (Enroll in Computer Science 138)</td>
<td>3</td>
</tr>
<tr>
<td>172. Physics of Solids I (Enroll in Physics 172)</td>
<td>3</td>
</tr>
<tr>
<td>192. Introductory Biophysics</td>
<td>3</td>
</tr>
<tr>
<td>195. Waves and Diffraction in Materials (Enroll in Mat. Sci. &amp; Engr. 195)</td>
<td>4</td>
</tr>
<tr>
<td>196. Scattering Physics</td>
<td>4</td>
</tr>
<tr>
<td>231A. Lasers I (Enroll in Elect. Engr. 231)</td>
<td>3</td>
</tr>
<tr>
<td>231B. Lasers II (Enroll in Elect. Engr. 232)</td>
<td>3</td>
</tr>
</tbody>
</table>

Prerequisites for the minor include the Physics 40 series (or equivalent), the Mathematics 40 series and Mathematics 130 (or equivalents), and preferably Mathematics 103 and 132. Applied Physics 150, 151, and 152 provide an extra one-hour section each week for students who need to develop the necessary mathematical and physical background.

All courses fulfilling the minor must be taken for a letter grade, except when letter grades are not offered. The minor declaration deadline is no later than the last day of the quarter two quarters before the quarter of degree conferral. For example, a student graduating Spring Quarter must declare the minor no later than the last day of Autumn Quarter of the senior year.

GRADUATE PROGRAMS

Admission requirements for graduate work in Applied Physics include a bachelor's degree in physics or an equivalent engineering degree. Students entering the program from an engineering curriculum should normally enter the department only in Autumn Quarter.

MASTER OF SCIENCE

The University’s basic requirements for the master’s degree are discussed in the “Graduate Degrees” section of this bulletin. The minimum requirements for the degree are 36 units, of which at least 30 units must be graduate-level courses in applied physics, engineering, mathematics, and physics. The required program consists of the following:

1. Courses in physics and mathematics to overcome deficiencies, if any, in undergraduate preparation.
2. Basic graduate courses:
   a) Advanced Mechanics—one quarter, 3 units: Physics 210
   b) Electrodynamics—two quarters, 6 units: Physics 220, 221; Electrical Engineering 241, 242
   c) Quantum Mechanics—two quarters, 6 units: Physics 230, 231
3. Additional advanced courses in science and/or engineering, not including Directed Study (Applied Physics 290) or 1-unit seminar courses, to complete the requirement of 36 units.
4. A final overall grade point average (GPA) of 'B' is required for courses used to fulfill degree requirements.

There are no department or University examinations, and a thesis is not required. If a student is admitted to the M.S. program only, but later wishes to change to the Ph.D. program, the student must apply to the department’s Admissions Committee.

DOCTOR OF PHILOSOPHY

The University’s basic requirements for the Ph.D. (residency, dissertation, examination, and so on) are discussed in the “Graduate Degrees” section of this bulletin. The program leading to a Ph.D. in Applied Physics consists of course work, research, qualifying for Ph.D. candidacy, a research progress report, a University oral examination, and a dissertation as follows:

1. Course Work
   a) Courses in physics and mathematics to overcome deficiencies, if any, in undergraduate preparation.
   b) Basic graduate courses*:
      1) Advanced Mechanics—one quarter: Physics 210
      2) Statistical Physics—one quarter: Physics 212
      3) Electrodynamics—two quarters: Physics 220, 221; Electrical Engineering 241, 242
      4) Quantum Mechanics—two quarters: Physics 230, 231
      5) Laboratory—one quarter: Applied Physics 207, 208, 304, 305; Electrical Engineering 357, 410; Physics 201, 202, 203, 301; Materials Science and Engineering 171, 171, 172, 173
   c) 18 units of additional advanced courses in science and/or engineering, not including Directed Study (Applied Physics 290), Dissertation Research (Applied Physics 390), and 1-unit seminar courses.
   d) A final average overall GPA of 'B' is required for courses used to fulfill degree requirements.
   e) Students are normally expected to complete the specified course requirements by the end of their third year of graduate study.

2. Research: may be conducted under the supervision of a member of the Applied Physics faculty or an appropriate faculty from other departments.

3. Ph.D. Candidacy: satisfactory progress in academic and research work, together with passing the Ph.D. Candidacy Qualifying Examination, qualifies the student to apply for Ph.D. candidacy which must be completed before the third year of graduate registration. The examination consists of a seminar on a suitable subject delivered by the student before the faculty academic adviser (or an approved substitute) and two other members of the faculty selected by the department.

4. Research Progress Report: normally before the end of the Winter Quarter of the fourth year inclusive of pertinent graduate study prior to Stanford, the student arranges to give an oral research progress report of approximately 30 minutes, of which a minimum of 10 minutes should be devoted to questions from the Ph.D. reading committee.

5. University Ph.D. Oral Examination: consists of a public seminar in defense of the dissertation, followed by private questioning of the candidate by the University examining committee.

6. Dissertation: must be approved and signed by the Ph.D. reading committee.

* Requirements for item 1b may be totally or partly satisfied with equivalent courses taken elsewhere, pending the approval of the Graduate Study Committee.

ASSISTANTSHIPS

Research assistantships are available for Ph.D. candidates. Information on applying for financial aid is included in the admission packet received from Graduate Admissions, the Registrar’s Office.
COURSES

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

79Q. Stanford Introductory Dialogue: Science-based Energy Technologies—The Pros and Cons—Preference to sophomores. The tradeoffs involved in various scenarios being considered for meeting energy and transportation needs in the next century; the underlying scientific principles; possibilities for reducing the present day less-than-optimum use of energy and materials considering, e.g., automotive transport, electrical power technology, and urban ecology; what we know and don’t know about global warming.

2 units, Aut (Geballe)

138. Matlab and Maple for Science and Engineering Applications—(Enroll in Computer Science 138.)

4 units, Win (Moler)

150. Applied Quantum Mechanics I—For undergraduates; see 222. Prerequisites: Physics 45 and 47, or Physics 65, or equivalents.

4 units, Aut (Harrison)

151. Applied Quantum Mechanics II—For undergraduates; see 223. Prerequisite: 150.

4 units, Win (Harrison)

152. Applied Statistical Mechanics—For undergraduates; see 224.

4 units, Spr (Yamamoto)

172. Physics of Solids I—(Enroll in Physics 172.)

3 units, Spr (Shen)


3 units, Spr (Doniach)

195. Waves and Diffraction in Solids—(Enroll in Materials Science and Engineering 195.)

4 units, Win (Clemens)

196. Scattering Physics—For undergraduates; see 218. Prerequisites: 150, 151, and Physics 172 or equivalent.

4 units, Spr (Greven)

198. Introduction to Synchrotron Radiation—For students using such radiation for basic and applied research and students in accelerator physics concentrating on source developments and the study of particle beam characteristics and stability. Electromagnetic radiation from relativistic electron beams, derived from first principles. Coherent and incoherent synchrotron radiation, free electron lasers; undulator and wiggler radiation with linear and elliptical polarization. Recommended: electromagnetism, optics, and special relativity.

3 units, alternate years, given 2000-01


207. 3 units, Win (Fox)

208. 3 units, alternate years, given 2000-01

210. Advanced Particle Mechanics—(Enroll in Physics 210.)

3 units, Aut (Fetter)

212. Statistical Mechanics—(Enroll in Physics 212.)

3 units, Spr (Willick)

215. Numerical Methods for Physicists and Engineers—Review of basic numerical techniques with additional advanced material: derivatives and integrals; linear algebra; linear least squares fitting, FFT and wavelets, singular value decomposition, linear prediction; optimization, nonlinear least squares, maximum entropy methods; deterministic and stochastic differential equations, Monte Carlo methods.

3 units, Win (Doniach) alternate years, not given 2000-01


3 units

217. Waves and Diffraction in Solids—(Enroll in Materials Science and Engineering 205.)

3 units, Win (Clemens)

218. Scattering Physics—Introduction to scattering techniques, including neutron, x-ray, and light scattering. Probing of phase transitions and excitations in condensed matter. Emphasis is on magnetic scattering from experimental model systems and from novel materials. Topics: low-dimensional magnets, e.g., Heisenberg chains and planes; and magnetic fluctuations in high-temperature superconductors. "Global" scattering probes are contrasted with "local" probes, e.g., nuclear magnetic resonance (NMR) and muon spin resonance (muSR). Prerequisites: 150, 151, and Physics 172 or equivalent.

3 units, Spr (Greven)


3 units, Aut (Chu)

220,221. Classical Electrodynamics—(Enroll in Physics 220, 221.)

220. 3 units, Win (Whittum)

221. 3 units, Spr (Whittum)

222. Applied Quantum Mechanics I—Two-quarter sequence provides a foundation in quantum mechanics for condensed matter physics, solid state electronics, and quantum optics. Basic theory; electronic structure of atoms, molecules, and solids; quantum transitions and the Golden...
Rule; tunneling; statistical physics, transport, and noise. Prerequisites: Physics 45 and 47, or Physics 65, or equivalents.

3 units, Aut (Harrison)

232. Applied Quantum Mechanics II—Energy bands and carrier dynamics, vibrations and the electron-phonon interaction; annihilation and creation operators, phonons, photons and lasers; coherent states, Coulomb effects, angular momentum and spin, shake-off excitations, mesoscopic systems. Prerequisite: 222.

3 units, Win (Yamamoto)


3 units, Spr (Yamamoto)

230A, B. Quantum Mechanics—(Enroll in Physics 230, 231.)
230A. 3 units, Aut (Shenker)
230B. 3 units, Win (Shenker)

231A, B. Lasers I and II—(Enroll in Electrical Engineering 231, 232.)
231A. 3 units, Aut (Solgaard)
231B. 3 units, Spr (Siegmam)

3 units, Aut (Yamamoto)

268. Introduction to Modern Optics—(Enroll in Electrical Engineering 268.)
3 units, Aut (Hesselink) alternate years, not given 2000-01

272, 273, 274. Solid State Physics—Topics to be announced.
3 units (Staff) alternate years, given 2000-01

290. Directed Studies in Applied Physics—Special studies under the direction of a faculty member for which academic credit may properly be allowed. May include lab work or directed reading.
Any quarter (Staff)

291. Practical Training—Opportunity for practical training in industrial labs. Arranged by student with the research adviser’s approval. A brief summary of activities is required, approved by the research adviser.
3 units, Sum (Staff)

301. Astrophysics Laboratory—(Enroll in Physics 301.)
3 units, Sum (Walker)

304. Lasers Laboratory—Laser theory and practice. Lectures on the theoretical and descriptive background for lab experiments, detectors and noise, lasers (helium neon, beams and resonators, argon ion, cw dye, titanium sapphire, semiconductor diode, and the Nd:YAG). Measurements of laser threshold, gain, saturation, and output power levels. Laser transverse and axial modes, linewidth, and tuning, Q-switching and modelocking. Limited enrollment. Prerequisites: Electrical Engineering 231 and 232, or consent of instructor.
3 units (Byer) given 2000-01

305. Nonlinear Optics Laboratory—Emphasis is on laser interaction with matter. The laser devices provide the radiation required to explore the linear and nonlinear properties of matter. Experiments on modulation, harmonic generation, parametric oscillators, modelocking, stimulated Raman and Brillouin scattering, Coherent Anti-Stokes scattering, other four wave mixing interactions such as wavefront conjugation and optical bistability. Optical pumping and spectroscopy of atomic and molecular species. Limited enrollment. Prerequisites: 304, Electrical Engineering 231 and 232, or consent of instructor.
3 units (Byer) given 2000-01

320. Quantum Optics and Selected Topics in Atomic Physics—(Enroll in Physics 320.)
3 units

321. Laser Spectroscopy—(Enroll in Physics 321.)
3 units

324. Introduction to Accelerator Physics—Introduction to basic accelerator physics in linear and circular accelerators. Topics: acceleration, phase stability, transfer matrices, beam envelopes, emittance, and the effects of synchrotron radiation. Topics of current research, including nonlinearities and instabilities.
3 units, Aut (Siemann) alternate years, not given 2000-01

346. Introduction to Nonlinear Optics—(Enroll in Electrical Engineering 346.)
3 units, Spr (S. Harris)

366. Introduction to Fourier Optics—(Enroll in Electrical Engineering 366.)
3 units, alternate years, given 2000-01

370. Theory of Many-Particle Systems—(Enroll in Physics 370.)
3 units

3 units, Aut (Zhang) alternate years, not given 2000-01

3 units, Win (Zhang) alternate years, not given 2000-2001

374. Condensed Matter Theory III—Special topics to be announced. Prerequisites: 372, 373.
3 units (Staff) alternate years, given 2000-01

376. Superfluidity and Superconductivity—(Enroll in Physics 376.)
3 units

3 units, Aut (Harris) alternate years, not given 2000-01

3 units, Win (Yamamoto) alternate years, not given 2000-01
Discussions of current topics in condensed matter physics. Content varies each quarter, depending on the interests of staff and students. Course may be repeated. Offered occasionally.

**470. Condensed Matter Seminar**
Weekly presentations and discussions of current research topics in condensed matter physics, critique each seminar for success in oral communication, and present a one-hour seminar on a contemporary topic for critique by the class. Corequisite: 470.
1 unit, Aut (Kapitulnik)

**473A. Electronic Structure**
Bond orbitals and the electronic structure of covalent solids. Universal tight-binding parameters and the prediction of the bonding and dielectric properties of semiconductors. Ionic solids and the bonding and dielectric properties of insulators. Theory of silicon dioxide and related compounds and their properties. Transition metals and their compounds. Prerequisites: elementary quantum theory and preferably undergraduate solid state physics.
3 units, Spr (Harrison)

**ART AND ART HISTORY**
Emeriti: (Professors) Keith Boyle, Lorenz Eltner, John LaPlante, Frank Lobdell, Dwight C. Miller, Nathan Oliveira, Michael Sullivan
Interim Chair: Wanda M. Corn
Director of Studio Art Program: Kristina Branch
Principal Adviser to Undergraduate Studio Majors: Kristina Branch
Principal Adviser to Undergraduate Art History Majors: Jody Maxmin
Director of Graduate Studies in Studio Art: David Hannah
 Directors of Graduate Studies in Art History: Leah Dickerman, Pamela Lee
Professors: Wanda M. Corn (American Art), Elliot Eisner (Art Education), David Hannah (Painting), Matthew S. Kahn (Design, on leave Spring) Suzanne Lewis (Medieval Art, on leave Autumn), Richard Randell (Sculpture), Paul V. Turner (Architectural History)
Associate Professors: Kristina Branch (Painting/Drawing), Michael Martinian (18th-19th century European Art), Jody Maxmin (Ancient Art), Melinda Takeuchi (Japanese Art), Richard Vinograd (Chinese Art, on leave 1999-2000)
Assistant Professors: Paolo Berdini (Renaissance Art), Scott Bukatman (Film Studies), Enrique Chagoya (Painting/Drawing, on leave Autumn), Leah Dickerman (Modern Art), Pamela Lee (Contemporary Art), Alexander Nemirov (American Art, on leave Autumn)
Acting Assistant Professor: Mark B. N. Hansen
Affiliated Professor: John H. Merryman (Art and Art History, Law)
Senior Lecturer: Joel Leivick (Photography)
Lecturers: Kevin Bean, Jason Francisco, Carolyn Kastner, Ellen H. Spitz

The department offers courses of study in: (1) the history of art, and (2) the practice of art (studio), with major concentrations in painting and drawing, sculpture, design, and photography. The undergraduate program of the department is designed to introduce students to the humanistic study of the visual arts. The courses are intended to increase an understanding of the meaning and purpose of the arts, their historical development, their role in society, and their relationship to other humanistic disciplines such as literature, music, and philosophy. The work in classroom and studio is designed to intensify visual perception of the formal and expressive means of art and to encourage insight into a variety of technical processes.

The Iris and B. Gerald Cantor Center for Visual Arts at Stanford University (opening January 1999) is a major resource for the department. The center offers a 22,000 object collection on view in rotating installations in 18 galleries and the Rodin Sculpture Garden, and a diverse schedule of special exhibitions, educational programs, and events. Through collaborations with the teaching program, student internships, and a range of student activities, the center provides a rich resource for Stanford students.
PROGRAMS OF STUDY

Undergraduates may major in History of Art or the Practice of Art (Studio). A freshman or sophomore intending to major in one of these areas must consult with an adviser appointed by the department to plan his or her course of study.

Graduate programs are offered in History of Art and Practice of Art Studio, including Product Design.

HISTORY OF ART

BACHELOR OF ARTS

The major program in the History of Art must include the following:

1. Two courses from Art and Art History 1, 2, 3.
2. Forty units in art history courses, of which at least 32 must be at or above the 100 level, including one seminar and one other seminar or colloquium. To ensure that majors have a broad foundation in art history, they are required to take 40 units in at least five of the eight following areas: ancient, medieval, renaissance/baroque, early modern, modern/contemporary, American, architecture, and Asian. This distribution still permits the student to take several courses in an area of particular interest.
3. Total units: 50. All required course work, including collateral requirements, must be taken for a grade; they may not be taken satisfactory/ no credit. University units earned by placement tests or advanced placement work in secondary school are not counted within the 50 units. 
4. Collateral Requirements:
   a) Each undergraduate major in the History of Art takes at least one university year of a foreign language or presents proof of reading ability in a foreign language. Students who intend to apply to graduate school in art history should become proficient in a German and either French or Italian because these are required by most major schools in art history. Students who intend to apply to graduate school in Asian art should take the appropriate Asian language.
   b) Each undergraduate major takes two upper-division courses in other departments that relate to his or her work in art history. Students should discuss the choice of these courses with their advisers as early as possible. The adviser must approve the collateral courses before the student registers for them.
   c) Each undergraduate major shall attend an Art library orientation session. Majors are to consult with the Art library staff for scheduling information.
5. Undergraduate majors planning to take courses at an overseas campus must have each course approved by their adviser prior to leaving for the overseas campus.
6. Art majors are required to meet with both their adviser and the undergraduate curriculum adviser during the first two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements.
7. Recommended courses (but which do not count towards the major): Art and Art History 40, 50, or 53 and 70.

MINORS

A student declaring a minor in Art History must complete 25 units of course work in one of the following four tracks: Open, Modern, Asian, or Architecture. Upon declaring the minor, students are assigned to an adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student’s departmental file. Only one class may be taken for credit outside of the Stanford campus (this includes the Stanford Overseas Programs).

Requirements for the Open Track: Art and Art History 1 plus five lecture courses, colloquia, or seminars in any field.

Requirements for the Modern Track: Art and Art History 1 plus five upper-level lecture courses, colloquia, or seminars in any aspect of 19th– and 20th-century art.

Requirements for the Asian Track: Art and Art History 2 plus five lecture courses, colloquia, or seminars in Asian art. (Art and Art History 1 may be one of the five courses.)

Requirements for the Architecture Track: Art and Art History 3 plus five lecture courses, colloquia, or seminars in architectural history. (Art and Art History 1 may be one of the five courses.)

HONORS PROGRAM

Art History majors wishing to undertake an individually supervised study in addition to the regular requirements of the major may apply for admission to the honors program. Candidates must have a 3.5 grade-point average (GPA) both in the major and overall.

Once a faculty member in Art History agrees to serve as thesis adviser, the candidate submits to the entire Art History faculty a thesis proposal of approximately five pages and a completed paper demonstrating the candidate’s writing ability and intellectual capacity. Submissions must be made no later than the third week of the Spring Quarter of the junior year. A majority of the faculty must approve the admission of the candidate to the honors program. The student must find two faculty members willing to serve, along with the adviser, as readers of the thesis; at least one of these additional readers must be a member of the Art History faculty. The thesis adviser must be in residence at Stanford during the student’s senior year. While working on the honors thesis, the student may register for up to 8 units of Art and Art History 240 (Individual Work: Art History); these are in addition to the units required for the major.

The completed thesis must be submitted to the three readers no later than the second week of the student’s final quarter of course work. The thesis adviser assigns a grade to the work. The approval of all three readers is required for the thesis to qualify for honors.

MASTER OF ARTS

The Department of Art and Art History offers A.M. and Ph.D. degrees. The A.M. is granted as a step toward fulfilling requirements for the Ph.D. The department does not admit students who wish to work only toward the A.M. degree.

The University’s basic requirements for the master’s degree are set forth in the "Graduate Degrees" section of this bulletin.

Completing the University’s requirements for an A.B. degree in the History of Art, or equivalent training, is required of students entering a program of study for the A.M. The required curriculum for entering students is determined by the Director of Graduate Studies through an evaluation of transcripts and records during an individual meeting scheduled with each student prior to the opening of Autumn Quarter to discuss course deficiencies.

Requirements for the Degree—The requirements for the A.M. degree in the History of Art are:
1. Residence: completing a minimum of three full-tuition quarters or the equivalent in partial-tuition quarters of graduate registration.
2. Units: completing a total of at least 36 units of graduate work in the history of art in courses at the 200 level, including a seminar in art historiography/visual theory.
3. Languages: reading knowledge of two foreign languages, preferably German and French or Italian. Students in Chinese and Japanese art are ordinarily expected to demonstrate reading competence in modern and classical Chinese or Japanese depending on the student’s area of focus. Final determination is made in consultation with the student’s primary adviser.
4. Papers: submission for consideration by the faculty of two term papers from among those written during the year.
5. Area Coverage: demonstration to the faculty, by course work and/or examination, that the student has adequate knowledge of the major areas of the history of art.

DOCTOR OF PHILOSOPHY

The University’s basic requirements for the Ph.D. degree are set forth in the "Graduate Degrees" section of this bulletin. The following are departmental requirements:
**Residence**—To be eligible for the doctoral degree, the student must complete three years of full-time graduate work in the history of art, at least two years of which must be in residence at Stanford.

**Unit Requirements**—The student must complete at least 99 units of course work with a minimum of 63 units in Art History.

**Collateral Studies**—The student is required to take at least three courses in supporting fields of study (such as anthropology, classics, history, literature, or philosophy), determined in consultation with the department advisers.

**Graduate Student Teaching**—As a required part of their training, all graduate students in Art History, regardless of their source of funding, must participate in the department’s teaching program. At least two one-quarter assignments in Art and Art History 1, 2, or 3 are required. Teaching students must register for the Seminar in Teaching Praxis (Art and Art History 295). Students receiving financial aid are required to serve as a teaching assistant for four quarters. Further opportunities for teaching may be available.

**Admission to Candidacy**—A graduate student’s progress is formally reviewed during Spring Quarter of the second year. The applicant for candidacy must complete the requirements governing the A.M. program in the History of Art (see above), and at least an additional 18-24 units by the end of Winter Quarter of the second year. The graduate student does not become a formal candidate for the Ph.D. degree until he or she has fully satisfied these requirements and has been accepted as a candidate by the department.

**Dissertation Proposal**—By the end of the third year, dissertation subjects should be chosen and the proposal written in consultation with the candidate’s adviser. The student forms a Reading Committee consisting of the principal adviser and two other readers. The proposal is submitted to the art history faculty for comments. The student then meets with the Reading Committee to discuss the proposal and faculty comments no later than 30 days after the submission of the proposal, at which time necessary revisions are determined. The proposal is submitted to the adviser for final approval.

**Area Core Requirements**—Every graduate student must participate in at least one 4-unit graded directed reading course or colloquium to acquire and demonstrate a command of current issues in a field. The course results in an examination or an appropriate paper. The student and the student’s adviser, or other suitable faculty member(s), agree on a format. If the number of students in a given field permits, this course may be offered as a colloquium.

**Dissertation**—A member of the faculty acts as the student’s dissertation adviser and as chair of the Reading Committee. The final draft of the dissertation must be in the adviser’s hands at least four weeks before the University deadline in the quarter during which the candidate expects to receive the degree. The dissertation must be completed within five years from the date of the student’s admission to the candidacy for the Ph.D. degree. A candidate taking more than five years must apply for an extension of candidacy.

**Oral Examination**—The student forms an Oral Defense Committee (see University guidelines). The oral examination consists mainly of a defense of the dissertation but may range, at the committee’s discretion, over a wider field. The student is required to discuss research methods and findings at some length and to answer all questions and criticisms put by members of the examining committee. Changes, resulting from the committee’s criticism of the manuscript and subsequent examination of the student’s research during the orals, must be incorporated by the student into the final draft of the dissertation for submission to the department as the final requirement for the granting of the Ph.D. degree in History of Art.

**Ph.D. MINOR**

For a minor in History of Art, a candidate is required to complete 24 units of graduate-level art history courses (200 level or above), in consultation with a department adviser.

**JOINT PH.D. IN ART HISTORY AND HUMANITIES**

The department participates in the Graduate Program in Humanities, leading to the joint Ph.D. in Art History and Humanities. For a description of this program, see the "Interdisciplinary Studies in Humanities" section of this bulletin.

**PRACTICE OF ART (STUDIO)**

**BACHELOR OF ARTS**

The studio program is designed to develop in-depth skills in more than one area. It emphasizes the expressive potential of an integration of media, often via a cross-disciplinary, interactive path. Through collaboration and connections with scientists, engineers, and humanities scholars, the program addresses a breadth of topical and artistic concerns central to a vital undergraduate education.

Medium-based courses in drawing, sculpture, painting, photography, and digital art, along with a basic design course, introduce students to visual fundamentals. The student is required to take courses at Level 1 before moving to the intermediate Level 2 where investigations of content are emphasized. At this level, the student focuses on a range of subject matter from historical motifs (figure, still life, landscape) to contemporary ideas in design. After fulfilling Level 2 requirements, the student selects courses at Level 3, which feature combined practices. Level 3 courses are designed to stretch the student’s understanding of materials and techniques. Experimental and challenging in nature, these courses cross area boundaries. Level 4 courses comprise a senior capstone experience. The Advanced Undergraduate Seminar emphasizes the investigation of visual concepts interpreted by a single medium, by cross-practices, or by collaboration among students working in a variety of materials. This seminar gives the student an opportunity to be exposed to the work of other majors in a critique-based forum directed by a visiting artist or critic. Advanced courses with a particular focus such as design, photography, or painting are offered on a rotational basis. Independent study supervised by a member of the permanent faculty is also available to the advanced student.

Students are encouraged to move through the requirements for the major in the sequence outlined. Levels 1, 2, 3, and 4 describe a sequence of course choices, not to be confused with the years freshman, sophomore, junior, and senior. Students are exposed to a range of practices early in their development in order to have a good basis of comparison if they choose to concentrate on a particular medium. This sequence of courses also broadens the students’ skills and enables them to combine materials and methods. The major program in the Practice of Art (Studio) must total 65 units.

The major program in the Practice of Art (Studio) must include the following:

1. Four Level 1 course from Art and Art History 50, 60, 70, 140, 145, 173 (12-13 units). Two courses to be completed before moving to Level 2.
2. Two Level 2 courses from Art and Art History 141, 146, 160, 170, 175 (6 units). To be completed before taking Level 3 courses.
3. Two to three Level 3 courses from Art and Art History 148, 149, 152, 169, 172, 174, 175A, 176, 271 (6-9 units). To be completed before taking Level 4 courses.
4. Two to three Level 4 courses from Art and Art History 142, 147, 153, 175B, 248, 249, 266, 269, 270 (6-9 units).
5. Five art history courses (21 units). Art and Art History 1, to be taken as the basic course, followed by four additional courses. At least one of the courses must be in the modern art series (Art and Art History 120A through 123A).
6. Electives, any level (7-11 units). As many as 6 elective units may be earned from workshops, internships, and independent study projects, supervised by a member of the permanent faculty. All units must be approved by the adviser prior to taking the workshop, internship, or independent study.
7. Total units: 65. All required course work must be taken for a letter grade; courses may not be taken satisfactory/no credit. University units earned by placement tests or advanced placement work in secondary school are not counted within the 65 units.
8. Majors are required to spend one quarter or summer pursuing studio interests at a site off campus. This requirement may be fulfilled in a number of ways including, but not limited to, Overseas Studies Programs, independent study sponsored by URO grants, the Haas Center, and so on. Students must meet with the Director of the Studio Art Program to discuss how the requirement will be met.

9. Each undergraduate major is required to attend an Art Library orientation session. Majors are to consult with the Art Library staff for scheduling information.

10. Studio majors are required to meet with both their adviser and the department’s undergraduate curriculum adviser during the first two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements. The adviser’s role is important both in regard to guiding the student’s decisions within the program as well as in discussing plans for summer study and graduate work. An adviser is chosen by the student or assigned by the department.

Transfer Credit Evaluation—Upon declaring a Studio Art major, a student transferring from another school must have his or her work evaluated by a Department of Art and Art History adviser. A maximum of 13 transfer units are applied toward the 65 total units required for the Studio Art major. A student wishing to have more than 13 units applied toward the major must submit a petition to the adviser and then have his or her work reviewed by a studio committee.

MINORS

The minor program in the Practice of Art (Studio) must include the following:

1. Two Level 1 courses from Art and Art History 50, 60, 70, 140, 145, 173 (6-7 units) before taking Level 2 courses.

2. Two Level 2 courses from Art and Art History 141, 146, 160, 170, 175 (6 units) before taking Level 3 courses.

3. Two Level 3 and/or Level 4 courses from Art and Art History 142, 147, 148, 149, 152, 153, 169, 172, 174, 175A, 175B, 176, 248, 249, 268, 269, 270, 271 (6 units).

4. Four art history courses, including Art and Art History 1 and one course from the modern art series, Art and Art History 120A through 123B (13 units).

5. Total units: 31. All required course work must be taken for a letter grade; courses may not be taken satisfactory/no credit. University units earned by placement tests or advanced placement work in secondary school are not counted within the 31 units.

6. Each undergraduate minor is required to attend an Art Library orientation session. Minors are to consult with the Art Library staff for scheduling information.

7. Minors are required to meet with both their adviser and the department’s undergraduate curriculum adviser during the first two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements.

OVERSEAS CAMPUS CREDIT FOR STUDIO ART COURSES

A minimum of 52 of the 65 units required for the studio art major and a minimum of 21 of the 31 units required for the studio art minor must be taken at the Stanford campus. In all cases, a student should meet with his or her adviser before planning an overseas campus program.

MASTER OF FINE ARTS

Programs for the M.F.A. degree are offered in painting, sculpture, new genres, photography, and product or graphic design.

Graduate Program in Painting, Sculpture, New Genres, and Photography—The program provides a rigorous and demanding course of study designed to challenge and encourage advanced students. Participants are chosen for the program on the basis of work that indicates artistic individuality, achievement, and promise. Candidates should embody the intellectual curiosity and broad interests appropriate to, and best served by, work and study within a university context.
either an undergraduate degree or at least three years of independent studio practice.

2. Portfolio Specifications: twelve slides or photographs of creative work. All slides must be labeled with the applicant’s name. If a carousel is sent, an accompanying slide list must be included indicating the size, date, and medium of each work; otherwise, slides should be labeled with the same information and sent in the standard cardboard box received from processing. If applicants want portfolios returned, a stamped, self-addressed container must be included.

Requirements for the Degree—The requirements for the M.F.A. degree with a specialization in design are:

1. Completing a minimum of two years (six quarters) of graduate work in residence or its equivalent at Stanford.
2. Completing in the first year 54 units of course work chosen in consultation with an adviser. At least 18 of the 54 units must be in Art and Art History 360A,B,C and Mechanical Engineering 211A,B,C.
3. Participating in a weekly seminar in which their work is criticized and discussed in detail.
4. As a part of their training for the M.F.A. degree, all students, regardless of their source of funding, are required to assist with the department’s teaching program for a minimum of eight hours per week over the period of six quarters; the percentage of work assigned in a given quarter is at the department’s convenience.

Graduate students must remain in residence at Stanford for the duration of the program.

ART EDUCATION

Information concerning the A.M. in Teaching, Doctor of Education, Ph.D. in Education, and Teaching Credential (Single Subject-Secondary) degrees and programs may be secured from the Office of the Dean of the School of Education.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

HISTORY OF ART

BASIC

1. Introduction to the Visual Arts—Introduction to the critical problems of understanding, analyzing, and writing about the visual arts. Approach is multicultural and topical rather than historical. Discussion sections. GER:3a (DR:7) (WIM)
   5 units, Aut (Marrinan)
   Spr (Nemerov)

2. Ideas and Forms in Asian Art—The religious and philosophical ideas and social attitudes of India, China, and Japan and how they are expressed in the architecture, painting, woodblock prints and sculpture, and in such forms as garden design and urban planning. Discussion sections. GER:3a, 4a (DR:2 or 7) (WIM)
   5 units, Win (Takeuchi)

3. Introduction to the History of Architecture—Selective survey of architecture from antiquity to the 20th century; mostly Western with some non-Western topics. For each period, specific buildings and general principles relevant to the study of architecture are examined. Discussion sections. GER:3a (DR:7) (WIM)
   5 units, Win (Turner)

11. Introduction to Ancient Art—Survey of the arts of Greece and Rome, emphasizing architecture, sculpture, and painting, and the broader cultural context in which they flourished.
   4 units (Maxmin) not given 1999-2000

12. Theme and Style in Japanese Art—Selected monuments of traditional Japanese architecture, sculpture, garden design, painting, and pots are presented in a chronological framework representing the intersection of art and society from protohistoric times through the early 19th century.
   4 units (Takeuchi) not given 1999-2000

13. Introduction to Chinese Art—Topics in Chinese art from the Neolithic to the 20th century. Emphasis is on recent archaeological discoveries, newly published material, and current issues of understanding and interpretation.
   4 units (Vinograd) not given 1999-2000

INTERMEDIATE

100A/200A. Archaic Greek Art—(Same as Classics 100A.) The development of Greek art from Protogeometric beginnings to the decade preceding the age of Pericles. GER:3a (DR:7)
   4 units, Aut (Maxmin)

100B/200B. Classical and Hellenistic Greek Art—The formation in 5th-century Athens, of the classical ideal and its development and diffusion in the centuries that followed. GER:3a (DR:7)
   4 units, Win (Maxmin)

100C/200C. Roman Art—(Same as Classics 100C.) Introduction to the rich and varied art and architecture of Rome from the Etruscans to the Late Empire. GER:3a (DR:7)
   4 units (Maxmin) not given 1999-2000

102/202. Greek Painting—Introduction to the study and appreciation of Greek vases and their painters, especially the masters of Athenian black- and red-figure who flourished in the culturally rich and volatile era of the tyrant Peisistratos and his sons.
   4 units (Maxmin) not given 1999-2000

105/205. Sites and Images of Power in 12th-Century Europe—Romanesque art and architecture in Western Europe from c. 1095 to 1200. Structuring a new visual discourse to shape and respond to experiences of political, spiritual, and intellectual expansion—Crusade, pilgrimage, and new learning in the schools. How spatial environments were built and systems of visual discourse were designed within the ideological contexts generated by monastic and feudal institutions in centers such as Cluny, Citeaux, Moissac, Mont Saint-Michel, Vézelay, Winchester, Canterbury, Durham, Santiago de Compostela, and Montreale. GER:3a (DR:7)
   4 units, Spr (Lewis)

107/207. Age of Cathedrals—Gothic art and architecture in Western Europe from c. 1150 to 1300. Structuring a "modern" visual discourse within the ideological framework of a new monarchical Church and State, emerging towns and universities, the rise of literacy, the cultivation of the self, and the consequent shifts in patterns of art patronage, practices, and reception in Chartres, Paris, Bourges, Strasbourg, Canterbury, London, Oxford, and Cambridge.
   4 units (Lewis) not given 1999-2000

108/208. Late Medieval "Realism": 15th-Century French and Netherlandish Painting—Restructuring representation and reception in the art of the Limbourg brothers, Van Eyck, Van der Weyden, Van der Goes, Fouquet, and Bosch. The shift from court patronage to entreprenuerial art markets; the new status of the image, artist, viewer, and self; and the problematical premodern context of the end of the Middle Ages.
   4 units (Lewis) not given 1999-2000

109/209. Apocalypse: Reading Medieval Images—Focus is on the multilayered relationships between textual images and their readers in medieval illuminated Apocalypse manuscripts, and how their production and dissemination provided critical cultural mechanisms for the creation of new technologies of the self. Within this framework of subjectivity, medieval theories of vision invested images with the power to articulate and activate dominant ideological positions regarding the self, society, and the "other." The medieval Apocalypse became a
powerful paradigm for the definition of such problematic medieval experiences as the Crusades, anti-Judaism, and expectations of the world's end.

4 units (Lewis) not given 1999-2000

110A/210A. Early Renaissance Painting, 1400-1490—Survey of 15th-century painting in light of the artistic practices and cultural attitudes that characterized the visual culture of Florence. The circumstances of patronage, secular and religious, offers the framework through which artistic episodes of Renaissance imagery, from the revivial of antiquity to Christian neo-Platonism, find historical explanation. Works by Masaccio, Masolino, Beato Angelico, Filippo Lippi, Paolo Uccello, Ghirlandaio, Piero di Soximo, Mantegna, Piero della Francesca, Botticelli, and Leonardo.

4 units (Berdini) not given 1999-2000

110B/210B. High Renaissance Painting, 1490-1570—Survey of 16th-century painting in light of notions of classicism as practiced in Rome, Tuscany, and Emilia. A visual ideology is aimed at producing a "mutual supplementation between viewing nature and forming ideas." Renaissance classicism was a novel attitude towards art, and identified the world of ideas with a world of heightened realities. Works by Leonardo; Michelangelo; Raphael and his school, Andrea del Sarto, Pontormo, Rosso, Bronzino, Correggio, and Parmigianino.

4 units (Berdini) not given 1999-2000

110C/210C. Renaissance Architecture, 1420-1580—Established first in Florence with Brunelleschi's buildings and Alberti's theory, Renaissance architecture produced a variety of typological and decorative innovations throughout Italy. Circumstances of patronage and context, physical or cultural, are examined to address the formal and iconographical novelties of a highly theoretical architecture. Context and theory are the privileged criteria according to which works by Brunelleschi, Michelozzo, Francesco di Giorgio, Bramante, Peruzzi, Raphael, Sangallo, Giulio Romano, Michelangelo, Alessi, Sansmicheli, Sansovino, Palladio and Vignola are studied.

4 units (Berdini) not given 1999-2000

110D/210D. The Venetian Renaissance—Venetian painting of the Renaissance in light of the exchange between center and periphery that characterizes Venice's visual culture. After the acquisition of land dominions, the terraferma, in the first half of the 15th century, Venice, the center, promoted forms of interaction (social, political, and cultural) among the diverse regions of the periphery. By renewing, absorbing, and valorizing the characteristics of the local schools of painting, Venice realized its own Renaissance. The pictorial genre of the pastoral is a typical reception between the urban center and the agrarian periphery. Focus is on the works of Carpaccio, Bellini, Giorgione, Savoldo, Lotto, Titian, Veronese, Bassano, and Tintoretto. GER: 3a (DR-7)

4 units, Win (Berdini)

110E/210E. The Bauhaus—The Bauhaus was an artistic idea, a school, and a social project. Its original curriculum was conceived by architect Walter Gropius in Weimar, Germany, at a time when architecture, painting, sculpture, and the applied arts were theorized and practiced under a common aesthetic and social agenda. Throughout its brief, intense life (1919-1933), the Bauhaus promoted a variety of artistic experiences that explored in different media the relationship between form and technique. Avant-garde and institutional, the Bauhaus constructed a unique visual culture of modernity grounded in experiment and rationality. The pedagogic principles, artistic theory, and practical activity of the school's individual laboratories (architecture, design, photography, graphics, tapestry).

4 units (Berdini) not given 1999-2000

111/211. Baroque Painting—The visual culture of Italy, France, and Spain, 1590 to 1660, focusing on the works and legacies of Carracci, Caravaggio, Guercino, Guido Reni, Poussin, and Velasquez. Theoretical issues (e.g., Naturalism). Emphasis is on what constitutes a Baroque image and what are the conditions of its beholding.

4 units (Berdini) not given 1999-2000

111A/211A. Renaissance Women—The ways in which models of feminine beauty were constructed and processed in the literary and visual culture of the Renaissance. Whether, in the guise of goddesses, courtiers, or others, the feminine image partook of a discursive arena in which its social, mythological, and erotic valencies required readers and beholders to evolve new forms of response. Reception theory and gender studies offer the theoretical framework for discussing artistic forms from Titian's paintings to Petrarchan poetry.

4 units (Berdini) not given 1999-2000

120A/220A. 18th-Century Art in Europe, ca. 1660-1780—The major developments in painting across Europe from the High Baroque illusionism of Bemini (Rome) and the founding of the French Academy (Paris) to the international revival of antiquity during the 1760s, with parallel developments in Venice, Naples, Madrid, Bavaria, and London. Lectures situate shifts in themes and styles amidst the emergence of new viewing publics. Artists: Tiepolo, Giordano, Batoni, and Mengs; Ricci, Pellegrini, and Thornhill; Watteau and Boucher; Chardin and Longhi; Reynolds and West; Hogarth and Greuze; Vien, Fragonard, and the first works by David. Additional hour discussion each week for graduate students.

4 units, Spr (Marrinan)

120B/220B. Painting in the Age of Revolution—Survey of painting in Europe within the context of the French Revolution and its aftermath. Lectures align ruptures in the traditions of representation with respect to shifting social formations and political events. Artists: David and his students; Gros and the painters of Napoleon; Gericault; Blake, Fuseli, and Goya; Turner and Constable; Friedrich, Runge, and the Nazarenes; Ingres and Delacroix. Additional hour discussion each week for graduate students.

4 units (Marrinan) not given 1999-2000

120C/220C. The Age of Naturalism, ca. 1830-1874—The origins, development, and triumph of naturalist painting in Europe. Lectures underscore the creative tensions between the traditional ambitions of painting and the challenge of new "modern" subjects and the emerging practice of working in the open air. Artists: Corot, Rousseau, and the painters of Barbizon; Courbet, Millet, and Daumier; the pre-Raphaelites; Manet and his circle; the early works of Monet, Renoir, Degas, and friends. Additional hour discussion each week for graduate students.

4 units (Marrinan) not given 1999-2000

120D/220D. Post-Naturalist Painting—How conceptual models from language, literature, new technologies, and scientific theory affected picture-making following the collapse of the radical naturalism that characterized European painting of the 1860s and early '70s. Bracketed in France by the first Impressionist exhibition (1874) and the first public acclamation of major canvases by Matisse and Picasso (1905), the related developments in England, Germany, and Austria. Artists: the Impressionists and Cézanne; Moreau, Redon, and Rops; Van Gogh and the Pauvres; Gauguin, Les XX, and Munch; Seurat and Signac; Puvis de Chavannes, Burne-Jones, Whistler and Klimt; Horta, van de Velde and Guimard; Beardsley, Vallotton, and Toulouse-Lautrec. Additional hour discussion each week for graduate students. Recommended: some prior experience with 19th-century art.

4 units (Marrinan) not given 1999-2000


4 units (Lee) not given 1999-2000

121/221. Abstract Expressionism—The painting and sculpture of the major Abstract Expressionist artists 1935-59 (Jackson Pollock, Willem de Kooning, Franz Kline, Mark Rothko, and Adolph Gottlieb) and artists reacting to Abstract Expressionism (Ad Reinhardt, Jasper Johns, and Robert Rauschenberg). Emphasis is on works of art, and the cultural and political context in which these works were made.

4 units, Win (Nemerov)

121A/221A. Rebellion, Revolution, and Reaction: European Art between the Wars (1918-1939)—Historical avant-garde movements (Dada, Russian Constructivism, and Surrealism) are examined in conjunction with important anti-modernist tendencies such as Socialist Realism and Nazi Art. Issues: artistic responses to wartime trauma; attempts to develop the progressive potential of technology and the political utility of art; and attempts to reorder relations between the body and the machine, the art object and the commodity, and private and public life. Artists: Richter, Heartfield, Höch, Tzara, Rodchenko, Tatlin, Bellmer, Man Ray, and Ernst. Readings: the modern subject, mass culture, the modernism/anti-modernism debates of the 1930s, and the uses of art in totalitarian regimes.

4 units, Win (Dickerman)

121B/221B. Modernism and Abstraction—The various histories, ideologies, and meanings of abstraction in 20th-century art Cubism, German Expressionism, Suprematism, Constructivism, Neo-Plasticism, Abstract Expressionism, Brutalism, hard-edge abstraction, Minimalism, and process art.

4 units (Dickerman, Lee) not given 1999-2000

122/222. Art under Hitler and Stalin—The role of the visual arts (architecture, exhibition design, painting, sculpture, photography) in Nazi Germany and Stalinist Russia. The relationship between art and totalitarianism, the uses of new systems of mass media, the similarities and distinctions between the two regimes, and the possibilities for critical resistance in the visual arts. GER:3a (DR:7)

4 units (Dickerman) not given 1999-2000

123/223. Art and Technology—Introduction to the thematic of technology as it has been treated through modern art. The relationship between technology, industrialization, mass culture, communication, and social engineering and control from the invention of photography to recent visual practices. Emphasis is placed less on "machine aesthetics" than the issue of technological rationality, e.g., the art of the last 30 years (kinetic art, video, digital photography, etc.). Recommended: some familiarity with modern art.

4 units (Lee) not given 1999-2000

123A/223A. Object after Minimalism—Object-based art from the 1960s to the present. Minimalism, process art, earth and land art, installation and site-specific work, body art. Work that comments upon the museum and gallery, new media sculpture and environments (e.g., video, digital technologies). GER:3a (DR:7)

4 units, Aut (Lee)

123B/223B. The Feminist Legacy in Contemporary Art—The impact of Second Wave feminism on art making and art historical practice in the 1970s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the '70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, Bad Girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of “performativity.” GER:3a (DR:7)

4 units, Win (Lee)

126A/226A. Introduction to the Study of Chinese Painting—Issues and approaches to the study of Chinese painting and related pictorial art. Introduction to major genres, styles, and techniques; problems of subject matter and significance; the social and institutional contexts of painting; painting theory and critical standards; and painters’ lives and cultural roles. Critical readings and discussions of representative studies.

4 units (Vinograd) not given 1999-2000

126B/226B. Early Chinese Pictorial Art—Major developments in the pictorial art of early Imperial China, Han through Sung dynasty. Emphasis is on recent archaeological discoveries, the appearance of the theoretical and critical literature for painting, and the diversity of functions and conceptions of painting in the Sung period.

4 units (Vinograd) not given 1999-2000

126C/226C. Artists and Systems in Later Chinese Painting—Survey of major Chinese artists, A.D. 1300-1900, in the context of changing systems of patronage, art theory, and image production. The literat, individualists, court artists, and urban painters of later Imperial China.

4 units (Vinograd) not given 1999-2000

126D/226D. Landscapes, Geographies, and Ideologies: Intercultural Perspectives—Comparative issues in the understanding of landscape arts, focusing on E. Asian and European/American traditions. Paintings, gardens, site-specific art, and literature utilize approaches drawn from art history, cultural geography, and literary studies. Topics: conceptions of landscape and nature, the social and economic contexts of landscape production, ideological and textual constructions of landscape.

4 units (Vinograd) not given 1999-2000

126E/226E. Across Cultures: Encounters of Eastern and Western Art—Crosscultural interactions and appropriations between the art of E. Asia, Europe, and America from the 16th century to the present. Artistic interchange in the context of culturally based attitudes toward visual representation, imagery, and the idea of the foreign.

4 units (Vinograd) not given 1999-2000

129/229. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868—Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty are viewed through the visual culture during the change of epistememe from medieval to premodern, i.e., the 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tension between the old and the new leading to the modernization of Japan.

4 units (Takeuchi) not given 1999-2000

129A/229A. Painting in Late Medieval and Early Modern Japan, 1500-1868—Questions of subject and subjectivity, the role of tradition/ideology vs. innovation/resistance, responses to the Other, developing art discourse, and transformation in notions of artist, art-making, and viewer response at different levels of Japanese society.

4 units (Takeuchi) not given 1999-2000

130/230. Art in America and Britain, 1670-1825: Culture and Politics—Interdisciplinary study of major themes and genres of British and early American art. Focus is on art in relation to the French and Indian Wars, the American Revolution and the invention of American national identity, and the art of indigenous peoples, particularly the Iroquois. Close readings of works of art. Artists: Copley, West, Trumbull, Allston, Hogarth, Wright of Derby.

4 units (Nemerov) not given 1999-2000

130A/230A. American Art and Culture in the Gilded Age, 1865-1910—Interdisciplinary study of art, literature, patronage, and cultural institutions of the late 19th century. Aestheticism, conspicuous consumption, the grand tour, and the expatriate experience. The period's great collectors, taste makers, and artists: Thomas Eakins, Winslow
Charles Demuth, Georgia O'Keeffe, Gerald Murphy, the Harlem Renaissance, Duchamp, Francis Picabia, Futurism, Fernand Léger, Alfred Stieglitz, who interacted with artists (Gertrude Stein, William Carlos Williams, creative alliances. Painters and sculptors are the focus; the literary figures Early 20th Century—Modernism in the American arts at home and abroad, emphasizing transatlantic expatriation, cultural politics, and creative alliances. Painters and sculptors are the focus; the literary figures

130B/230B. Transatlantic Modernism: Paris and New York in the Early 20th Century—Modernism in the American arts at home and abroad, emphasizing transatlantic expatriation, cultural politics, and creative alliances. Painters and sculptors are the focus; the literary figures

130D/230D. American Art since 1945—Introduces the major figures, movements, and concepts of American art (with examples from Europe) from WW II to the present. Topics: the ideology and aesthetics of high modernism, the relationship between art and popular culture, the “death of painting,” the question of postmodernism. Artists: Pollock, Newman, Stella, Johns, Warhol, Andre, Rainer, Smithson, Hesse, Serra, Kruger, Sherman.

130E/230E. Regionalism—Comparative study of four cultural regionalisms of the 1920s and ’30s: New York City (especially Harlem), the South, the Midwest, and the West (particularly the Southwest). The openings artists attached to place, the invention of rhetoric and sign systems that stand for geographic districts, and the cultural politics of regional rivalry. Topics: Harlem Renaissance; Southern Agrarians; Midwestern Triumvirate (Thomas Benton, Grant Wood, and John Curry); artists colonies of Taos and Santa Fe. The representations of California as “region” in “Pacific Arcadia,” a spring exhibition at the Stanford Museum.

134A/234A. Photography in America—A history of photography surveys photography from its invention in the 19th century to the present. Working from images in the collection of the Stanford Museum, the San Francisco Museum of Modern Art, and important primary and critical texts, focuses on the nature of photographic representation and the changing status of photography as an artistic and social practice. GER: 3a (DR: 7)


135/235. A History of Photography—Surveys photography from its invention in the 19th century to the present. Working from images in the collection of the Stanford Museum, the San Francisco Museum of Modern Art, and important primary and critical texts, focuses on the nature of photographic representation and the changing status of photography as an artistic and social practice. GER: 3a (DR: 7)

137A/237A. The ’60s: America and Europe—Focus is on the major figures, movements, and critical issues in the U.S. and Europe, with forays into Japan and S. America. Topics: the viability of abstraction after Abstract Expressionism (Hardedge abstraction, Minimalism, and Process Art); the role of commodity and popular culture in artistic production (Warhol and Pop Art in America, the Independent Group in Great Britain, the Situationist International in France); the emergence of performance art and other new art forms (fluxus, the Happenings, Earth Art, Video, Kinetic Art); the function of language and the nature of art-as-idea in Conceptual Art; and the relationship between art and political activism in regards to the anti-war movement, feminism, and civil rights. Recommended: some knowledge of 20th-century art history.

140/240. Introduction to Film Study—The formal, historical, and cultural issues associated with the study of film. Familiar models of classical narrative cinema are juxtaposed with alternative narrative structures, documentary films, and experimental cinematic forms. Issues of cinematic “language,” visual perception, and representations of gender, ethnicity, and sexuality. Develops basic relevant aesthetic and conceptual analytical skills. Weekly screenings. GER: 3a (DR: 7)

141/241. Cinema and the City—Changing understandings of urban space over time are illustrated by reviewing a range of films from the past century. The cinematic city is an arena of social control, social liberation, collective memory, and complex experience. Cinematic effects (montage, movement, and subjective camerawork) are integral to understanding the city as a lived environment. The rise and decline of the utopian precepts of architectural modernism and the representation of the city into the realm of cyberspace, where it still functions as a site of navigation, perception, and self-redéfinition. Weekly screenings. Recommended: 140 or its equivalent.

142/242. Comedy—(Same as Comparative Literature 167.) Introductory survey of comic traditions from Ancient Greek drama to contemporary film. Literary texts are dovetailed with comparative media experiences. Readings of Aristophanes, Plautus, Shakespeare, Sheridan, Wilde, and Coward are in conjunction with such cultural phenomena as mime, masque, and puppetry; the Commedia dell’Arte; and the films of the Marx Brothers, Jacques Tati, Jerry Lewis, and others. The possibilities of cross-cultural comic form; the representations of gender, race, and power in performance; the archetypal approaches to the genre, and the nature of stand-up. GER: 3a (DR: 7)

143/243. The Hollywood Musical—Explore the liberation that arises in the film musical, a liberation that is reality and illusion and which can be physical, emotional, aesthetic, and social, all at once. Performance is central to the genre. Musicals connect cinema to other arts. The interplay among song, stage, and screen; and the interplay of cultural identities (regional, racial, gendered, and sexual). Musicals provide a place for the staging of issues of identity: sexuality and ethnicity are emphasized onscreen and off. The impact of African-American and Jewish culture on the genre, issues of gay reception and interpretation. The history of the American stage musical. GER: 3a (DR: 7)

144/244. Science Fiction Cinema—Science fiction film’s sense of wonder depends upon the development and revelation of new ways of seeing. If cinema is a privileged site of technological representation, then science fiction, the genre most obsessively concerned with technology and its deployment, takes on new relevance. The American SF film’s emphasis on the fundamental activity of human perception and its exploration of other worlds, new cities, and other modes of being. Science fiction as the Hollywood genre most directly concerned with the essence of cinema itself, and such new technological spaces as the cyberspaces of the information age.

145/245. Subjectivity and Gender in Contemporary European Film—Cinematic reflexivity, gendering film authorship, self-imaging masculinity as feminine, modernism/postmodernism, narrative/anti-narrative, sexuality and difference, and allegories of spectatorship and voyeurism.
National Identity—The question, "What is American about American..."
214C. Seminar: The Pastoral Vision in the Renaissance—Whether secular or profane, nostalgic or premonitory, the encounter with the other offered by the voluntary retreat into the countryside fostered an artistic genre that only could be accomplished by the combined representational naturalism and classical revival of letters pursued during the Renaissance. A multidisciplinary discursive field, the pastoral offered a hermeneutic experience that exposed (and continues to expose) the social, gender, and ideological prerogatives of readers and beholders. The cultural and phenomenological implications of images like Giorgione's Tempest. Critical and art-historical models of interpretation are tested from iconology to semiotics.

4 units (Berdini) not given 1999-2000

215. Seminar: Michelangelo and the Aesthetics of the Unfinished—Michelangelo's sculptures were often left in a state prior to completion, so as to reveal the process and the results of their making. It was left to the beholders to complete these works in their imagination, and in this regard the artist's sonnets, letters, and Neoplatonic conceptions offered critical instruction. For the reader-beholder, Michelangelo's poetry, sculpture, and related drawings constitute a complex aesthetic unity. Readings from Michelangelo's sonnets and letters, art theory, and Platonic and Neoplatonic works.

4 units (Berdini, Harrison) not given 1999-2000

215S. Undergraduate Major Seminar: Renaissance Rome—Art and Ideology in the Age of Julius II (1503-13)—The role played by Bernante's, Michelangelo's, and Raphael's art in shaping Julius Roman. The papal attempt to revive the dual foundation of Rome, i.e., classical antiquity and Early Christianity. Architecture, painting, and sculpture contributed toward construction of a new visual culture for a New Rome, a city destined to be the center of Christianity and the capital of an absolutist state. Antiquarian studies, monarchical ideologies, humanistic discourses, and the new artistic practices were experimented with throughout Italy in the previous century, and shaped a pontifical project which succeeded artistically but failed ideologically, as the subsequent divisions within Christendom demonstrated.

4 units (Berdini) not given 1999-2000

221C. Seminar: Aspects of Realism in 19th-Century Painting

4 units (Marrinan)

221D. Undergraduate Seminar: Eugène Delacroix—Born in 1798, scorned by the art establishment in his early years, heralded by the critical "avant garde" (Baudelaire) in mid-life, Delacroix died in 1863 as one of the "old masters" of the French tradition, important to young painters (Manet and Degas) as a role model for their own work. Delacroix painted in every format (small casel pictures, large-scale architectural ensembles, lithographic works, drawings and illustrated notebooks), and left a body of critical writings in the form of letters and journals. Delacroix's life and art as the means for understanding the historical person and the culture of 19th-century France. Student group reports on general topics and individual presentations on specific works by Delacroix. Enrollment limited to 16. Prerequisite: consent of instructor. Recommended: reading knowledge of French.

4 units, Spr (Marrinan)

221H. Undergraduate Seminar: Paul Cezanne

4 units (Marrinan)

223D. Seminar: Site Specific and Installation Art—Drawing on precedents in early 20th-century art (De Stijl, the Bauhaus, the Russian and Soviet Avant-Garde, Schwitters), considers the thematic of place in the production and reception of site-specific work, art made for, and bound to, a particular place. Topics: the legacy of the Gesamtkunstwerk, the notion of community and the public sphere, the viewer of art as phenomenological body, the body as site, the politics of liminal space, and the critique of the museum and gallery as institutions. Artists: Smithson, Heizer, Morris, Serra, Situationist International, Antin, Piper, Asher, Buren, Matta-Clark, Broodthaers, Haacke, Wilke, Gonzalez-Torres, Holzer, Green, Wodiczko, the Border Arts Collective, Wilson, Luna, Mendiesta.

4 units (Lee) not given 1999-2000

224A. Seminar: Collage/Montage—Case studies in collage and montage practice (including Cubist collage, the films of Dziga Vertov and Sergei Eisenstein, the photomontages of Hannah Höch and John Heartfield, and the early work of Robert Rauschenberg) and the historiographical problems that this work engenders. Important 20th-century theories of fragmentation and recombination including Walter Benjamin's conception of allegory; Claude Levi-Strauss on bricolage and Jacques Derrida's reworking of this term; and Frederic Jameson and Rosalind Krauss on pastiche.

4 units (Dickerman) not given 1999-2000

227B. Undergraduate Seminar: Contemporary Chinese Arts—Critical issues in contemporary Chinese visual arts are examined through concurrent exhibitions at the San Francisco Museum of Modern Art and the Asian Art Museum, selected readings, and discussion. The problems of globalization and cultural identity, manipulations of language and the burdens of memory and historical trauma. Embodiment and gender, urban dislocations, postmodern strategies, and the role of electronic and mass media.

4 units (Vinograd) not given 1999-2000

227C. Colloquium: New Studies in Chinese Art—Critical readings of current studies of Chinese art, focusing on the Ming and Qing period pictorial arts. Emphasis is on issues of political and cultural authority; systems of production, exchange, and possession; and gender-implicated imagery.

4 units (Vinograd) not given 1999-2000

227F. Colloquium: New Studies in Chinese Art—Critical readings of current studies of Chinese art, focusing on the Ming and Qing period pictorial arts. Emphasis is on issues of political and cultural authority; systems of production, exchange, and possession; and gender-implicated imagery.

4 units (Vinograd) not given 1999-2000

228A. Seminar: Pictorial Art and Cultural Spaces in Late Ming China—Studies of late 16th- through mid-17th century Chinese painting and printmaking in the context of emerging cultural and media spaces. Topics: narrative spaces and staging of drama and fiction; sites of urban entertainment, psychological spaces of subjectivity and desire, spaces of historical representation; and the proliferation of image spaces.

4 units (Vinograd) not given 1999-2000

228B. Seminar: Warrior Culture of Japan—The ethos and cultural legacy of the Japanese warrior: how those in power stay in power; the "tools of the trade;" how the image of the warrior was constructed in...
literature and in the visual arts; and the relationship between visual ideology and codes of legitimacy.

4 units (Takeuchi) not given 1999-2000

229C. Seminar: Nostalgia in Japanese Art—Revivals, Reformations, Representations—The foundations of classical court culture in Japan as a sphere discourse, and its various afterlives: major themes, interpretations, text-image relationships, and the ideological uses to which the classical past was put throughout traditional Japanese culture.

4 units (Takeuchi) not given 1999-2000

229D. Seminar: Japanese Discourse on Painting and Its Chinese Antecedents—Primarily for graduate students in Asian art and Asian languages. The “information explosion” of the 17th century, brought about by advanced technologies of printing, made accessible to the Japanese the vast body of Chinese literature on painting theory. The major texts and their influence in Japan. Material is in English; some texts are read in the original to understand key aesthetic terms.

4 units (Takeuchi) not given 1999-2000

229E. Colloquium: “Pictures of the Floating World”—Images from Japanese Popular Culture—Examines printed objects produced during the Edo period (1600-1868), including the famous Ukiyo-e (“pictures of the floating world”) and lesser-studied genres like printed books (ehon), and popular broadsheets (kawaraban). How a society constructs itself through images; questions concerning the borders of the acceptable/censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles. Prerequisites: 2, 12, 129 or 129A.

4 units (Takeuchi) not given 1999-2000

229F. Seminar: Conformity and Rebellion in 18th-Century Japanese Painting—The rise of new styles and artistic revivals, the extraordinary number of “eccentric” painters, influences from China and the West, the proliferation of art-historical treatises, and the redefinition of the role of the artist in Japanese society. Prerequisites: 2, 12, 129 or 129A.

4 units (Takeuchi) not given 1999-2000

229G. Colloquium: Arts of Zen Buddhism—Primarily for seniors. Since its introduction to Japan in the medieval period, Zen and its attendant arts have produced reams of discourse, despite the well-publicized Zen distrust of the intellect. The arts produced in the Zen milieu in the context of this literature, and the myths perpetrated about Zen art in the modern era. Prerequisite: familiarity with Japanese art and culture.

4 units, Aut (Takeuchi)

231. Seminar: The Art Museum—History and Practices—Workshop on contemporary museum culture, with emphasis on the collecting and exhibiting practices of art museums. Selected readings, field trips, and discussions with museum professionals. Each student creates a detailed proposal for a museum exhibition and presents it to a panel of faculty and curators.

4 units, Aut (Corn)


4 units (W. Corn) not given 1999-2000

231N. Stanford Introductory Seminar: Hollywood and New York—The 1940s—Preference to freshmen. Works of the major painters, photographers, and filmmakers of the 1940s: Edward Hopper, Jackson Pollock, Willem de Kooning and Weegee (painters and photographers); and John Ford, Preston Sturges, and Billy Wilder (film directors). Topics: war-time and Cold War propaganda, the popularization of psychoanalysis, period-specific constructions of the city, and other cultural and political practices and discourses. Paintings and films are examined in terms of the internal histories of modernist painting and the American film industry.

4 units (Nemerov) not given 1999-2000

232A. Seminar: The Art of the Old West—Major painters and sculptors of the American West 1880-1920, including Frederic Remington, Charles Russell, and Charles Schreyvogel. Cowboys and Indians in the context of evolutionary theory, ethnographic documentation, national symbolism, immigration and the urban world, the advent of movies, other turn-of-the-century nostalgias (e.g., New England and the Middle Ages), and questions about the recoverability of the past.

4 units (Nemerov) not given 1999-2000

232E. Seminar: Interpretation and History—The Art of Benjamin West—Study of Benjamin West (1738-1820), the American artist who spent most of his career in England as court painter to George III. The “new historical” emphasis on the “West” in terms of the various discourses (British colonial expansion) embodied in his art. Close readings of individual works by West and his contemporaries.

4 units (Corn) not given 1999-2000

233. Colloquium on the History of Photography—Readings on the history and criticism of photography are combined with a close study of works in Bay Area collections. Enrollment limited.

4 units (W. Corn) not given 1999-2000


2 units (Leivick) not given 1999-2000

236. Art History Bibliography and Library Methods—Primarily for art history graduate students; upper-class undergraduate majors who plan to continue in art history on the graduate level may enroll with the consent of the instructor. Introduction to reference works and library techniques essential to the study of architectural and art history. Sources of artistic, historical, and cultural information in their printed and automated forms.

3 units (Ross) not given 1999-2000

247. Theories of the Moving Image I—Cinema and Models of Perception—Film theory emphasizes cinema’s relation to human perception in the context of industrial, modern life. What are the implications of a medium similar to, but distinct from, human perception? As a medium insufficiently real or too immediate and palpable; as concrete perception or phantasmagoric diversion, cinema’s role in how we perceive, understand, and circulate through the world is open to debate. The medium’s real-time aspects bring issues of performance into play. Theorists: Benjamin, Kraeauer, Epstein, Vertov, Eisenstein, Bazin, Custodber, Derr, Krakhage, Baudry, Mulvey, Deleuze. Screenings from narrative and non-narrative models. Enrollment limited to 20. Recommended: 140 or equivalent.

4 units (Bukatman) not given 1999-2000

249. Seminar: French New Wave Film (1958-68)—Theory and Practice—Exploration of a radical paradigmatic shift in cinematic modernism in the works of Godard, Resnais, Truffaut, Varda, etc. New visual narratives of existentialist freedom, eroticism, and reflexivity.

4 units, Spr (Lewis)

249A. Seminar: Beyond the New Wave—French Film in 1970s, ‘80s, and ‘90s—Postmodernism, narrative/anti-narrative, spectatorship and
voyeurism, auterism and cinematic reflexivity. America as problematic intertext, social and sexual politics, crises in gendered identity, and the "New History." The later works of Godard, Chabrol, Renais, Tanner, Truffaut, and Varda, and younger filmmakers, such as Beineix and Kieslowski.

4 units (Lewis) not given 1999-2000

263. Psychoanalytic Perspectives on Art and Literature—Experiments with and critiques psychoanalytic perspectives on a broad spectrum of visual images and literary texts. Book illustration, advertising, and the cartoon strip; and conventional media such as theater, novel, painting, and sculpture. Topics: symbolism, play, dreams, madness, the biography of the artist, fetishism, trauma. Texts: Freud, Lacan, Melanie Klein, and Winnicott.

4 units, Aut (Spitz)

267. Undergraduate Seminar: Buildings and Society in Europe, 1500-1800—Architecture from a sociological perspective, looking at how it responds to and shapes human needs and activities: governance, worship, work, education, entertainment, commerce, pleasure, justice, welfare, warfare, health, punishment, etc. How buildings serve as instruments of social justice and control in times of societal stress (famine, plague, and political and religious discord). Buildings in the context of the current political debate over the legitimacy of the "welfare" state.

4 units, Win (Scott)

277. Seminar: Le Corbusier—A study of this controversial figure in modern architecture and city planning, whose designs and writings shaped much of the contemporary environment throughout the world. Students conduct research on selected aspects of Le Corbusier’s work, theory, influence, or connection with related subjects. Prerequisites: 175, consent of instructor.

4 units (Turner) not given 1999-2000

278. Seminar: The American College Campus—The college and university campus is a distinctively American type of environmental planning. The historical development of the campus, its spaces, and architecture. Focus is on issues relating to Stanford and other Bay Area campuses. Prerequisites: 175 or 176, and consent of instructor.

4 units, Aut (Turner)

278N. Stanford Introductory Seminar: The Stanford Campus, Architectural History in Microcosm—Preference to freshmen. The buildings and grounds of Stanford provide examples of architectural traditions and developments of the 19th and 20th centuries. The campus is used as a laboratory for the examination of these subjects and of basic architectural concepts and principles.

4 units (Turner) not given 1999-2000

279. Seminar: Frank Lloyd Wright—Examination of this most influential American architect, whose work transformed domestic architecture in particular. Students choose research subjects dealing with specific designs or aspects of Wright’s career. Field trips to Wright’s buildings in the Bay Area. Prerequisites: 175 or 176, and consent of instructor.

4 units (Turner) not given 1999-2000

280. Seminar: Utopia and Reality in Modern Urban Planning—Primarily for Urban Studies majors, but others may be admitted. Utopian urbanist thinkers (Ebenezer Howard, Le Corbusier, Frank Lloyd Wright, etc.) who established the conceptual groundwork of contemporary urban planning practice. Student participation and research-oriented term paper required.

4 units, Win, Spr (Stout, Turner)

285. Undergraduate Major Seminar: Methods of Art Historical Research—The historiography and methodology of the discipline of art history.

4 units (Lee) not given 1999-2000

298. Individual Work: Art History

any quarter (Staff)

299. Research Project: Art History

any quarter (Staff)

GRADUATE

300. Graduate Proseminar: Graduate Studies in Art History—For first-year art history graduate students only. Introduction to fields, issues, and practices in art history.

2 units, Aut (Dickerman, Lee)

301. Graduate Seminar: Political Iconography—Study of 6th-century painters and the extent to which their work can be seen to reflect the history and political shenanigans of their age. Prerequisite: 100A or 102.

4 units (Maxmin) not given 1999-2000

302. Graduate Seminar: Greek Vase Painting

4 units (Maxmin) not given 1999-2000

310. Graduate Seminar: Scopophilia—On Visual Pleasure—What kind of images give pleasure and why? The modalities of attention and expectation in the visual experience that resolve in what psychologists call scopophilia are analyzed within a historical horizon which moves from the neo-Platonic legitimation of aesthetic pleasure during the Renaissance (including its reconciliation with Christian faith) to the modernist emancipation of visual pleasure from mimetic representation. Readings focus on the structure and modifications of the language of appreciation as it relates to understanding, from the early theories of Leonardo, to the criticism of Diderot, modern connoisseurship, the psychoanalytic theories of Freud and Lacan, and contemporary forms of reception such as Derrida’s notion of the Gift.

4 units (Berdini) not given 1999-2000

322. Graduate Seminar: Crossroads of the Enlightenment—The Artistic Culture of Rome in the mid-18th Century—Rome, as a long-privileged site for training young artists, acquired new importance following the discovery of ruins at Herculaneum and Pompeii (1730-1780). Roman artistic culture, as the arena where international artists and critics, dealers, and dilettantes met and were visited by wealthy young people making the Grand Tour, became the center of the contemporary art in Europe. Students research topics and presentations on any relevant aspect of artistic life in Rome at this time: patronage and patterns of collecting, monographs on artists or writers working in the city, art practices characteristic to Rome (e.g., copying antiquities), or constructions of the "mythic" Rome in visual renderings or written accounts. Prerequisite: working knowledge of at least one non-English language.

4 units (Marrinan) not given 1999-2000

323. Graduate Seminar: Conceptual Art—Issues surrounding conceptual art from the ’60s to the mid-’70s. Topics: the end of the work of art and the notion of “art as idea” or philosophical proposition; the relationship between art, language, and the document; ephemerality and “dematerialization;” body art performativity and the public sphere. Artists: Sol Lewitt, Joseph Kosuth, Hans Haacke, Adrian Piper, Vito Acconci. Art and language: Joan Jonas, Chris Burden, Dan Graham, Bruce Nauman, Lawrence Weiner, Hannah Darboven, Daniël Buren.

4 units (Lee) not given 1999-2000

323A. Graduate Seminar: Methods and Historiography of Art History—Close analysis of key art historical and methodological texts, providing a graduate-level introduction to the writing, history and interpretative approaches of the discipline of art history. Authors: Berenson, Mirelli, Wölfflin, Riegl, Panofsky, Fry, Greenberg, Schapiro, Clark, Krauss, Bois.

4 units (Dickerman) not given 1999-2000

323B. Graduate Seminar: Dada—Case studies in the various Dadaist movements based in Zürich, Cologne, Hannover, Paris, and New York.

4 units (Dickerman) not given 1999-2000

325. Graduate Seminar: Photography and Visuality—Using various case studies in 19th- and 20th-century photographic practice, explores the intersection of issues of social context, technology, and vision in the definition of historical modes of perception. Weekly meetings at San Francisco Museum of Modern Art or other collections.

4 units (Dickerman) not given 1999-2000

329. Graduate Seminar: Chinese and Japanese Painting Discourse—The relationship between the large body of Chinese painting treatises and their rearticulated roles in Japan: subjectivity and ideology, realism/idealism; legitimacy; visuality; social formations. Prerequisite: knowledge of Chinese or Japanese.

4 units (Takeuchi) not given 1999-2000

329A. Graduate Seminar: Methods and Historiography in Japanese Art—Introduces graduate students in Asian art and other disciplines to issues of historiography, research techniques, dictionaries for deciphering script styles, and other tools for advanced work in Japanese art.

4 units (Takeuchi) not given 1999-2000

329B. Graduate Seminar: Problematizing the Japanese Landscape of Travel—The cultural construction of landscape in medieval and premodern Japan. The representation of landscapes, seen and imagined, in painting, literature, religion, and social practice. Topics: religious visions and ritual fields (mandalas, sacred mountains), sites of cult and cult of sight (Fuji, Kumano), narratives of itinerary (travel diaries, illustrated hand scrolls), and topographic taxonomies (Meisho, Shinkeizu, guidebooks).

4 units (Takeuchi) not given 1999-2000

330. Graduate Seminar: Gertrude Stein—Stein’s life and work, emphasizing her role in the formation of innovative art in the 20th century. Stein as writer of biography, fiction, poetry, drama, criticism, operas, and genres of her own making; and Stein as art collector, salon hostess, expatriate, and lesbian Portraiture by painters, sculptors, and writers.

4 units, Spr (Corn, Dunn)

331D. Graduate Seminar: The Visual and Literary Art of Edwardian England—Interdisciplinary study focusing on England 1895-1918. The works of major painters (John Singer Sargent); writings of Thomas Hardy, Henry James, Arthur Conan Doyle, Kenneth Grahame, and Beatrix Potter; the relation to contemporary American art and literature; and the English visual art and poetry of WW I and later 20th-century constructions of the Edwardian period.

4 units (Corn, Dunn) not given 1999-2000


4 units (Nemerov) not given 1999-2000

333B. Graduate Seminar: Darkness and Light: American Illustration, 1895-1915—The turn of the century, the so-called “golden age” of American illustration, produced three well-known American artists, Maxfield Parrish, Howard Pyle, and N.C. Wyeth, and many talented, now largely forgotten artists whose images fill the pages of Scribner’s, Century, and other illustrated periodicals and books. Yet early 20th-century illustration is still regarded as a “low” art form not worth serious visual analysis and critical study. American illustration in historical and theoretical frameworks, emphasizing the oddness (if not the outright darkness) of this ostensibly good-natured art.

4 units, Win (Nemerov)

334. Graduate Seminar: Gender, Modernism, and Art History—Revisionist scholarship of gender and sexuality in Impressionism, Dada and Surrealism, abstraction, and pop art. Students elect their own topic for research and interpretation.

4 units (Nemerov) not given 1999-2000

335. Graduate Seminar: Visual Theory—Introduction to some major theoretical approaches in the contemporary praxis of art history and file studies. Readings/discussion are centered on the problematics of poststructuralism, semiotics, narratology, phenomenology, reception theory, issues of gender, context, and the new Marxism.

4 units (Lewis) not given 1999-2000

335B. Graduate Seminar: Notions of “The Public” in Art Historical Discourse

4 units (Marrinan) not given 1999-2000

335C. Graduate Seminar: The Vision of Art History

4 units (Marrinan) not given 1999-2000

335D. Graduate Seminar: Narrative Theory and Visual Forms

4 units (Marrinan) not given 1999-2000

335J. Graduate Seminar: Looking at Violence—Violence in the media and its effect upon viewers, especially the young, is an issue of national concern that has produced legislation for the ratings of movies, television shows, and computer and video games. “V-chips” can be programmed to censor electronically what TV programs they play. These are political and legal fixes. Why do we watch violence in the first place? Why are images of violence compelling? Texts of aesthetics, psychology, and moral philosophy are read, developing detailed analyses for specific examples of visual media (painting and sculpture, film, and video). Preliminary ideas about a history of our desire to look at images of violence.

4 units (Marrinan) not given 1999-2000

335K. Graduate Seminar: Theories of the Sublime and Art—For graduate students and advanced art history majors only. The notion of the sublime through the terms of art and art history. Readings in philosophy and literary criticism (Kant, Burke, De Man, Lacoue-Labarte, Lyotard, Nancy, Weiskel, etc.) and art historical “case studies” (European Romanticism, American landscape, modernist abstraction, earth work, and recent video).

4 units (Lee) not given 1999-2000

335Q. Graduate Seminar: The Time of the Object—How artists, art historians, philosophers, and critics have theorized the temporality of the art object. Topics: the origin of the work of art, duration, repetition, entropy, kineticism, the monument, the end of death of art, “schizophrenia.” Writers: Bergson, Deleuze, Focillon, Fried, Hegel, Heidegger, Jameson, Kubler, Krauss, Riegl.

4 units, Aut (Lee)

345. Graduate Seminar: World Fairs and Theme Parks—World Fairs and theme parks as communications media and social discourse. From the 1851 Crystal Palace Exhibition in London, to expositions in Paris, Philadelphia, Chicago, New York, etc., fairs have been a fascinating and conflicted site of meaning. Technological and ideological utopianism were supported by nationalist discourse, capitalist enterprise, anthropological exhibition, and varied modes of popular address. The issues that recur across the history of the fairs: display culture; utopian space; sensory immersion; technological trauma; the place of nature, art, and design; urban planning; and virtual realities. The importance of fairs in understanding the contradictory foundations of American self-defini-
tion (e.g., moral uplift vs. popular entertainment). Amusement parks, contemporary themed entertainment sites, and the 1996 Internet World’s Fair.

347. Phenomenology of Film—Film and phenomenology are 20th-century developments historically and conceptually interdependent. Phenomenology investigates consciously experienced phenomena, apart from causality or presupposition. Embodied subjectivity is central to the intensely experiential medium of cinema. The ways that film foregrounds, distills, and recasts aspects of phenomenological process. The analysis of the embodiment of vision replaces the “decoding” of narrative or symbolic systems, and the easy link between cinematic illusion and ideological duplicity is replaced by an exploration of visual knowledge and subjective development. Writers and filmmakers shared the task of mapping a phenomenology of film. Authors: Bazin, Cavell, Michelson, Deleuze, Sobchack, Gunning. Filmmakers: Brakhage, Warhol, Snow, Kubrick, Gehr. Screenings emphasize experimental cinema, often an interrogation of these very issues. The historical movement away from, and the return to, phenomenology in film analysis.

4 units, Win (Bukatman)

395. Teaching Praxis
1-5 units, Aut, Win, Spr (Staff)

397. Area Core—For art history Ph.D. candidates. Prerequisite: consent of instructor.
4 units, Aut, Win, Spr (Staff)

398. Individual Work: Art History—For graduate students.
Any quarter (Staff)

399. Research Project: Art History—For graduate students.
Any quarter (Staff)

400. Dissertation: Art History
Any quarter (Staff)

PRACTICE OF ART

14. Drawing for Nonmajors
2 units, Aut, Win, Spr (Staff)

16. Sculpture for Nonmajors
2 units, Win (Staff)

17. Photography for Nonmajors
2 units, Spr (Staff)

50. Clay Modeling—Entry level. The representational ideas and techniques of Rodin, Picasso, Medardo Rosso, Segal, and Duane Hanson, and the irrational approach of Jean Arp, Dubuffet, and Giacometti. Students work from the life model: library readings and slide lectures.
3 units, Aut, Win, Spr (Randell)

60. Design I: Fundamental Visual Language—Formal elements of visual expression (color, composition, space, and process) are experienced analytically and intuitively through hands-on projects. Mediums vary and are two- and three-dimensional. Originality and inventiveness are emphasized within the constraints of each assignment. Content is realized abstractly. Centered in design, but relevant to all visual art study and meaningful to the general university student who seeks to develop visual perception.
3 units, Aut (Kahn)

70. Photography I—The critical, theoretical, and practical aspects of creative photography are addressed through basic camera and lab techniques. Lecture/discussion, viewing of slides, and field work. Stanford Museum and Art Gallery viewing are scheduled according to current exhibitions. 35mm camera required.
4 units, Aut, Win, Spr (Leivick, Staff)

950. Stanford Introductory Seminar: Visual Art—Concept, Production, Critique—Preference to sophomores. Artists inherit the history of their medium, form an agenda in relation to the culture, and face the implications in practice. How are art objects, situations, and events negotiated and understood by the viewer? How do works of art model a course of action within the everyday world of practical life? How is critique developed? How does visual art affect the formation of personal and cultural values? What is the reciprocation between consciousness and the artifactual world in which works of art form a special category? Reading, discussion, short papers, and student presentations. Visits to artists’ studios, and the Cantor Center for Visual Arts at Stanford.
3 units, Win (Hannah)

117. History and Philosophy of Design—(Enroll in Mechanical Engineering 120.)
3-4 units, Spr (Katz)

140. Drawing I—Introduction to functional anatomy and perspective as these apply to problems of drawing the form in space. Individual and group instruction as student’s work from still life set-ups, nature, and the model. Emphasis is on the development of critical skills and perceptual drawing techniques for those with little or no previous experience with pastels, inks, charcoal, conte, and pencil. Lectures alternate with studio work in the investigation of drawing fundamentals.
3 units, Aut, Win, Spr (Staff)

141. Drawing II—Intermediate/advanced drawing. Observation, invention, and construction. Development of conceptual and material strategies, with attention to process and purpose. May be repeated for credit. Prerequisite: 40 or 140, or consent of instructor.
3 units, Aut, Win, Spr (Staff)

142. Drawing III—Advanced drawing. Emphasis is on student initiative with respect to composition, color, and use of a variety of drawing materials. Work from imagination, still life, and model. May be repeated for credit. Prerequisite: 40 or 140, or consent of instructor.
3 or more units, Aut, Win, Spr (Staff)

145. Painting I—Introduction to techniques, materials, and vocabulary in oil painting. Still-life, landscape, and figure are used as subject matter. Painting and drawing directly from life is emphasized.
3 units, Aut, Win, Spr (Staff)

146. Painting II: The Self-Portrait in Painting—Symbolic, narrative, and representational self-portraits. Introduction to the pictorial strategies, painting methods, and psychological imperatives of Durer, Rembrandt, Cezanne, Kahlo, Beckmann, Schiele, and Munch. Students paint from life, memory, reproductions, and objects of personal significance to create a world in which they describe themselves. Prerequisites: 140, 145, or consent of instructor.
3 units, Aut, Win, Spr (Staff)

147. Painting III—Advanced painting with emphasis on the individual point of view. May be repeated for credit. Prerequisites: three quarters of 145, 146, or equivalent, or consent of instructor.
3 or more units, Aut, Win, Spr (Staff)

148. Printmaking—Introduction to print-making using monotype, a graphic art medium used by such artists as Blake, Degas, Gauguin, Pendergast, etc. May be repeated for credit. Prerequisite: 40 or 140.
3 units, Win, Spr (Chagoya)

149. Collage—The generative principles of this most characteristic 20th-century art form. Along with assemblage (its three-dimensional equivalent) and montage (its counterpart in photography, film, and
video), collage has introduced many of the crucial aesthetic issues of the modern and postmodern eras. Typically, collage creates an expressive visual language through juxtaposition and displacement, and through sheer materiality, difference, and event. Issues of location (where it happens), object (what it is), process (how it is realized) and purpose (why it is). Prerequisites: 140, 145, or consent of the instructor.

3 units, Spr (Hannah)

152. Constructed Art—The non-objective inventions of the Russian Constructivists are the departure point which parallels the development of non-representational sculpture beginning in the early 20th century. Found Art, welded sculpture, Assemblage, and Kinetic Art projects direct the students' attention to the continuing evolution of art ideas. Lectures, readings, and projects culminate in sculptures concerning art of the 1960s and '70s: Minimalism, Earth Works, and Process Art.

3 units, Aut (Randell)

153. Recent Sculpture Concepts and Projects—Study and practice of the art of recent decades, emphasizing current post-abstract procedures. Various materials and nonmaterials. Prerequisite: any one of 50, 60, or 70.

3 units, Win, Spr (Randell)

160. Design II: The Bridge—The historical spectrum of design, from practical to ritual, while maintaining contact with the basic values and the conceptual orientation of visual fundamentals. Two- and three-dimensional projects are sequentially grouped to relate design theory to application, balancing imaginative and responsible thinking. Prerequisite: 60.

3 or more units, Win (Kahn)

168A. Introduction to Urban Design—(Enroll in Urban Studies 170.)

5 units, Win (Gast)

169. Professional Design Exploration—Six to eight mature projects are stimulated by weekly field trips into significant areas of design activity or need.

3 or more units (Kahn)

170. Photography II—Students individually pursue a topic of their own definition. Class sessions meet for individual and group critiques, lab demonstration, discussions, and slide lectures.

3 units, Win, Spr (Staff)

172. Alternative Processes—Priority to advanced students. Technical procedures and the uses of primitive and hand-made photographic emulsions. Enrollment limited to 10. Prerequisites: 70, 170, 270, or consent of instructor.

3 units, Aut (Leivick)

173. Digital Narratives—Focus is on developing visual narrative skills based on digital production and distribution media. Topics: digital imagemaking, storyboarding, dramatic structure, image manipulation, image sequencing, manipulation of virtual time and space, quicktime movie production and interactive web authoring. Prerequisite: working knowledge of Macintosh and hypertext.

3 units, Aut (Niemeyer)

174. Digital Art in Public Spaces—The relationship between digital art, public policy, and community action. Large-scale works are produced for installation in Bay Area public spaces using digital art media. Final project is a collaborative effort between student artists, community administrators, and the public involving issues of public concern, communication strategies, fundraising, and interacting with the press. For pre-enrollment, see http://www-leland.stanford.edu/dept/SUDAC. Prerequisites: 70, 145 or 60, plus working knowledge of Photoshop and Illustrator.

3 units, Spr (Niemeyer)

175. Motion Studies: An Introduction to Animation, Cartoon Physics, and Funny Walks—Hands-on animation, providing a foundation for future work in computer graphics, digital art, and animation. The techniques, tools, principles, and methods of traditional animation. Through lectures, hands-on exercises, motion analysis, and screenings, students learn a variety of animation techniques and gain a background of timing, spacing, weight, and expressive motion.

3 units, Aut (Loeb)

175A. The Virtual Object—Introduction to modeling, shading, and lighting in Maya, a high-end 3D modeling and animation application. Prerequisite: 173 and/or 175.

3 units, Win (Niemeyer)

175B. Digital Narrative Production—Third in a year-long sequence to produce full screen, multiple character, short animation.

3 units, Spr (Niemeyer)

176. The Illusion of Life—The analysis of visual and temporal perceptions of reality provides the basis for advanced modeling, shading, and lighting exercises for virtual 3D environments. For pre-enrollment, see http://www-leland.stanford.edu/dept/SUDAC.

3 units, Win (Dym)

200. The Work of Art and the Creation of Mind—(Enroll in Education 200X.)

4 units, Win (Eisner, Chagoya, Rehm, Ross, Sano)

246. Individual Work: Drawing and Painting—Prerequisites: at least two quarters of painting or drawing and consent of instructor.

Aut, Win, Spr (Staff)

248. Advanced Monotype—Continuation of monotype, dealing with advanced technical and aesthetic problems in the medium. Prerequisite: 148.

3 or more units (Chagoya)

249. Advanced Undergraduate Seminar—Interdisciplinary concepts, engaging in collaborative projects using a variety of materials and techniques. This capstone experience for the major and minor in Art involves an exhibition open to the public or a final project review to which visiting critics may be invited. Taught by visiting artists.

3 units, Win, Spr (Staff)

250. Individual Work: Sculpture any quarter (Randell)

260. Individual Work: Design

any quarter (Kahn)

268. Design Synthesis—Mature semi-elective problems in composite and multi-media design areas. Prerequisites: any two design courses above 160.

4 or more units, Spr (Kahn)

269. Advanced Creative Studies—Seminar based on elective design projects in areas of individual specialization. Prerequisite: consent of instructor.

3 or more units, Aut (Kahn)

270. Photography III—Student continues with own work, showing it in weekly seminar critiques.

Aut, Win, Spr (Leivick Staff)

271. The View Camera, its Uses and Techniques—Designed for serious students of photography who wish to gain greater control and refine skills in image-making. 4 x 5 view cameras are provided. Enrollment limited to 8.

3 units, Aut, Win, Spr (Leivick, Staff)
310A,B,C. Directed Reading: Studio
any quarter (Niemeyer)

342. Master's Project—Two weekly seminars and studio practice

360A,B,C. Master's Project (Seminar): Design
any quarter (Staff)

AFFILIATED DEPARTMENT OFFERINGS

CLASSES

303. Graduate Seminar: Art in the Roman Empire—Ideology, Place, and the Individual

SLAVIC LANGUAGES AND LITERATURES

148/248. The Factory of the Eccentric Actor (1921-1929): Between Theater and Film, Avant-Garde and Trivial Genres, East and West

168/268. Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present

MECHANICAL ENGINEERING

101. Visual Thinking

SPANISH AND PORTUGUESE

286. Chicanos/a Muralism

OVERSEAS STUDIES

The following courses are approved for the Art and Art History major and taught overseas at the campus indicated below. Students should discuss with their major advisers on campus which courses would best meet their educational needs. Course descriptions can be found in the "Overseas Section" section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

BERLIN

173Y. The Industrial Revolution and its Impact on Art, Architecture, and Theory—(Same as Overseas Studies 117V.)
5 units, Aut (Neckenig)

174Y. Architecture and the City, 1871-1990: Berlin as Nucleus of Modernity—(Same as Overseas Studies 143U.)
4 units, Spr (Neckenig)

FLORENCE

111Y. From Giotto to Michelangelo: Introduction to the Renaissance in Florence
4 units, Win (Verdon)

112Y. The Duomo and Palazzo della Signora: Symbols of a Civilization
4 units, Aut (Verdon)

OXFORD

176Y. Architecture in Britain and Europe, 1800 to the 1900s
5 units, Aut (Tyack)

221Y. Art and Society in 19th- and 20th-Century Britain
5 units, Win (Tyack)

PARIS

132Y. The Memory of a Nation: The Birth of Museums in France
4 units, Aut (Georgel)

120X. French Painting from 1780-1900
4 units, Win (Halevi)

ASIAN LANGUAGES

Emeriti: (Professors) Albert E. Dien, David S. Nivison, Makoto Ueda
Chair: Haun Saussy
Professor: John C. Y. Wang
Associate Professors: Thomas W. Hare (Asian Languages, Comparative Literature), William A. Lyell, Susan K. Matisoff (on leave), Haun Saussy (Asian Languages, Comparative Literature), Chaofen Sun
Assistant Professors: Wan Liu, Yoshiko Matsumoto, James Reichert, Deborah Tze-lan Sang
Courtesy Associate Professor: Melinda Takeuchi
Senior Lecturers: Kazuko M. Busbin, Kimie N. Nebrig
Lecturers: Fumiko Arao, Shelley Chan, Sungdai Cho, Marina Chung, Keiko Fukuma, Grace Li, Hisayo O. Lipton, Momoyo K. Lowdermilk, Aki Morì, Yu-hua Rozelle, Xiao Yu (on leave), Hong Zeng
Acting Instructor: Howard Choy

Chinese-Japanese Language and Area Studies Faculty:
Professors: Masahiko Aoki (Economics), Peter Duus (History), Harold L. Kahn (History), Lawrence Lau (Economics), John W. Lewis (Political Science), Jeffrey Mass (History), Daniel I. Okimoto (Political Science), Jean Oi (Political Science), Thomas P. Rohlen (Education), Andrew Walder (Sociology), John C. Y. Wang (Asian Languages), Arthur P. Wolf (Anthropological Sciences), Lee H. Yearley (Religious Studies)
Associate Professors: Carl W. Bielefeldt (Religious Studies), Bernard Faure (Religious Studies), Thomas W. Hare (Asian Languages, Comparative Literature), William A. Lyell (Asian Languages), Susan K. Matisoff (Asian Languages), David Palumbo-Liu (Comparative Literature), Haun Saussy (Asian Languages, Comparative Literature), Peter Sells (Linguistics), Chaofen Sun (Asian Languages) Melinda Takeuchi (Art and Art History), Richard Vinograd (Art and Art History)
Assistant Professors: Wan Liu (Asian Languages), Yoshiko Matsumoto (Asian Languages), Ellen Neskar (History), James Reichert (Asian Languages)
Senior Lecturers (Asian Languages): Kazuko M. Busbin, Kimie Nishimura Nebrig
Lecturers: Charles Egan, Hill Gates (Anthropological Sciences)
Acting Assistant Professors: Atsuko Ueda, John Wallace

The Department of Asian Languages offers courses in the languages, linguistics, cultures, and literatures of China, Japan, and Korea. The department accepts candidates for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy in Chinese or Japanese. It also offers an undergraduate and a Ph.D. minor in Chinese or Japanese language and literature.

For information concerning other opportunities for study in the Asian field, see listings under the following departments and programs: Anthropological Sciences, Art and Art History, Business, Comparative Literature, East Asian Studies, Economics, History, Interdisciplinary Studies in Humanities, Law, Linguistics, Philosophy, Political Science, Religious Studies, and Sociology. Students interested in Asian languages not listed should contact the Special Language Program, Language Center.
UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The A.B. degree is granted both in Chinese and in Japanese. The following courses and their prerequisites must be completed with a grade point average (GPA) of 'C' or better:

1. Concentrations in Chinese: Asian Languages 91 and 92, Chinese 207, Asian Languages 131, 132, 133, and four other content courses dealing with China primarily at the 100 level, as approved by the undergraduate adviser. Asian Languages 133 is the required Writing in the Major (WIM) course.

2. Concentrations in Japanese: Asian Languages 91 and 92, Japanese 103, and seven other content courses dealing primarily with Japan at the 100 level, as approved by the undergraduate adviser. At least two of these courses must be selected from the sequence 135, 136, 137, 138. Asian Languages 138 is the required WIM course. Asian Languages 51/151 and Japanese 30/130 are not counted toward the major.

These requirements are in addition to the University's basic requirement for the bachelor's degree. Letter grades are mandatory for all required courses.

MINORS

The undergraduate minor in Asian Languages has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Chinese (Mandarin) or Japanese language, as well as an introduction to the culture and civilization of East Asia. The minor consists of:

1. Completion of one year of language study at the second-year level (that is, Chinese 21, 22, 23 or Japanese 21, 22, 23) for students with no previous training in Chinese or Japanese. Students who already have first-year competence in Chinese or Japanese must complete the third-year course (Chinese 101, 102, 103 or Japanese 101, 102, 103) before undertaking any training in the Department of Asian Languages. Students who already have a competence at the second-year level may fulfill the language component of the minor by taking three courses in the department using materials in either Chinese or Japanese. These courses may be language courses such as the third-year sequence mentioned above, or they may be advanced literature and linguistics courses, depending on the capabilities and interests of the student in question.

2. The core courses, Asian Languages 91 (Traditional East Asian Civilization: China), and Asian Languages 92 (Traditional East Asian Civilization: Japan).

3. Two courses selected from among the department's other offerings in literature, linguistics, and civilization. All courses for the minor must be completed with an GPA of 'C' or better.

HONORS PROGRAM

Majors with an overall GPA of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a skeleton reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved, research and writing begins in the Spring Quarter of the junior year, and for the first two quarters takes the form of directed reading with the chosen supervisor; the finished essay (normally about 15,000 words) is submitted to the committee no later than the end of the Winter Quarter in the senior year. From 10 to 15 units of credit are granted for the finished thesis.

COTERMINAL PROGRAMS

With department approval, students may be able to combine programs for the A.B. and A.M. degrees in Chinese or Japanese. For details, see the "Graduate Degrees" section of this bulletin.

EAST ASIAN STUDIES THEME HOUSE

EAST House, located at Governor's Corner on campus, is an undergraduate residence that houses 60 students and offers them a wide variety of opportunities to expand their knowledge, understanding, and appreciation of East Asia. Assignment is made through the regular undergraduate housing draw.

SUMMER PROGRAM

A nine-week summer program of intensive instruction is offered, in three different levels, in both Chinese and Japanese. The intensive course provide the equivalent in instruction to regular academic-year courses. (See courses Chinese 5, 25, 105 and Japanese 5, 25, 105, and 114 as described below.) For detailed information about these and other aspects of the summer program, inquire at the Department of Asian Languages.

GRADUATE PROGRAMS

Admission—All students contemplating application for admission to graduate study must have a creditable undergraduate record. The applicant need not have majored in Chinese or Japanese as an undergraduate, but must have had the equivalent of at least three years of training in the language in which he or she intends to specialize, and must also demonstrate a command of English adequate for the pursuit of graduate study. Applicants should not wish merely to acquire or improve language skills, but to pursue study in one of the following fields: Chinese history (pre-modern), Chinese linguistics, Chinese literature, Chinese philosophy, Japanese cultural history, Japanese literature, and Japanese linguistics.

MAJOR OF ARTS

The A.M. is granted in Chinese and in Japanese. The normal length of study for the degree is two years.

Applicants who wish to obtain only the A.M. and who do not intend to proceed to the Ph.D. are considered only if no financial aid is requested.

Students who wish to spend the first year of graduate study at the Taipei or Yokohama centers must obtain department approval first.

Candidates for the degree must be in residence at Stanford in California during the final quarter of registration.

A thesis or an annotated translation of a text of suitable literary or historical worth is required for the A.M. degree. Under special circumstances, a paper approved by the graduate adviser may be substituted.

The University's basic requirements for the master's degree, including a 36-unit minimum requirement, are given in the "Graduate Degrees" section of this bulletin. Department requirements are set forth below.

CHINESE

The candidate must:

1. Meet the department's requirements for the A.B. in Chinese or their equivalent.

2. Complete the following course work: 103, 201, 221, 222, 223, 299; four courses in Chinese numbered between 230 and 292; and two upper-division or graduate-level courses in fields such as Chinese anthropology, art, history, philosophy, and politics as approved by the graduate adviser in consultation with the student's individual adviser. Students may be exempted from 101, 102, 103, and 221, 222, 223 by passing examinations to demonstrate that they have attained equivalent language competence. Letter grades are mandatory for all required courses and their prerequisites.

JAPANESE

The candidate must:

1. Meet the department's requirements for the A.B. in Japanese or their equivalent.

2. Complete the following course work: 201, 211-213, 246, 247, 248, 299; four courses in Japanese numbered between 256 and 298; one course in literary theory or methodology at the 100 level or higher; and two courses in such fields as Japanese anthropology, art, history,
politics, and religion, as approved by the graduate adviser in consultation with the student’s individual adviser. Students may be exempted from 211, 212, 213, and 246 by passing examinations to demonstrate that they have attained equivalent language competence. Letter grades are mandatory for all required courses and their prerequisites.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is granted in Chinese and Japanese. Candidates for the degree are expected to acquire a thorough familiarity with Chinese or Japanese literature, an adequate command of both languages, and a comprehensive knowledge of East Asian history, social institutions, and thought. The University’s basic requirements for the Ph.D. are given in the “Graduate Degrees” section of this bulletin. Department requirements are set forth below.

ADMISSION TO CANDIDACY

Students admitted with an A.B. only are evaluated by the graduate faculty during the Autumn Quarter of their second year at Stanford. The evaluation is based on written work and at least a portion of the A.M. thesis or translation. If the faculty has serious doubts about a student’s ability to work for the Ph.D., they will convey this to the student. During the subsequent Spring Quarter, the faculty formally decides whether a student should be admitted to candidacy for the Ph.D. or be terminated. In the case of a student who already has an A.M. in Chinese or Japanese when admitted to the department, the evaluation takes place in the Spring Quarter of the student’s first year. If a student goes to the Taipei or Yokohama centers during his or her first two years, the department will consider an extension for admission to candidacy. The timing of the evaluation of a student admitted with an A.M. in East Asian Studies is decided on an individual basis.

Admission to candidacy does not mean that the student has fulfilled all requirements for the degree except the dissertation, but that the department faculty consider the student qualified to pursue a program of study leading to the Ph.D. and that, subject to continued satisfactory progress, the student’s status in this department is secure.

REQUIREMENTS

A candidate must fulfill the following requirements:

1. Demonstrate a reading knowledge of French, German, or another European language approved by the graduate adviser.
2. Complete two seminars at the 300 level. These seminars must be in different subjects.
3. Pass an examination in the supporting Asian language. A candidate whose field is Chinese is examined on his or her ability to read modern Japanese works relevant to his or her field of study. This requirement may be met by taking Japanese 101, 102, and 103 or 104 for letter grades. A candidate whose field is Japanese is examined on the ability to read classical Chinese works relevant to his or her field of study. This requirement may be met either by taking Chinese 205, 206, and 207 for letter grades.
4. Pass a set of four comprehensive written examinations, one of which tests the candidate’s methodological competence in a discipline. The remaining three fields are chosen, with the approval of the graduate adviser in consultation with the student’s individual adviser, from the following: anthropology, art, Chinese literature, history, Japanese literature, linguistics, philosophy, and religion.
5. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter, and taking Chinese, Japanese, or Korean 208 (Teaching Asian Languages).

University Oral Examination—General regulations governing the oral examination are found in the “Graduate Degrees” section of this bulletin. The candidate is examined on questions related to the dissertation, after acceptable parts of it have been completed in draft form.

Dissertation—The candidate must write a dissertation demonstrating ability to undertake original research based on primary materials in Chinese or Japanese.

Ph.D. MINOR

A student taking a minor in Asian Languages must complete at least 30 units of work within the department at the 200 and 300 level, chosen in consultation with a department adviser. The student must elect either Chinese or Japanese 201 unless the department is satisfied that work done elsewhere has provided similar training. The student must also pass a written examination in the Chinese or Japanese language.

STUDYING ABROAD

Students interested in a serious study of Japanese language, history, culture, and social organization are encouraged to apply to the Kyoto Center for Japanese Studies (KCJS), a September-to-April program managed by Stanford and including students from other American universities. Students with two years of Japanese may attend the full academic year, or Autumn or Spring semester only. In Spring Quarter, the Stanford Center for Technology and Innovation (SCTI), also in Kyoto, focuses on Japanese organizations and the political economy of research, development, and production of high technology and advanced industries, followed by a two-to-three month internship in an agency, firm, or laboratory in Japan. For students in a technical major, two quarters of Modern Japanese or Japanese Language, Culture, and Communication B (5 units), or five quarters of Japanese Language, Culture and Communication A (3 units) fulfill the SCTI language requirement; for students in a non-technical major, five quarters of Japanese Language, Culture, and Communication B (5 units) fulfill the SCTI language requirement. For information about other programs in Kyoto, students should contact the Overseas Studies office in Sweet Hall.

Students should take note of the programs of the Inter-University Board for Chinese Language Studies and the Inter-University Center for Japanese Studies located in Yokohama. Stanford is a member of these consortia programs. See “The Institute for International Studies” section in this bulletin.

Attention is also called to the exchange program established with the Department of Chinese at Peking University in Beijing. Those interested in the program should consult the chair of the department early in the academic year.

COURSES

(WSM) indicates that the course meets the Writing in the Major requirements.

Since unavoidable changes occasionally have to be made in course offerings after the Stanford Bulletin has gone to print, students are advised to consult the department each quarter.

GENERAL

These courses are open to all undergraduate and graduate students, are taught in English, and do not require a knowledge of an Asian language.

46. Introduction to Chinese Religions—(Enroll in Religious Studies 55.)
4 units, Win (Cedzich)
3 units (Staff) not given 1999-2000
71N. Stanford Introductory Seminar: Language and Gender in Japan—Myths and Reality—Preference to freshmen. The social position of women in Japan is believed to be reflected in a characteristically feminine form of the language. The past and present speech styles of women, linguistic ideology, class, generation differences, and identity in Japan. How belief and reality are refracted through mass media and fictional representations. Comparisons with male speech styles and with similar phenomena in other cultures. GER:3b,4c (DR:9+)
3 units, Spr (Matsumoto)

249
73/173. Chinese Language, Culture, and Society—Introduction to important functions of the language serve in Chinese culture and society. Topics: the origin of the language, developments of dialects, emergence of the standard, evolution of Chinese writing, language policies in Greater China, language and gender, formulaic expressions preferred in Chinese, etc. Required: one quarter of Chinese 1 or 1B, or equivalent. GER: 3a, 4a (DR: 2 or 7)
4 units, Win (Sun)

74. Women and Children in the May Fourth Literary Imagination—Students examine literary portrayals of women and children as social and cultural metaphors during the May Fourth Period of Chinese history (1919-30s), a period of iconoclastic intellectual ferment which included movements to adopt the use of vernacular Chinese in literature and the exploration of different forms of Western cultural and political models. Images of women and children are looked at as a response to the historical events of that period and a re-assessment of their role in Chinese society.
5 units, Spr (Abraham)

4 units, Win (Suttmeier)

81N. Stanford Introductory Seminar: Writing and Writing Systems—Preference to freshmen. The material nature of writing, primarily writing in languages which do not rely on exclusively phonetic symbols for expression, such as ancient Egyptian, Chinese, Japanese, etc. The representational capabilities, on the micro-level, of such writing in its interplay with other visual arts, its facility with visual puns, and its thematic discussions of major representative works available in English translation. GER: 3a, 4a (DR: 2 or 7)
4 units, Win (Egan)

85C. Aspects of Asian American Culture—(Enroll in Comparative Literature 85C.)
2 units, Aut (Palumbo-Liu, Staff)

86C. Asian Pacific Islander American Men: Contemporary Issues— (Enroll in Comparative Literature 86C.)
2 units, Win (Palumbo-Liu, Staff)

87C: Asian Pacific Islander Women: Contemporary Issues— (Enroll in Comparative Literature 87C.)
2 units, Spr (Palumbo-Liu, Staff)

91. Traditional East Asian Civilization: China—Introduction to Chinese culture in a historical context. GER: 3a, 4a (DR: 2 or 7)
5 units, Aut (Egan)

92. Traditional East Asian Civilization: Japan—Perspectives on Japan's traditional civilization, focusing on the literature, religion, history, music, and visual arts of Japan's medieval period (approximately 1200 to 1600 A.D.). The historical context from which the medieval period emerged, and some of the social and intellectual contributions it made to the development of modern Japan. The focus is on the society of samurai, priests, actors, and poets which created the rich culture of Japan's middle ages. GER: 3a, 4a (DR: 2 or 7)
5 units, Win (Hare)

95. The Japanese Language in Culture and Society—Introduction to the essentials of how the language functions in Japanese society and culture; salient characteristics are contrasted with English. Topics: politeness rules, conversational strategies, language and gender, formulaic expressions and factors that make certain linguistic forms preferred in Japanese. Recommended: one quarter of Japanese 1 or equivalent. GER: 3a (DR: 7)
4 units (Matsumoto) not given 1999-2000

114. Haiku—Japanese haiku from the 16th century to the present. Works of Basho, Buson, Issa, and other representative poets in English translation. Students exchange their readings of individual poems in class, learning how others have filled in the blanks in the text. Analysis of traditional Japanese aesthetics.
3 units (Staff) not given 1999-2000

4 units, Win (Shao)

131/231. Chinese Poetry in Translation—The Chinese poetic tradition from the first millennium B.C. to the 14th century. Traditional verse forms representative of the classical tradition; highlights of the most distinguished poets. Topics on the history, language, and culture relevant to the literary works under study. GER: 3a, 4a (DR: 2 or 7)
4 units, Win (J. Wang)

4 units Spr (Lyell)

133A/233A. Introduction to Modern Chinese Literature—Developments in literature and literary theory in 20th-century China. The May Fourth Period, Mandarin Ducks, and Butterfly urban popular fiction, the socialist realism era beginning in the 1930s and extending through the Yan'an days in the 1940s, the Cultural Revolution, and the rapidly changing literary forms of post-Mao society. Readings in English. GER: 3a, 4a (DR: 2 or 7)
4 units, Spr (Sang)

135. Classic Japanese Drama—The development of drama from early religious ritual forms through noh, puppet theater, and kabuki. Plays are analyzed as dramatic literature and in terms of performance. Texts are in English translation. Video tapes supplement lectures. GER: 3a (DR: 7)
4 units (Hare) not given 1999-2000

137/237. Classical Japanese Fiction in Translation—Introduction to major works of prose narrative from premodern Japan (7th through mid-19th centuries) read in English translation, and emphasizing the historical, intellectual, and cultural context in which they were written. Work varies each year; may be repeated for credit with instructor's consent.
4 units, Aut (Wallace)

138/238. Modern Japanese Literature in Translation—Required for Japanese majors. Introduction to Japanese literature since 1868. Authors: Futabatei Shimei, Higuchi Ichiyo, Natsume Soseki, Yoshimoto Banana, etc. GER: 3a, 4a (DR: 2 or 7) (WIM)
4 units, Win (A. Ueda)

141. Chinese Mythology and Lyrical Imagination—Introduction to Chinese mythology. The mythic narratives about Chinese ancestry, legendary dynasties, natural deities, and divine heroes in Chinese culture, and the dissemination of myths in poetry that reenact earlier
mythopoetic impulses and/or invoke primal fears and desires in different historical contexts. Approach is eclectic, incorporating Chinese and Western perspectives and drawing on theories of sinologists and general mythologists. GER:3a (DR:7)
4 units (Liu) not given 1999-2000

168. Introduction to Asian American Culture—(Enroll in Comparative Literature 168.)
5 units, Win (Pal gum-Bo Liu)

173.—For juniors and seniors. See 73.
4 units, Win (Sun)

181. Japanese Women Writers—Works in translation by women novelists and poets from the Meiji period to the present. Focus is on women’s response to their marginal role in Japanese society and the literary establishment.
4 units (Staff) not given 1999-2000

187/287. Romance, Desire, and Sexuality in Modern Japanese Literature—Constructions of romance, desire, and sexuality (sexual connoisseurship, love suicide, nan shoku, etc.) in Edo Japan and how these paradigms are reconfigured by modern writers. Readings: Saikaku, Chikamatsu, Ichiy, So seki, Tanizaki, and Mishima. GER:3a,4c (DR:7)
4 units (Reichert) not given 1999-2000

200. Directed Reading—By instructor’s assignment. For both Chinese and Japanese literatures.
units by arrangement, Aut, Win, Spr (Staff)

273. The Postmodern Pacific—(Enroll in Comparative Literature 273.)
5 units (Pal gum-Bo Liu) not given 1999-2000

372. Literary Theory and the Necessary Fiction of Asia—Examination of effective multiculturality (fantasy, misunderstanding, exaggeration, projection, and mirror effects) in the theories about literature and culture. The enabling role of a hypothetical “other” culture, integrating the lessons into our practice as students of Asia. Readings from Hegel, Nietzsche, Segalen, Pound, Husserl, Corbin, Heidegger, Foucault, Derrida, de Man, Geertz, Said, Kristeva, Clifford, etc.
5 units (Saussy) not given 1999-2000

CHINESE
FIRST- AND SECOND-YEAR LANGUAGE

Note—Students registering for the first time in a first- or second-year course must take a placement test if they have had any training in Chinese before entering Stanford. All entering students must take Part I (written) of the placement test on-line during the summer, followed by Part II (oral), to be administered on campus 9/26/99. Consult the Stanford Language Center for further information or see the web site.

1, 2, 3. First-Year Modern Chinese—Conversation, grammar, reading, elementary composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements.
1. 5 units, Aut (Chung, Zeng, Choy)
2. 5 units, Win (Chung, Zeng, Choy)
3. 5 units, Spr (Chung, Zeng, Choy)

1B, 2B, 3B. First-Year Modern Chinese for Bilingual Students—For students with elementary comprehension and speaking skills. Provides a basic knowledge of modern Chinese literature and culture, improving conversation and grammar.
1B. 3 units, Aut (Rozelle, Staff)
2B. 3 units, Win (Rozelle, Staff)
3B. 3 units, Spr (Rozelle, Staff)

4. Intensive First-Year Modern Chinese—Equivalent to 1, 2, and 3 combined. Five weeks at Stanford and four weeks at Peking University.
8 units, Sum (Staff)

6, 7, 8. Beginning Conversational Chinese—Three-quarter sequence equips students with basic language skills in Mandarin to function abroad.
2 units, Aut, Win, Spr (Rozelle, Staff)

10, 11, 12. Beginning Southern Min (Taiwanese) Conversation
2 units, Aut, Win, Spr (Lin)

15, 16, 17. Beginning Cantonese Conversation—Three-quarter sequence designed to equip students with the basic language skills needed in everyday life situations.
2 units, Aut, Win, Spr (Choy)

21, 22, 23. Second-Year Modern Chinese—Further study in grammar, reading, conversation, composition. Prerequisite: 3 or equivalent.
21. 3 units, Aut (Chan, Staff)
22. 3 units, Win (Chan, Staff)
23. 3 units, Spr (Chan, Staff)

21B, 22B, 23B. Second-Year Modern Chinese for Bilingual Students—For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Equivalent to 21, 22, 23.

21B. 3 units, Aut (Staff)
22B. 3 units, Win (Staff)
23B. 3 units, Spr (Staff)

25. Intensive Second-Year Modern Chinese—Equivalent to 21, 22, 23 combined. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 3 or equivalent.
8 units, Sum (Staff)

27, 28, 29. Intermediate Chinese Conversation—Prerequisite: 3 or consent of instructor.
27. 2 units, Aut (Chan)
28. 2 units, Win (Chan)
29. 2 units, Spr (Chan)

51. Chinese Calligraphy—Practice in writing Chinese characters with a brush and learning different scripts. Limited enrollment. May be repeated for credit. Prerequisite: 3 or equivalent. (AU)
1-2 units, Win, Spr (Chuang)

99. Language Specials—With consent of department only. See instructor for section number.
1-5 units, Aut, Win, Spr (Staff)

ADVANCED

101, 102, 103. Third-Year Modern Chinese—Designed to help students solidify and further their communicative ability in Chinese through contact with various written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; on-line Chinese software and e-mail network to facilitate study. Prerequisite: 23 or equivalent.
5 units, Aut, Win, Spr (Li)

101B, 102B, 103B. Third-Year Modern Chinese for Bilingual Students—For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Equivalent of 101, 102, 103.
3 units, Aut, Win, Spr (Li)
105. Intensive Modern Chinese—Equivalent to 101, 102, 103 combined. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 23 or equivalent.
121. 2 units, Sun (Staff)

121.2,3. Advanced Chinese Conversation—Prerequisite: 23 or equivalent.
121. 2 units, Aut (Chung)
122. 2 units, Win (Chung)
123. 2 units, Spr (Chung)

125.126.127. Beginning Classical Chinese—For students who need to develop a reading knowledge of Classical Chinese and have completed at least two years of Modern Chinese, or its equivalent. Students who have no background in Classical Chinese and are taking 127 to satisfy Chinese major requirements must begin with 125. Introduces basic grammar and commonly used vocabulary of classical Chinese. Prerequisite: 23 or equivalent.
125. 5 units, Aut (Sun)
126. 5 units, Win (Sun)
127. 5 units, Spr (Sun)

131.132.133. Business Chinese—Chinese for doing business (specialized vocabulary on commercial, economic, and business-related subjects). Materials include a text of formal conversations of typical business transactions, newspaper and journal articles, and TV news broadcasts on foreign trade and economic development in the world. Students achieve a familiarization with the technical language and business etiquette, and report in spoken and written Chinese based on their own research regarding recent economic developments, using sources in Chinese. Prerequisite: 23 or equivalent.
131. 3-4 units, Aut (Li)
132. 3-4 units, Win (Li)
133. 3-4 units, Spr (Li)

191. The Structure of Modern Chinese—Introduction to the grammatical structure of Chinese, focusing on syntax and semantics. Designed to help students, who have had one year or more of modern Chinese, develop a sophisticated knowledge of Chinese grammar. Prerequisite: 3 or equivalent, or consent of instructor.
4 units (Sun) not given 1999-2000

192. The History of Chinese—Historical changes in the Chinese language in the last 2,000 years, emphasizing syntactic and semantic changes, and grammaticalization. Students use a computer corpus to do research on the history of Chinese. Prerequisite: 206 or consent of instructor.
4 units (Sun) not given 1999-2000

199. Individual Reading in Chinese—Asian Languages majors only. Prerequisite: 103 or consent of instructor.
4 units, Aut, Win, Spr (Staff)

GRADUATE

200. Directed Reading in Chinese—Prerequisite: 213 or 223, or consent of instructor.
units by arrangement, Aut, Win, Spr (Staff)

201. Proseminar—Introduction to the research tools and sources relevant to Chinese humanistic studies, taught as a workshop with participation by faculty from various departments. Prerequisite: knowledge of classical Chinese.
5 units, Aut (Saussy, Staff)

205.206.207.—For graduate students; see 125, 126, 127.
205. 5 units, Aut (Sun)
206. 5 units, Win (Sun)
207. 5 units, Spr (Sun)

208. Teaching Asian Languages—Lectures on teaching methods, class visitsations, and in-class teaching exercises prepare students for a career in teaching. May be repeated for credit. Pass/no credit only. Prerequisite: consent of mentor teacher.
2 units, Spr (Matsumoto)

211.212.213. Advanced Modern Chinese—Appropriate for non-majors and individuals with language experience overseas. Year-long sequence helps students become functional speakers, readers, and writers of modern Chinese through articles and essays from newspapers, magazines, and scholarly journals. Frequent opportunities for oral presentations reflect the students’ interests and form the basis of papers. Prerequisite: minimum three years of Chinese language training.
211. 5 units, Aut (Staff)
212. 5 units, Win (Staff)
213. 5 units, Spr (Staff)

214. Introduction to Modern Chinese Literature I—Introduction to modern and contemporary Chinese literature (short stories, novels, plays, and poetry) through annotated texts. Students discuss materials in Chinese during class. Prerequisite: three years of modern Chinese.
5 units (Lyell) not given 1999-2000

215. Introduction to Modern Chinese Literature II—Continuation of
214. Prerequisite: advanced Chinese.
5 units (Lyell) not given 1999-2000

221,222,223. Advanced Classical Chinese—Prerequisite: 207 or equivalent.
221. 3-4 units, Staff not given 1999-2000
222. Historical Narration
5 units, Spr (J. Wang)
223. Literary Essays—Prerequisite: basic classical Chinese.
5 units (Li) not given 1999-2000

241. The Short Story—Prerequisite: three of four years of Chinese.
5 units, Aut (Lyell)
242. Essay
5 units (Staff) not given 1999-2000
243. The Novel
5 units, Win (Lyell)

244. Workshop in Translation—Students practice translating modern and contemporary Chinese works of literature into good English. Books and articles on the theory and practice of translation are required. Students translate identical works and criticize and improve each other’s work. Tool books are introduced and discussed. Prerequisite: advanced Chinese.
5 units (Lyell) not given 1999-2000

251. 3-4 units, Aut (Li)
252. 3-4 units, Win (Li)
253. 3-4 units, Spr (Li)

261. Sources of Chinese Poetry—Selections from the Book of Songs (c. 1000-500 B.C.) and the Songs of Ch’u (c. 400 B.C.), the two earliest anthologies of Chinese poetry.
4 units (Saussy) not given 1999-2000

262. Early Chinese Prose and Verse Genres—Readings from the 6th-century anthology Wen xuan, encompassing examples of the shi lyric, the fu rhapsody, critical essays, letters, deliberations, memorials, eulogies.
etc. Focus is on the intrinsic interest of the texts and on the anthologists’ reasons for singling them out as model compositions. Readings in classical Chinese. Prerequisite: 207 or consent of instructor.

4 units (Saussy) not given 1999-2000

263. Lyric (shī) I—Selected readings in the early history of the lyric (shī), Han through Sui dynasties.
4 units (Liu) not given 1999-2000

264. Lyric (shī) II—In-depth examination of T’ang poetry, focusing on major figures and forms.
4 units (Liu) not given 1999-2000

266. Chinese Tz’u Poetry (Song Lyrics)—Highlights from the Northern and Southern Sung periods. Patterns of generic development are correlated to social changes in historical context. Prerequisite: classical Chinese.
4 units (Liu) not given 1999-2000

267. Methodologies in Approaching Modern and Contemporary Chinese Literature—Survey of the methodologies various scholars have employed in looking at, and writing about, modern and contemporary Chinese literature. Students are expected to write a reasoned summary of their own methodology.
5 units, Aut (Lyell)

271,272. Traditional Chinese Fiction—Selected readings in short stories and novels from early times to Ch’ing. Prerequisite: 127/207 or consent of instructor.
4 units (J. Wang) not given 1999-2000

272. Novels
4 units (J. Wang) not given 1999-2000

273. Chinese Drama—Selected readings in the dramatic works of the Yulan, Ming, and Ch’ing periods emphasizing literary, not theatrical qualities. Prerequisite: 207 or consent of instructor.
4 units, Win (J. Wang)

274. Apparitions of Women in Traditional Chinese Fiction—Selections from Lienu zhu, (a Han Dynasty exemplar book), Sai Yangdi yanyi, Nü caizi shu, and Hong lou meng.
4 units (Saussy) not given 1999-2000

282. Qing Intellectual History—The main trends of Qing thought at different stages, from the mid-17th to the late 19th centuries. The Manchu ruler’s political theories and classical Confucian literati learning. The variety and changes in Qing intellectual history.
4 units, Win (Shao)

286. Women Writers of Transnational China—Chinese women writers across national borders, focusing on contemporary novelists in Taiwan, Hong Kong, and the mainland. Their stylistic innovations and approaches to gender, culture, and national identities. The contours and boundaries of transnational China through the female imaginary. Writers: Wang Anyi, Lin Bai, Chen Ran, Zhu Tianxin, Li Ang, Chen Xue, Xi Xi, Anchee Min.
4 units, Spr (Sang)

289. Master’s Thesis or Translation—A total of 5 units taken in one or more quarters.
Aui, Win, Spr (Staff)

324. Seminar in Modern Chinese Literature—May be repeated for credit. Prerequisite: 243 or consent of instructor.
5 units (Lyell) not given 1999-2000

368. Dream of the Red Chamber: The Novel and its Readers—A study of the novel Hong lou meng (ca. 1750) by Cao Xueqin and Gao E, together with its major commentaries, and a study of the intrinsic field of Hong lou meng criticism, one of the major areas of cultural debate in modern China. Methods of Euro-American criticism are tested against this important work. Readings mainly in Chinese.
4 units (Saussy) not given 1999-2000

371. Seminar in Chinese Literary Criticism—Readings/discussion of Chinese critical texts vs. a relevant literary theories in the West. May be repeated for credit. Prerequisite: 127/207 or consent of instructor.
5 units (J. Wang) not given 1999-2000

373. Seminar on the Tso-chuan—In-depth reading and study of the Tso-chuan as history and literature. Prerequisite: 127/207 or consent of instructor.
5 units, Spr (J. Wang)

1-12 units, Aut, Win, Spr, Sum (Staff)

400. Advanced Language Training—Open only to students in the Inter-University Board for Chinese language programs in Beijing or Taipei. For more information, contact the consortium office at U.C. Berkeley (510) 642-3873.
1-15 units per quarter (Staff)

JAPANESE

FIRST- AND SECOND-YEAR LANGUAGE

Note—Students registering for the first time in a course must take a placement test if they have had any training in Japanese before entering Stanford. All entering students must take Part I (written) of the placement test on-line during the summer, followed by Part II (oral), to be administered on campus 9/26/99. Consult the Stanford Language Center for further information or see the web site.

FIRST-YEAR JAPANESE

1,2,3. First-Year Modern Japanese—Provides students with a solid foundation in grammar, conversation, reading, and basic composition (150 Kanji characters introduced).
1. 5 units, Aut (Busbin)
2. 5 units, Win (Busbin)
3. 5 units, Spr (Busbin)

5. Intensive First-Year Modern Japanese—Equivalent to 1, 2, and 3 combined.
12 units, Sum (Staff)

7A/107A, 8A/108A, 9A/109A. First-Year Japanese Language, Culture, and Communication A—Strongly recommended for those interested in studying in Japan in a program such as SCTI. Focus is on the skills necessary to communicate successfully in Japanese, offering a practical means of acquiring a working knowledge of current Japanese. On-line listening exercises, audiovisual materials, and Kanji tutorials enhance students’ competence. At the completion of the course, students
are able to talk, write, and read on topics such as personal history, experiences, familiar people, and places. Serves as the core course of the 5 units option of JLCC (7B/107B, 8B/108B, and 9B/109B). See http://www-leland.stanford.edu/class/japanese7/j7a.html.

7A/107A. 3 units, Aut (Okano)
8A/108A. 3 units, Win (Okano)
9A/109A. 3 units, Spr (Okano)

7B/107B, 8B/108B, 9B/109B. First-Year Japanese Language, Culture, and Communication B—Strongly recommended for those interested in studying in Japan in a program such as SCTI. Enhances the students' ability to use Japanese as a tool, building on language competence developed in 7A/107A, 8A/108A, 9A/109A. Two components focus on the cultural background necessary for successful communication, and on speaking and listening strategies for effective communication. See http://www-leland.stanford.edu/class/japanese7/j7b.html.

7B/107B. 5 units, Aut (Okano)
8B/108B. 5 units, Win (Okano)
9B/109B. 5 units, Spr (Okano)

SECOND-YEAR JAPANESE


17A/117A. 3 units, Aut (Kubo)
18A/118A. 3 units, Win (Kubo)
19A/119A. 3 units, Spr (Kubo)


17B/117B. 5 units, Aut (Kubo)
18B/118B. 5 units, Win (Kubo)
19B/119B. 5 units, Spr (Kubo)

21, 22, 23. Second-Year Modern Japanese—Continuation of Japanese 3 (or 5). Students develop conversation and expression of ideas, master more advanced grammatical patterns, use 600 kanji, write simple compositions, and have an enhanced understanding of Japanese culture. At the completion of the sequence, students can read original source material. Prerequisite: 3 or equivalent.

21. 5 units, Aut (Nebri, Aroa)
22. 5 units, Win (Aroa)
23. 3 units, Spr (Aroa)

25. Intensive Second-Year Modern Japanese—Equivalent to 21, 22, and 23 combined. Prerequisite: 3 or equivalent.

26 units, Sum (Staff)

27, 28, 29. Intermediate Japanese Conversation—Develops oral proficiency ("survival level") through the practice of simple sentence patterns, use of audiotapes, and oral presentations. Targeted for the practical use of Japanese. Prerequisite: 3 or consent of instructor.

27. 2 units, Aut (Gibeau)
28. 2 units, Win (Kikunaga)
29. 2 units, Spr (Kikunaga)

99. Language Specials—With consent of department only. See instructor for section number.

1-5 units, Aut, Win, Spr (Staff)

THIRD-YEAR ADVANCED JAPANESE

101, 102, 103. Third-Year Modern Japanese—Third-year Japanese students move beyond acquisition of fundamental grammatical forms reading and discussion of more complex material. Emphasis is on the accurate understanding of Japanese sentence structure in newspaper and journal articles; and readings from other genres (fiction, poetry, and essays). Polite language (keigo) skills and additional written and spoken patterns are mastered. Videos of everyday Japanese spoken at normal speed develop listening skills. Sequence course. Prerequisite: 23 or equivalent.

101. 5 units, Aut (Aroa)
102. 5 units, Win (Aroa)
103. 5 units, Spr (Aroa)

105. Intensive Third-Year Modern Japanese—Equivalent to 101, 102, and 103 combined. Prerequisite: 23 or equivalent.

12 units, Sum (Staff)

111, 112, 113. Business Japanese—Conducted entirely in Japanese. Readings/discussions focus on business-related topics: cultural attitudes and approaches, work ethic, the stock market, import-export trade. Introduction to business letters, job interviews, and resume writing. May be repeated for credit. Prerequisite: 23 or 25 or consent of instructor.

111. 3 units, Aut (Fukuma)
112. 3 units, Win (Fukuma)
113. 3 units, Spr (Fukuma)

114. Japanese for Business—Eight-week summer course designed to improve Japanese language skills as used in business circles in Japan. Focuses on cultural attitudes and approaches, the stock market, international trade, business letters, usage of honorific forms and expressions, telephone etiquette, etc. Entirely in Japanese. Prerequisite: 23 or equivalent.

3 units, Sum (Staff)

121, 122, 123. Advanced Japanese Conversation—Creates "paragraph persons" with three focal points: fine tuning grammatical points, practice explaining things in Japanese, more fluency in speech. Use of audio/visual tapes, oral presentations, and discussions. Prerequisite: 23, 29, or consent of instructor.

121. 2 units, Aut (Kubo)
122. 2 units, Win (Kubo)
123. 2 units, Spr (Kubo)

127A, 128A, 129A. Third-Year Japanese Language, Culture, and Communication A

3 units, not given 1999-2000


127. 5 units, Aut (Okano)
128. 5 units, Win (Okano)
129. 5 units, Spr (Okano)

177/277. The Structure of Japanese—Linguistic analysis of the major grammatical structures of Japanese, focusing on their salient characteristics and functions. Prerequisites: two years of Japanese. Recommended: previous course in linguistics.

4 units (Matsumoto) not given 1999-2000

199. Individual Reading in Japanese—Asian Languages majors only. Prerequisite: 103 and consent of instructor.

4 units, Aut, Win, Spr (Staff)
200. Directed Reading in Japanese—Prerequisite: 213 or equivalent.
units by arrangement, Aut, Win, Spr (Staff)

201. Proseminar—Bibliography and research methods in Japanese studies. Prerequisite: 103 or equivalent.
5 units, Win (Wallace)

208. Teaching Asian Languages—Lectures on teaching methods, class visitations, and in-class teaching exercises to prepare students for a career in teaching. May be repeated for credit. Prerequisite: consent of mentor teacher.
2 units, Win (Matsumoto)

211, 212, 213. Advanced Modern Japanese—Increase the ability to understand the structure of Japanese, become familiar with writings in different genres and styles, utilize such knowledge in writing, and discuss and express verbally questions and opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: 103 or equivalent.
211. 3-5 units, Aut (Matsumoto)
212. 3-5 units, Win (Kubo)
213. 3-5 units, Spr (Kubo)

246. Introduction to Classical Japanese—The basic principles of the classical literary language, concentrating on grammar and vocabulary. Prerequisite: 103 or equivalent.
5 units, Aut (Wallace)

247, 248. Readings in Classical Japanese—Readings of texts in classical Japanese from Nara through Tokugawa periods. Literary analysis, rhetoric, and poetics (Japanese and Western). Offered alternate years and can be taken independently. Prerequisite: 246.
247. 5 units, Win (Wallace)
248. 5 units, Spr (A. Ueda)

258. Japanese Buddhist Texts—(Enroll in Religious Studies 258.)
5 units, Spr (Bielefeldt)

4 units (Hare) not given 1999-2000

281. Master's Thesis or Translation—A total of 5 units, taken in one or more quarters.
Aut, Win, Spr (Staff)

330. Seminar in Heian Fiction—Advanced work in Heian fiction, concentrating on Genji monogatari. Substantial reading in the original text, discussions of narrative voice, literary structure, the interaction of poetry and prose, and critical reception. Students complete a major paper. Prerequisite: 247 or 248.
5 units (Hare) not given 1999-2000

333. Seminar in Japanese Classical Drama—Advanced work in traditional dramatic forms, emphasizing the relation between text and performance in Noh, Joruri, and other performance narratives. Paper. Prerequisite: 247 or 248 or consent of instructor.
5 units, Win (Hare)

336. Seminar: Writing in Early Japan—Advanced work in the textualities of the 6th through mid-8th century Japan. Focus is on Man'yoshu, with attention to other early texts of literary, historical, and/or religious interest. Prerequisites: 246, and 247 or 248.
5 units (Hare) not given 1999-2000

396. Seminar in Modern Japanese Literature—May be repeated for credit. Prerequisite: 213.
5 units, Aut (A. Ueda)

1-12 units, Aut, Win, Spr, Sum (Staff)

400. Advanced Language Training—Open only to students at the Yokohama Center. For more information, see the program description under the “Inter-University Center for Japanese Studies in Yokohama” section in this bulletin.
1-15 units per quarter (Staff)

KOREAN

1, 2, 3. First-Year Modern Korean—Elementary spoken and written Korean, equipping students with basic sentence patterns using basic vocabulary. Speaking, reading, writing, and listening comprehension with spoken language emphasized. Students develop the ability to say greetings, tell time, carry on limited conversation in classrooms, stores, and ask directions.
5 units, Aut, Win, Spr (Cho)

21, 22, 23. Second-Year Modern Korean—Intermediate spoken and written Korean, providing students with more complex sentences in advanced grammatical patterns, building on the grammatical structures taught and learned during first-year Korean. Students are expected to be competent in conversing on topics in daily life situations. Emphasis is on speaking, reading, writing, and listening comprehension. Students communicate at an intermediate level of topics in everyday life, read simple texts, and have a good knowledge of Korean culture.
5 units, Aut, Win, Spr (Cho)

101, 102, 103. Third-Year Modern Korean—Advanced spoken and written Korean. Develops communicative competence in reading, writing, speaking, and listening skills. Students build their vocabulary, heighten their reading ability, and strengthen aural/oral skills. Through weekly writing assignments, students learn about syntax, pragmatic ways of expression, and logical ways of thinking in Korean. Short story telling, free-group discussion, and acquaintance with Korean drama, movie, news, newspapers, and songs.
1-3 units, Aut, Win, Spr (Cho)

171/271. The Structure of Korean—Introduction to modern Korean linguistics, focusing on history, phonology and morphology, syntax and
astrophysics: 100, Introduction to Observational and Laboratory Astronomy. The following courses are suitable for undergraduates oriented course of study should contact the chair of the Astronomy Program Committee. The following courses are suitable for advanced undergraduates, subject to prior approval by the course instructor.

**208. Teaching Asian Languages**—Lectures on teaching methods, class visitations, and in-class teaching exercises. Prepares students for a career in teaching. May be repeated for credit. Prerequisite: consent of instructor.
2 units, Win (Cho)

**ASTRONOMY COURSE PROGRAM**

*Emeriti: (Professors)* Ronald N. Bracewell, Von R. Eshleman, John R. Spreiter, Peter A. Sturrock

*Committee in Charge: (Director)* Vahe Petrosian; Roger W. Romani, Robert V. Wagoner, Arthur B. C. Walker, Jr., Jeffrey Willick

*Professors:* Blas Cabrera (Physics), Peter Michelson (Physics), Vahe Petrosian (Physics, Applied Physics), G. Leonard Tyler (Electrical Engineering), Robert V. Wagoner (Physics), Arthur B. C. Walker, Jr. (Physics, Applied Physics)

*Associate Professor:* Roger W. Romani (Physics)

*Assistant Professors:* Sarah Church (Physics), Jeffrey Willick (Physics)

*Professor (Research):* Philip H. Scherrer

Although Stanford University does not have a degree program in astronomy or astrophysics, teaching and research in various branches of these disciplines is an ongoing activity in the departments of Applied Physics, Electrical Engineering, and Physics. For the convenience of students interested in the general areas of astronomy, astrophysics, and cosmology, a course program for undergraduate and graduate study is listed below.

The program is especially committed to providing introductory courses for the student who wishes to be informed about the fields of astronomy without the need for prerequisites beyond high school algebra and physics. Astronomy courses numbered below 100 are designed to serve this group of students.

Astronomy courses numbered 100-199 serve the student interested in an initial scientific study of astronomy.

The courses numbered 200 and above are for graduate students and advanced undergraduates, subject to prior approval by the course instructor.

**UNDERGRADUATE PROGRAMS**

The University does not offer a separate undergraduate major in astronomy. Students who intend to pursue graduate study in astronomy or space science are encouraged to major in physics, following the advanced sequence if possible, or in electrical engineering if the student has a strongly developed interest in radioscience. The course descriptions for these basic studies are listed under the appropriate department sections of this bulletin. Students desiring guidance in developing an astronomy-oriented course of study should contact the chair of the Astronomy Program Committee. The following courses are suitable for undergraduates and are recommended to students considering advanced study in astronomy or astrophysics: 100, Introduction to Observational and Laboratory Astronomy; 106, Planetary Exploration; 160, Introduction to Stellar and Galactic Astrophysics; 161, Extragalactic Astrophysics and Cosmology. Students planning study in astronomy beyond the B.S. are urged to take 260 and 262, Introduction to Astrophysics and to Gravitation, and consider an undergraduate thesis (Astronomy 169) or honors thesis in astrophysics-related area. The above-mentioned courses are required in physics majors who choose the curriculum with concentration in astrophysics (see the "Physics" section of this bulletin). The student observatory, located in the hills to the west of the campus and equipped with a 24-inch and other small reflecting telescopes, is used for instruction on the observation-oriented courses.

**MINORS**

The minor program in Astronomy is described in the "Physics" section of this bulletin. A non-technical minor, intended for students whose major does not require the Physics 40 series, requires 9 units of Physics courses (21, 23, 25) and 10 units of Astronomy courses (50 or 100, 34 units; 15, 16, 18N, 27, and 162, 6-7 units). The technical minor for other students consists of Physics courses 27, 70, 100, 160, 161, and 162.

To be accepted to the minor program, students need to obtain an advisor selected from the faculty in the Astronomy Course Program. The minor declaration deadline is three quarters before graduation (that is, beginning Autumn Quarter if the student is graduating at the end of Spring Quarter). All courses for the minor must be taken at Stanford University, and a letter grade of "C" or better must be received for all units applied toward the minor.

**GRADUATE PROGRAMS**

Graduate programs in astronomy and astrophysics, and related topics, are carried out in the departments of Applied Physics, Electrical Engineering, and Physics. Students should consult the course listings, degree requirements, and research programs of these departments for more detailed information. For graduate research opportunities, see the "Center for Space Science and Astrophysics" section of this bulletin.

Stanford is a member of a consortium building the Hobby Eberly telescope, a 10-meter-class telescope to be located at McDonald Observatory in Texas. Construction of the telescope is nearly completed. Opportunities to do research projects using this telescope were available for graduate students starting in late 1998.

Students planning to conduct research in astronomy and astrophysics are required to take Physics 360 (Physics of Astrophysics) and at least one of the following: 361 (Stellar and Galactic Physics), 362 (Extragalactic Astrophysics and Cosmology) or Applied Physics 363 (Solar Physics). Students lacking background in astrophysics, gravitation, and plasma physics are recommended to take Physics 260 and 262, Introduction to Astrophysics and to Gravitation, and Applied Physics 312 on Plasmas and Plasma Physics. Students with special interests in theories of gravitation are recommended to take Physics 364, Advanced Gravitation.

Students interested in research programs in space physics involving spacecraft studies of the planets, their satellites, and their near-space environments should see the "Center for Space Science and Astrophysics" section of this bulletin.

**COURSES**

**ELEMENTARY LECTURES**

The following courses provide a descriptive knowledge of astronomical objects and astrophysics of the universe. 15A and B are for students not majoring in the sciences and are taught in different quarters by different instructors, but are related in topic. 27 is similar to 15, but at a more quantitative level. Students cannot receive credit for more than one of these courses. 18N is a freshman seminar and 81Q and 82Q are sophomore discussions.

**PHYSICS**

15. The Nature of the Universe
3 units, Aut (Wagoner)

16. Cosmic Horizons
3 units, Spr (Romani)
18N. Stanford Introductory Seminar: Revolutions in Concepts of the Cosmos
4 units, Spr (Walker)

27. Evolution of the Cosmos
3 units, Win (Wagoner)

31Q. Stanford Introductory Dialogue: Lookback Time in Cosmology
1 unit, Win (Romani)

32Q. Stanford Introductory Dialogue: Expanding Cosmic Horizons
1 unit, Aut (Wagoner)

OBSERVATORY
The following courses are intended to familiarize students with observational methods and analysis of astronomical data. 100 involves more advanced observations and is intended for students with some background in physics.

PHYSICS

50. Astronomy Laboratory and Observational Astronomy
3-4 units, Aut, Sum (Walker)

100. Introduction to Observational and Laboratory Astronomy
4 units, Win (Walker)

ADVANCED UNDERGRADUATE
The following courses are for students with more advanced knowledge of basic physics and mathematics and form the core courses for a concentration in astrophysics for Physics majors.

ELECTRICAL ENGINEERING

106. Planetary Exploration
3 units, Spr (Fraser-Smith)

PHYSICS

160. Introduction to Stellar and Galactic Astrophysics
3 units, Aut (Petrosian)

161. Introduction to Extragalactic Astrophysics and Cosmology
3 units, Spr (Church)

169 A,B,C. Independent Study in Astrophysics and Honors Thesis
1-9 units, Aut, Win, Spr (Staff)

GRADUATE

PHYSICS

260. Introduction to Astrophysics
3 units

262. Introduction to Gravitation
3 units, Spr (Wagoner)

301. Astrophysics Laboratory
3 units, Sum (Walker)

360. Physics of Astrophysics
3 units

361. Stellar and Galactic Astrophysics
3 units

362. Extragalactic Astrophysics and Cosmology
3 units, Spr (Petrosian)

363. Solar and Solar-Terrestrial Physics
3 units, Win (Kosovichev) alternate years, not given 2000-01

364. Advanced Gravitation
3 units

463. Special Topics in Astrophysics
3 units

ATHLETICS, PHYSICAL EDUCATION, AND RECREATION

Emeriti: (Professor) Wesley K. Ruff; (Associate Professor) William P. Fehring; (Athletic Director) Joseph H. Ruetz; (Associate Director) Robert C. Young; (Assistant Director) Shirley Schoof

Athletic Director: Ted Leland
Senior Associate Athletic Director: Cheryl Levick
Associate Athletic Director, External Relations: Jon Denney
Associate Athletic Director, Finance and Operations: Debra Gore-Mann
Assistant Athletic Director, Community and Student Relations: Darrin Nelson
Assistant Athletic Director, Operations and Events: Ray Purpur
Assistant Athletic Director, Development: Karen Recht
Assistant Athletic Director, Finance: Chuck Spielman
Assistant Athletic Director, Marketing, Tickets: Bob Carruesco
Assistant Athletic Director, Football Operations/Athletic Services: Scott Schuhmann
Assistant Athletic Director, Media Relations: Gary Migdol
Assistant Athletic Director, Student Services: Susan Burk
Assistant Athletic Director, Intercollegiate Sports and Championships: Earl Koberlein

Director, Major Gifts: John R. Kates
Director of Physical Education, Club Sports, Intramurals and Recreation: to be announced

Senior Lecturers: Anne Gould, Elizabeth Weeks

Sports Directors: Aimee Baker (Crew, women), Steve Bourdow (Sailing), Frank Brennan (Tennis, women), Bobby Clark (Soccer, men), Heidi Connor (Lacrosse), Mark Cook (Gymnastics, women), Dante Dettamanti (Water Polo, men), Gail Emery (Synchronized Swimming), Wallace Goodwin (Golf, men), Richard Gould (Tennis, men), Sadao Hamada (Gymnastics, men), Chris Horpel (Wrestling), Cheryl Johnson (Field Hockey), Skip Kenney (Swimming, men), Wieslaw Kuja (Crew, men), Vin Lanana (Track and Field), Mark Marquez (Baseball), Mike Montgomery (Basketball, men), Ruben Nieves (Volleyball, men), Caroline O’Connor (Golf, women), Richard Quick (Swimming, women), John Rittman (Softball), Richard Schavone (Diving), Don Shaw (Volleyball, women), Steve Swanson (Soccer, women), John Tanner (Water Polo, women), Tara VanDerVeer (Basketball, women), Tyrone Willingham (Football)

Sport Assistant Coaches: Lonni Alameda (Softball), Beth Alford-Sullivan (Track and Field), Kyle Asano (Gymnastics, men), Kent Baer (Football), Nathalie Bartleson (Synchronized Swimming), Tom Bratianu (Football), Josh Cohen (Volleyball, women), Denise Corlett (Volleyball, women), Bill Diedrick (Football), Edrick Floreal (Track and Field), Lele Forood (Tennis, women), Kristine Franson (Crew, women), Ross Gerry (Swimming, women), John Kaitz (Crew, men), Ted Knapp (Swimming, men), John Kosty (Volleyball, men), Rene Lyst (Gymnastics, women), Karen Middleton (Basketball, women), Lisa Milgram (Fencing), Chuck Moller (Football), Mark O’Brien (Baseball), Susan Ortwein (Water Polo, women), Buzz Preston (Football), Mike Reilly (Track and Field), Eric Reveno (Basketball, men), Mose Rison (Football), Denny Schuler (Football), Dean Stotz (Baseball), Blaine Taylor (Basketball, men), Dave Tipton (Football), Amy Tucker (Basketball, women), Robert Weir (Track and Field), John Whittington (Tennis, men), Wayne Wright (Gymnastics, women), Philip Zacharias (Football)
From the founding of the University, Stanford’s leaders have believed physical activity is valuable for its own sake and complementary to the educational purpose of the University. The mission of the Department of Athletics, Physical Education, and Recreation is to offer the widest possible range of quality programs for athletic participation and physical fitness at all levels of skill and interest. Within the limitations of its resources, the department provides a broad range of instructional, recreational, and intramural competitive programs for all who wish to participate. The intrinsic value to the participant is the primary criterion by which the worth of the programs should be judged.

The goals of the instructional programs are to promote understanding of the value and role of physical activity as an important dimension of the human condition, to develop performance skills in sport, to develop the habit of participation, and to provide leadership opportunities in athletics, sports, and other physical activities. To this end, the program encompasses a diversity of learning and participating opportunities from informal recreation through organized intramural competition, basic instructional classes, and theoretical study to, and including, intercollegiate athletic competition.

PROGRAMS

No degrees are offered in Physical Education.

INTERCOLLEGIATE ATHLETICS

In keeping with American university tradition, Stanford offers a broad intercollegiate athletic program. The objectives are to provide the opportunity to compete at the highest possible level without jeopardizing the integrity of the individual or the institution; to adhere strictly to all University, association, and conference rules governing athletic participation; and to encourage effectively the achievement of academic goals by student athletes at the same rate as other University students. As a member of the National Collegiate Athletic Association (NCAA), Stanford fields both men’s and women’s varsity teams. Those for men are baseball, basketball, crew, cross country, fencing, football, golf, gymnastics, sailing, soccer, swimming and diving, tennis, track and field, volleyball, water polo, and wrestling. Those for women are basketball, crew, cross country, fencing, field hockey, golf, gymnastics, lacrosse, sailing, soccer, softball, swimming and diving, synchronized swimming, tennis, track and field, volleyball, and water polo.

Both men’s and women’s teams are affiliated with the Pacific Ten Conference, one of the premier athletic conferences in the nation. Additional or alternative intercollegiate athletic competition is available for all teams.

CLUB SPORTS

The Stanford Club Sports program is coeducational. It provides competition in sports not included in the intercollegiate varsity program and instruction in classes or activities not included in the Physical Education program. It also develops student leadership in organizing, administering, and funding activities. The club program is actively supervised by the Director of Club Sports, but the emphasis is on student interest and potential. Those for men are badminton, baseball, basketball, crew, cross country, fencing, hockey, football, golf, gymnastics, sailing, soccer, softball, swimming and diving, tennis, track and field, volleyball, and water polo.

Both men’s and women’s teams are affiliated with the Pacific Ten Conference, one of the premier athletic conferences in the nation. Additional or alternative intercollegiate athletic competition is available for all teams.

INTRAMURAL SPORTS (IM)

Students interested in intramural competition may receive information from the IM Office in Burnham Pavilion or through their campus residences. The program includes formal competition in league and tournament play for many different sports leading toward the All-University, Coed, and Women’s Intramural championships. Competing organizations, teams, and individuals are urged to contact the IM office on the day before the start of classes to obtain meeting dates and times. Each quarter’s printed materials and IM handbooks are available on or after the day before the start of classes. The intramural manager meetings are held the first Wednesday of the first week of classes each Autumn, Winter, and Spring Quarters.

RECREATION

The department provides facility use for faculty, staff, and students (and, for some activities, their immediate families) to participate in aquatics, conditioning, and sports for general recreation. Specific recreation hours for all the facilities are published throughout the year in both the Stanford Report, at the respective facilities, and on the department’s website, www.stanford.edu/dept/pe.

The golf course and driving range are available for faculty, staff, and student use on a fee basis; information is available from the Golf Pro Shop.

FACILITIES

Athletic facilities are located throughout the campus. On the west side of campus are the Golf Course, the Golf Driving Range, the Red Ban Stables, Roble Gym, the Sand Hill Intramural Fields, and the West Campus Tennis Courts. Centrally located is the Tresidder Fitness Center. On the east side of campus are the Arrillaga Family Sports Center, Burnham Pavilion, Cobb Track and Angell Field, the DeGuerre Complex, Encina Tennis Courts, the Ford Center for Sports and Recreation, the Maloney Fields, Maples Pavilion, the Stanford Stadium, Sunken Diamond, and Taube Tennis Stadium.

Off campus facilities include a sailing center and a rowing facility.

CURRICULUM AND SERVICES

The diverse instructional program strives to accommodate the sports interests of all undergraduate and graduate students. Only intercollegiate varsity men’s and women’s teams are limited to undergraduates. Homogeneous skill groupings and limited class sizes enable the beginning student or the advanced performer to achieve success within the limits of individual motivation and potential. Skill level in, and knowledge about, a specific activity as well as available space are the only limitations to enrollment. Physically disabled students are encouraged to contact Anne Gould for enrollment advice.

Academic Credit—Activity classes carry 1 unit of credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other University activity classes) may be applied toward undergraduate graduation requirements (see the "Undergraduate Degrees" section of this bulletin).

Auditing—No auditing is allowed in activity classes. Faculty and staff may take an activity class as space is available with instructor consent after student enrollment is completed.

Class Fees—Fees are charged for enrollment in all physical education classes and club sports.

Class fees are payable only by check or money order. Cash is not acceptable. Checks or money orders should be made payable to Stanford University. Fees are payable at the first, and are required by the second, class meeting for a student to remain in class. Late enrollees must submit fees no later than the second time they attend the class.

Full refund is given to students who drop a class during the first two weeks of classes and request a refund at that time. No refund is given if a student either neglects to request a refund under the conditions listed previously or drops the class after the second week.

Class Sign-Ups vs. Axess—All classes (except varsity and club sports) require sign-ups. Information on sign-up procedures can be found on the department’s web site, www.stanford.edu/dept/pe or under Athletics in the Time Schedule. Students must attend the first class meeting at which time they are informed if they are in the class and, therefore, can register for that class through Axess.

Deadline for Adding a Class—Students who have never appeared in a class may not enroll in that class after the fourth class meeting has passed. Students may add the class after the fourth meeting if they have been in attendance and, for whatever reason, did not get registered until the fourth week (the University deadline for adding courses).
Equipment—Students provide their own rackets for tennis. Specific information on equipment and recommended class attire is available from the department or instructor.

Lockers—Lockers are available for rent to faculty/staff and students at the Arrillaga Family Sports Center and Roble Gym. The fee for faculty/staff is $15 a quarter or $40 a year. The fee for students is $10 a quarter or $25 a year.

COURSES

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

PHYSICAL EDUCATION AND SPORTS THEORY

190. Analysis of Human Movement—Overview of skeletal and muscular anatomy and a study of the mechanical principles of movement as related to efficient performance in aquatics, dance, and sports.

3 units, Aut, Win (Weeks)

LEADERSHIP OPPORTUNITIES IN PHYSICAL EDUCATION

81. Manager: Athletic Team—For student managers of intercollegiate teams. Prerequisite: consent of respective varsity team head coach. (AU)

1 unit, Aut, Win, Spr (Staff)

AQUATIC ACTIVITY AND THEORY

78. Lifeguard Training—Aspects of professional lifeguarding: lifeguard characteristics and responsibilities, recognition of hazards and emergencies, patrol and duty procedures, public service, and rescue skills. Community first aid and CPR for the professional rescuer. Priority to those with summer jobs requiring certification; bring letter from employer to first class meeting. Fee. Prerequisite: pass swim test (swimmer/advanced swimmer level); see instructor for details.

2 units, Spr (Weeks)

106. Sailing: Beginning Keelboat—Basic skills, theory, and techniques to enable beginners to sail with confidence. Emphasis is on safety and seamanship skills. Fee. (AU)

1 unit, Aut, Spr (Bourdow)

107. Sailing: Beginning Dinghy—Basic skills, theory, and techniques to enable beginners to sail with confidence in small centerboard boats. Fee. (AU)

1 unit, Aut, Spr (Bourdow)

108. Sailing: Intermediate—Refinement of skills. Introduction to racing. Fee. Prerequisite: consent of instructor. (AU)

1 unit, Aut, Spr (Bourdow)

109. Sailing: Advanced—Refinement of heavy weather sailing skills, with emphasis on racing. Fee. Prerequisite: 108 or consent of instructor. (AU)

1 unit, Spr (Bourdow)

132. Swimming III: Intermediate—Continued work on crawl, elementary backstroke, backstroke, and sidestroke. Safety skill work as needed. Introduction to or review of breaststroke. Open turns. Introduction to butterfly, flipturn, and conditioning. Fee. Prerequisites: fair technique in crawl, elementary backstroke, backstroke; some sidestroke and breaststroke; ability to swim approximately 100-200 yards continuously by mixing strokes. (AU)

1 unit, Aut, Win, Spr (Gerry, Weeks)

133. Swimming IV: Advanced—Review and refinement of all basic strokes and safety skills. Introduction to or review of butterfly and flipturn. Stroke drills and information on conditioning and designing individual workouts. Prerequisite: average to good strokes; ability to swim approximately 400-500 yards continuously. Fee. (AU)

1 unit, Aut, Win, Spr (Dettamanti, Quick, Tanner)

134. Swim Conditioning—For students wanting to improve cardiorespiratory endurance through directed swimming workouts. Technique corrections as needed. Prerequisite: advanced swimmer. Fee. (AU)

1 unit, Aut, Win, Spr (Dettamanti, Kenney, Knapp)

166. Water Polo: Beginning—Introduction to basic skills and game play. For those who have never played or have had limited experience. Fee. (AU)

1 unit, Spr (Dettamanti)

167. Water Polo: Intermediate/Advanced—Further work on skills. Game strategies. Fee. (AU)

1 unit, Aut, Spr (Dettamanti, Tanner)

FITNESS, INDIVIDUAL, AND TEAM SPORT ACTIVITIES

2. Aerobics—High-powered strength building class. Focus is on body awareness, balance of strength, and flexibility through continuous body motion and cardiovascular enhancement. All levels. Fee. (AU)

1 unit, Aut, Win, Spr (Coughlin)

38. Fencing: Beginning—The fundamentals of the golf swing; introduction (AU)

1 unit, Win (Wateska)

39. Fencing: Intermediate/Advanced—Continuation of 38; learn advanced footwork and handwork. Strategy and bouting. Introduction to epee and saber. All equipment provided. Fee. Prerequisite: 38 or consent of instructor. (AU)

1 unit, Win (Milgram)

40. Fencing: Saber Class—Continuation of 38. Learn saber technique, the fastest of the three weapons. Saber takes speed, quick reflexes and a sly, strategic mind. All equipment provided. Fee. Prerequisite: 38 or consent of instructor. (AU)

1 unit, Spr (Milgram)

45. Field Hockey: Advanced for Women—Understanding techniques and skills under competitive pressure. Must know team strategies and positioning. Prerequisite: varsity competition. Fee. (AU)

1 unit, Win (Johnson)

52. Golf: Beginning—The fundamentals of the golf swing; introduction to putting, chipping, sand play. Golf etiquette and knowledge of rules
53. Golf: Advanced Beginning—Further development of the golf swing and short game. How to practice effectively and gain the confidence to play a round of golf. Rules and etiquette. Prerequisite: 52 or previous golf experience. Fee. (AU)

1 unit, Aut, Win, Spr (Hamada, Miller, Stotz, Uchiyama)

54. Golf: Intermediate—Improvement through the use of drills and practice on all facets of golf game. Utilization of these skills in the game. Lower your score and manage your game on the course. Fee. Prerequisite: 52 or the equivalent. (AU)

1 unit, Aut, Win, Spr (Miller, Stotz, Uchiyama)

55. Golf: Advanced—Understanding of and refining the golf swing and increasing power, distance, and accuracy. Course management, mental preparation, visualization techniques. Fee. Prerequisites: 54 or experience playing and practicing, and the ability to hit shots with relative accuracy and distance. (AU)

1 unit, Aut, Win, Spr (Miller)

59. Gymnastics: Beginning—Fundamental gymnastics movement for men and women, including flexibility and strength exercises taught on the Olympic apparatus (e.g., floor, balance beam, bars, rings, etc.). Fee. (AU)

1 unit, Aut, Win, Spr (Hamada)

60. Gymnastics: Intermediate/Advanced—For students who have completed 59 or have a background in gymnastics. Emphasis is on tumbling and somersaulting. Group work and individualized instruction for men and women. Limited apparatus work. Fee. (AU)

1 unit, Aut, Win, Spr (Cook, Lyst)

65. Horsemanship: Beginning Riding—No background or very little. Includes walk, trot, and canter. Fee. (AU)

1 unit, Aut, Win, Spr (Saxe, Staff)

66. Horsemanship: Advanced Beginning Riding—Can walk and trot, but not with very secure seat. Gymnastic work develops position and rhythm. Fee. (AU)

1 unit, Aut, Win, Spr (Saxe, Staff)

68. Horsemanship: Intermediate Riding and Jumping—Work at the walk, trot, canter. Cross rails up to two foot jumps. Fee. (AU)

1 unit, Aut, Win, Spr (Saxe, Staff)

73. Interval Training—For students who want to improve their overall fitness level. Active participation in workouts include brief periods of high intensity exercise interspersed with lower-intensity exercise or rest. Short duration agility runs, weight lifting, and cardiovascular improvement. Emphasis is on proper stretching techniques, warm-ups, cool-downs, and monitoring heart rate. Fee. (AU)

1 unit, Win, Spr (Johnson)

74. Women’s Lacrosse: Beginning/Intermediate—Introduction to the basics of women’s lacrosse. Emphasis is on learning and improving stick skills such as cradling, passing, catching, and shooting, and on an overall knowledge of the game and its rules. Fee. (AU)

1 unit, Aut (Connor)

101. Posture—Individual standing posture evaluation; exercises for proper body alignment emphasizing flexibility and balance of muscle strength development. Techniques for correct body mechanics: push, pull, lift, carry, reach, sit, lie, walk. Some nutrition, relaxation, and weight management; group and individualized exercise program. Fee. (AU)

1 unit, Aut, Win, Spr (Weeks)

102. Power Walk—Physical fitness is increased through walking exercises. The intensity of exercise varies according to individual levels of fitness. Focus is on the use of walking to improve aerobic fitness, muscular strength and endurance, body composition and flexibility, and to provide stress release. Fee. (AU)

1 unit, Aut (Hamada)

119. Soccer, Indoor: Beginning—Uses a smaller ball and playing area. Emphasis is on individual ball skills through small-sided games. Fee. (AU)

1 unit, Win (Swanson)

120. Soccer, Indoor: Intermediate—For the intermediate player looking to hone his/her skills and learn more about the game. Emphasis is on skill development through technical sessions and small sided games. Basic tactics and the rules of the game. Limited enrollment. Fee. (AU)

1 unit, Win (Clark)

121. Soccer: Beginning—Introduction to soccer for the true beginner. The rules of the game and basic skills for dribbling, passing, controlling, shooting, and defending. Small game tactics. Fee. (AU)

1 unit, Aut, Spr (Swanson)

122. Soccer: Intermediate—The basic skills and rules of the game. Small group tactics offensively and defensively. Improving play through drills and small-sided games. Fee. (AU)

1 unit, Aut, Win, Spr (Clark)

123. Soccer: Advanced for Men—Techniques under pressure; small group and team tactics. Fitness for the soccer player. Fee. Prerequisites: consent of instructor, tryouts. (AU)

1 unit, Win (Clark)

124. Soccer: Advanced for Women—Techniques under pressure; small group and team tactics. Fitness for the soccer player. Fee. Prerequisites: consent of instructor, tryouts. (AU)

1 unit, Win, Spr (Swanson)

125. Soccer: Advanced—Designed for the advanced player looking to improve individual technique under pressure, small group and team tactics, and fitness. Fee. Prerequisites: consent of instructor, tryouts. (AU)

1 unit, Aut, Spr (Swanson)

148. Tennis: Beginning—Fundamental strokes (forehand, backhand, serve, and net play), rules, and scoring. Fee. (AU)

1 unit, Aut, Win, Spr (Staff)

149. Tennis: Low Intermediate—Intended as a bridge between beginning and intermediate classes. Review of fundamental strokes and utilization of these skills in a game situation. Fee. Prerequisites: beginning-level class or knowledge of rules and scoring and average ability in fundamental strokes, but limited playing experience. (AU)

1 unit, Aut, Win, Spr (Staff)

150. Tennis: Intermediate—Fundamental stroke review and increased emphasis on singles and doubles tactics. Prerequisites: low intermediate class or average ability in fundamental strokes and regular playing experience. NTRP rating of 3.0 or equivalent. Fee. (AU)

1 unit, Aut, Win, Spr (Staff)

151. Tennis: Advanced—Review of fundamental strokes. Drills emphasize footwork, serve and return, approach shots, volleys, lobs, and overheads. Strategy for competition in singles and doubles. Prerequisites: well above average stroking and game playing ability; NTRP rating above 4.0 or equivalent. Fee. (AU)

1 unit, Aut, Win, Spr (Staff)
152. Tennis: Tournament—Advanced drills and practice sessions for tournament-experienced players of near-varsity-level ability. Tryouts at Varsity Courts in Autumn Quarter for autumn enrollment and position on all-University ladder for winter and spring classes. Fee. Prerequisite: consent of instructor. (AU)
1 unit, Aut, Win, Spr (Staff)

154. Tennis: Analysis—Use of computer for analyzing tennis matches. Assist players and coaches by collecting data on player performance. Prerequisite: consent of instructor. Recommended: excellent knowledge of tennis, background in computers and statistics. (AU)
2 units, Aut, Win, Spr (Brennan, D. Gould)

1 unit, Aut, Win, Spr (Corlett, Kosty)

161. Volleyball: Intermediate—Drills to improve skills and game playing strategy. As ability indicates, more emphasis on team play and strategy. Fee. (AU)
1 unit, Aut, Win, Spr (Kosty, Nieves)

1 unit, Aut, Win, Spr (Staff)

175. Weight Training: Intermediate—Review of basic exercises and techniques. Emphasis is on individualized programs and learning the use of available machines and free weights. Further discussion on exercise physiology. Fee. Prerequisite: 174 or thorough knowledge of basic weight training principles. (AU)
1 unit, Aut, Win, Spr (Staff)

186. Wrestling: Beginning/Intermediate—Introduces intercollegiate wrestling. Conditioning, cultivating the spirit of one-on-one competition. Basic skills and high-level sequences of upper- and lower-body technique. Fee. (AU)
1 unit, Spr (Horpel)

188. Yoga: Beginning—Challenging practice designed for beginning-intermediate student. Focus is on a completely integrated and balanced body. Promotes increased flexibility; strengthens skeletal, muscular, and nervous systems; improves circulation; releases tension and stress; improves concentration and clarity of mind. Fee. (AU)
1 unit, Aut, Win, Spr (Coughlin)

189. Yoga: Intermediate—Builds and expands on the basic asanas. Student should be comfortable with the beginning class and ready for more challenging poses. More inverted poses, i.e., shoulder stand. Range of motion is increased as is length of time in poses. Deeper understanding of pranayama. Fee. Prerequisite: beginning yoga or previous yoga experience. (AU)
1 unit, Aut, Win, Spr (Coughlin)

INTERCOLLEGIATE ATHLETIC TEAMS
Varsity men's and women's teams in PAC-10 are for the highly talented and motivated undergraduate student. Unless specified, team tryouts are open to men and women students.

14V. Baseball: Varsity—Men's team. (AU)
1-2 units, Aut, Win, Spr (Marquess, Stotz)

17V. Basketball: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win (Montgomery, Staff) men's team
Aut, Win (Van Derveer, Staff) women's team

26V. Crew: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win (Kujda) men's team
Aut, Win, Spr (Baker) women's team

29V. Cross Country: Varsity—Men's and women's teams. (AU)
1-2 units, Aut (Lananna)

35V. Diving: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Schavone)

41V. Fencing: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win (Staff)

46V. Field Hockey: Varsity—Women's team. (AU)
1-2 units, Aut, Spr (Johnson)

49V. Football: Varsity—Men's team. (AU)
1-2 units, Aut, Spr (Willingham, Staff)

57V. Golf: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Hamada) men's team
Aut, Win, Spr (O'Connor) women's team

62V. Gymnastics: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Hamada) men's team
Aut, Win, Spr (Cook) women's team

75V. Lacrosse: Varsity—Women's team. (AU)
1-2 units, Aut, Win, Spr (Connor)

111V. Sailing: Varsity—Coed and women's teams. (AU)
1-2 units, Aut, Win, Spr (Bourdow)

124V. Soccer: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Clark) men's team
Aut (Swanson) women's team

127V. Softball: Varsity—Women's team. (AU)
1-2 units, Aut, Win, Spr (Rittman)

136V. Synchronized Swimming—Women's team. (AU)
1-2 units, Aut, Win (Emery)

137V. Swimming: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Kenney) men's team
Aut, Win, Spr (Quick) women's team

153V. Tennis: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Brennan) men's team
Aut, Win, Spr (Brennan) women's team

157V. Track and Field: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Lananna)

163V. Volleyball: Varsity—Men's and women's teams. (AU)
1-2 units, Aut, Win, Spr (Nieves) men's team
Aut, Win, Spr (Shaw) women's team

Athletics, Physical Education, and Recreation
168V. Water Polo: Varsity—Men’s and women’s teams. (AU)  
1-2 units, Aut, Win, Spr (Dettamanti) men’s team  
Aut, Win, Spr (Tanner) women’s team

184V. Wrestling: Varsity—Men’s team. (AU)  
1-2 units, Aut, Win, Spr (Horpel)

**CLASS SPORTS**

The Stanford Club Sports Program is affiliated with the department but is initiated, organized, and conducted by students. All clubs are co-educational except as specified. Clubs, whose instructional classes meet the criteria for academic credit, are scheduled for meeting times as published each quarter in the *Time Schedule*. For additional information, contact the Club Sports Director.

11C. Badminton Club Team—(AU)  
1 unit, Aut, Win, Spr

32C. Cycling Club Team—(AU)  
1 unit, Aut, Win, Spr

36C. Equestrian Club Team—(AU)  
1 unit, Aut, Win, Spr

70C. Horse Polo Club Team—(AU)  
1 unit, Aut, Win, Spr

72C. Ice Hockey Club Team—Men. (AU)  
1 unit, Aut, Win

75C. Lacrosse Club Team—Men. (AU)  
1 unit, Aut, Win, Spr

88C. Judo Club Team—(AU)  
1 unit, Aut, Win, Spr

104C. Rugby Club Teams—Men’s and women’s teams. (AU)  
1 unit, Aut, Win

118C. Ski Club Team—(AU)  
1 unit, Win

159C. Ultimate Frisbee Team—Women. (AU)  
1 unit, Aut, Win, Spr

Additional clubs (Cricket, Squash, Table Tennis, and Ultimate Frisbee—men) schedule activities each quarter for no credit.

**BIOLOGICAL SCIENCES**

*Emeriti: (Professors)* Winslow R. Briggs, David D. Perkins, David C. Regnery, Robert Schimke, John H. Thomas, Dow O. Woodward; (Research) R. Paul Levine; (by courtesy) David C. Fork

*Chair:* H. Craig Heller


*Associate Professors:* Barbara A. Block, Martha S. Cyert, Deborah M. Gordon, Paul MacDonald, Susan K. McConnell, Michael A. Simon

*Assistant Professors:* David Ackerly, Brendan Bohannon, Judith Friedman, Elizabeth A. Hadly, Liqun Luo, Michael F. Rexach, Timothy P. Stearns

*Associate Professor (Teaching):* Carol L. Boggs

*Professor (Research):* Robert Metzenberg, Jr.

*Consulting Professors:* Richard G. Klein, Irving L. Weissman

*Consulting Associate Professor:* Shauna C. Somerville

*Consulting Assistant Professor:* Alfred Sporman

*Lecturers:* Shyamala D. Malladi, Laura McIntosh, Roger Morrisett, James Watanabe, Melanie Yelton

*Consulting Professor:* Terrence M. Gosliner

*Consulting Associate Professors:* Nina G. Jablonski, Patrick J. Kociok

*Visiting Associate Professor:* Alex Meyer

**LIBRARIAN:** Michael Newman

The facilities and personnel of the Department of Biological Sciences are housed in the Gilbert Building, Herrin Laboratories, Herrin Hall, the Jasper Ridge Biological Preserve on the main campus, and at the Hopkins Marine Station in Pacific Grove on Monterey Bay.

The department provides: (1) courses designed for the nonmajor, (2) a major program leading to the B.S. degree, (3) a minor program, (4) a coterminal program leading to the M.S. degree, (5) a terminal program leading to the Ph.D. degree.

Course work and laboratory instruction in the Department of Biological Sciences conform to the "Policy on the Use of Vertebrate Animals in Teaching Activities" section of this bulletin.

The Jasper Ridge Biological Preserve is a 1,200-acre natural area containing an unusual diversity of plant communities. It is managed solely for teaching and research purposes and is available to investigators from various institutions. Stanford-based research at Jasper Ridge currently concentrates on physiological, ecological, and population studies.

Special laboratory facilities for marine research are described in the pamphlet *Hopkins Marine Station*, available at the department’s Student Services office (Gilbert 108) or from Hopkins Marine Station.

The department’s large collections of plants (Dudley Herbarium), fishes, reptiles, and amphibians, as well as smaller collections of birds, mammals, and invertebrates, are housed at the California Academy of Sciences in San Francisco, where they, and extensive collections of the academy, are available to those interested in the systematics of these groups. Entomological collections, restricted to those being used in particular research projects, are housed in the Herrin Laboratories. No general collections are maintained except for teaching purposes.

The Falconer Biology Library in Herrin Hall contains over 1,200 current subscriptions and an extensive collection of monographs and reference works. A specialized library is maintained at the Hopkins Marine Station.

**UNDERGRADUATE PROGRAMS**

**BACHELOR OF SCIENCE**

**ADVISING**

Most members of the Biological Sciences faculty are available for advising on such academic matters as choice of courses and career plans. The Student Services office maintains a current list of faculty advisers, advising schedules, and research interests.

The Student Services office is prepared to answer questions on administrative matters, such as requirements for the major, approved out-of-department electives, transfer course evaluations, and petition procedures. This office also distributes the department’s *Bachelor of Science Handbook*, which delineates policies and requirements, as well as other department forms and information handouts.

Each undergraduate student interested in the major in Biological Sciences is required to select a department adviser as part of the major declaration process. Students who plan to attend medical or graduate school, enroll in the honors or coterminal programs, take courses at Hopkins Marine Station, or attend one of the overseas campuses will find their faculty adviser particularly helpful.

**REQUIREMENTS**

Candidates for the B.S. degree must complete:
Electives

Biology 51*
Biology 52*
Biology 53*
Biology 44X
Biology 44Y (may be replaced by 4 units of 175H)

Total

Courses

Biology 53*
Biology 52*

Total

Electives

* May be used to satisfy either area I or area II requirement.

No more than 6 units from any combination of individual instruction courses (143, 175H, 198, 199, 290, 291, or 300) may be applied toward the total number of elective units. No more than 6 units applied toward the elective unit requirement may be taken CR/NC.

Students intending to pursue research careers in biology, especially in ecology, population genetics, or theoretical biology, should be aware that Mathematics 19, 20, 21, or Mathematics 41, 42 are minimum math requirements for the B.S. degree in Biological Sciences. Substantial additional training in mathematics, including differential equations, linear algebra, and probability theory, is often highly advisable. Students should consult the Biological Sciences faculty to discuss individual needs.

Additionally, even though only two or three quarters of physics are required, students should be aware that many graduate and professional schools (for example, medicine and education) require a year of general physics with a lab. Biological Sciences majors are therefore advised to take the year-long physics sequence Physics 21, 22, 23, 24, 25, 26 (or Physics 41, 43, 45, 46, 47, 48).

For students considering residence at Hopkins Marine Station during the junior or senior year, or an overseas program, the department recommends fulfilling as many University General Education Requirements as possible in the first two years at Stanford. A student may use 175H for up to 6 departmental elective units (these are considered research units). For information, contact the Student Services office.

**TYPICAL SCHEDULE FOR A FOUR-YEAR MINIMUM PROGRAM**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tbody>
<tr>
<td>CHEM 31, 33, 35, 36</td>
<td>4 4 7</td>
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<tr>
<td>Math. 19, 20, 21. Calculus and Analytic Geometry</td>
<td>3 3 4</td>
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<td>Freshman requirements or electives</td>
<td>8 8 6</td>
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<tr>
<td><strong>Totals</strong></td>
<td><strong>15 15 17</strong></td>
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**SECOND YEAR**

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<tr>
<th>Course No. and Subject</th>
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<tbody>
<tr>
<td>Bio. 51. Principles of Biology*</td>
<td>5</td>
</tr>
<tr>
<td>Bio. 52. Principles of Biology*</td>
<td>5</td>
</tr>
<tr>
<td>Bio. 53. Principles of Biology*</td>
<td>5</td>
</tr>
<tr>
<td>Bio. 44. Core Experimental Laboratory</td>
<td>4 4</td>
</tr>
<tr>
<td>Chem. 130 or 132, 131, 135 (or 171) Organic and Physical Chemistry</td>
<td>8 3</td>
</tr>
<tr>
<td>General Education Requirements or electives</td>
<td>3 5 8</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>16 17 17</strong></td>
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**THIRD YEAR**

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<thead>
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<th>Course No. and Subject</th>
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<td>Physics 21, 22, 23, 24. Introductory Physics</td>
<td>4 4 4</td>
</tr>
<tr>
<td>General Education Requirements or electives</td>
<td>11 11 11</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>15 15 15</strong></td>
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**FOURTH YEAR**

Electives

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transfer Students</strong></td>
<td>15 15 15</td>
</tr>
</tbody>
</table>

Because of differences between Stanford undergraduate courses and prerequisites and those of many other institutions, transfer students may face problems not encountered by entering freshmen. Transfer students are strongly urged to visit the Student Services office in Gilbert 108 during Transfer Orientation to obtain information on credit evaluations. Course catalogs, syllabi, and/or lecture notes from the former institution are necessary in the evaluation and accreditation process. Transfer students are encouraged to find a faculty adviser soon after arrival.

All transfer courses intended to fulfill department requirements must be evaluated on Evaluation of Transfer Course Content forms (available in the Student Services office), which is kept in the student’s file. This
4. If graduating in June, participate in the Biological Sciences Honors Program. For more information about the honors program, including requirements, research sponsors, and petition forms, see the Undergraduate Research Coordinator in Gilbert 118.

5. Complete and submit, by the end of the quarter of graduation, two copies of the honor thesis abstract. Students must submit two complete copies of the honor thesis abstract, signed and bound copies of an honors thesis approved by at least two readers (one of whom must be from the faculty of the Department of Biological Sciences and both Academic Council members). In addition, students must submit two copies of the honor thesis abstract, which now includes name, thesis title, sponsor, and department.

Further information on the honors program, including petition forms, examples of honors posters, theses, and proposals, is available in the Group Study Room in Falconer Library. See the Web page "Research and Honors" for more information about the honors program, including requirements, research sponsors, and petition forms. Questions should be directed to the Undergraduate Research Coordinator in Gilbert 118.

PREMEDICAL, PREDENTAL, AND PREPARAMEDICAL REQUIREMENTS

Premedical, preprofessional, and preprofessional students who are not premedical, preprofessional, and preprofessional students who are not biology majors should take at least the following courses in Biological Sciences: 44X, 44Y, 51, 52, 53, and such upper-division electives as may be recommended by Stanford's Preprofessional Advising Office (Undergraduate Advising Center, Student Services Office).

COTERMINAL B.S./M.S. DEGREE

The Department of Biological Sciences admits a limited number of undergraduate students to work for coterminal B.S. and M.S. degrees in Biological Sciences. Students must apply to the program between their seventh and eleventh quarters. They are required to submit a complete application, which includes a statement of purpose, a Stanford transcript, official GRE or MCAT scores, two letters of recommendation from faculty members in this department, and a list of courses in which they intend to enroll to fulfill degree requirements. A minimum GPA of 3.0 is necessary in all courses required for the undergraduate degree in Biological Sciences. Students must meet all requirements for both the B.S. and M.S. degrees. They must complete 15 full-time quarters (or the equivalent), or three full quarters after completing 180 units. Unit requirements for a coterminal program are 180 units for the bachelor's degree and 45 units for the master's degree. A more detailed description of the coterminal master's degree program may be obtained from the Student Services office.

GRADUATE PROGRAMS

MASTER OF SCIENCE

For information on the University's basic requirements for the M.S. degree, see the "Graduate Degrees" section of this bulletin. The M.S. degree program offers general or specialized study to individuals seeking biologically oriented work and to graduate students majoring in biological sciences. Students who have majored in related fields are eligible to apply, must complete, or have completed the time of graduation, the equivalent of a Stanford B.S. in Biological Sciences.

The M.S. program consists of Department of Biological Sciences courses (or otherwise approved) course work totaling at least 45 units of academic credit, distributed as follows:

1. A minimum of 36 units must be Department of Biological Sciences courses approved out-of-department electives (list available in the University Services Office).
   a) At least 18 of these 36 units must be courses designated primarily for graduate students (generally at the 200-level or above), excluding research and teaching units.
   b) At least 9 of the 36 units must be 3-unit or more upper-division courses from the Department of Biological Sciences, taken from three different Biology faculty members. Teaching and research units do not fulfill this requirement.
   c) Up to 9 of these 36 units may be advanced-level cognate courses in chemistry, mathematics, statistics, computer sciences, or physics beyond the level required for the undergraduate degree.
   d) Up to 18 of the 36 units may be a combination of biological research and teaching (biology courses 175H, 198, 199, 200, 291, or 300).

2. The remaining 9 units may come from any other Stanford course work other than research or teaching.

Each candidate designs a coherent program of study in consultation with her or his department adviser. Although there are no specific courses required, program proposals must adhere to department parameters. A Program Proposal signed by the student's adviser, and approved by the chair of the M.S. Committee, must be filed during the first month of the first quarter of enrollment. Students may take only 6 units on a credit/no credit basis and must receive a grade of "B+" or better in all courses taken for the degree.
To apply, students submit an application for admission to the M.S. program, two letters of recommendation, official transcripts, and official Graduate Record Examination (GRE) scores. Applicants should plan on taking the GRE at least one month prior to the application deadline to insure that the official scores are available when applications are evaluated. Applications are accepted for Autumn Quarter only; the deadline is March 15. Financial support is not available from either the department or the University for students in this program.

MASTER OF ARTS IN TEACHING

The Master of Arts. Teaching degree is offered jointly by this department and the School of Education. The degree is intended for candidates who have a teaching credential and wish to strengthen their academic preparation. The program consists of a minimum of 25 units in the teaching field and 12 units in the School of Education. Detailed requirements are outlined in the “School of Education” section of this bulletin or may be obtained from the Admissions Director, School of Education.

TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, consult the “School of Education” section of this bulletin or address an inquiry to the Credential Administrator, School of Education.

DOCTOR OF PHILOSOPHY

For information on the University’s basic requirements for the Ph.D., see the “Graduate Degrees” section of this bulletin.

Preparation for Graduate Study—Students seeking entrance to graduate study in Biological Sciences ordinarily should have the equivalent of an undergraduate major in Biological Sciences at Stanford. However, students from other disciplines, particularly the physical sciences, are also encouraged to apply. Such students are advised at the time of initial registration on how they should complete background training during the first year of graduate study. In addition to the usual basic undergraduate courses in biology, it is recommended that preparation for graduate work include courses in chemistry through organic chemistry, general physics, and mathematics through calculus.

Application, Admission, and Financial Aid—Prospective graduate students should request application information, instructions, and materials from Graduate Admissions, the Registrar’s Office. The department’s program is divided into three separate tracks—Population/Evolution Biology, Integrative and Organisimal, and the third in Molecular/Cell Biology. Applications to the three tracks are evaluated separately; all applicants should specify the track which interests them. The deadline for receiving applications is December 15.

Scores on the general test and the advanced biology, biochemistry, cellular and molecular biology, or chemistry test of the Graduate Record Examination (GRE) are required. Applicants should plan on taking the GRE at least one month prior to the application deadline to insure that the official scores are available when applications are evaluated.

Competition for admission to the Ph.D. program is keen and in recent years it has been possible to offer admission to only 15 percent of the applicants. Admitted students normally are offered financial support in the form of Stanford Presidential Graduate Fellowships, biology research assistantships, NIH traineeships, or Biological Sciences student fellowships. Qualified applicants should apply for predoctoral national competitive fellowships, especially those from the National Science Foundation and the Howard Hughes Medical Institute. Applicants to the Ph.D. program should consult their financial aid officers for information and applications.

General Departmental Requirements—An admitted applicant is required to fulfill the requirements of the University as outlined in the “Graduate Degrees” section of this bulletin and the department requirements stated below.

Each student must take at least 3 units of course work under each of four or more Stanford faculty members. Course work is planned in consultation with an advising committee assigned for his or her track. In addition, all students must take a course on the ethical conduct of research, including Bio. 325, one the ethics courses in the Medical School or another similar course.

1. Teaching experience and training are part of the graduate curriculum. Each student assists in teaching one course in the department’s core lecture (51, 52, 53) or lab courses (44X, 44Y), a second course that can be either a core course or central menu course, and a third department course recommended to be an advanced course in the student’s area of specialization.

2. Graduate seminars devoted to the discussion of current literature and research in particular fields of biology are an important means of attaining professional perspective and competence. Seminars are presented under individual course listings or are announced by the various research groups. A department seminar meets on most Mondays at 4 p.m. Topics of current biological interest are presented by speakers from Stanford and other institutions and are announced in the weekly Stanford Report. Graduate students are expected to attend.

3. Third Year and Beyond: each student must meet with the Advising Committee beginning the third year, and each year thereafter prior to the end of the Spring Quarter. The committee signs a form to ensure compliance. During Autumn Quarter of the fourth year, candidates must meet with their committee to evaluate the project and to discuss financial support, if required, beyond the fourth year. Advanced students are encouraged to meet with their committee at least twice a year.

Academic requirements for the three tracks are as follows:

Molecular/Cell Ph.D. Track Requirements—

1. First Year:
   a) Advising Committee: shortly after arrival, each entering student meets with the First-Year Advising Committee. The committee reviews the student’s previous academic work and current goals and advises the student on a program of Stanford courses, some of which may be required and others recommended. Satisfactory completion of the Core Curriculum (below) is required of all students.
   b) Core Curriculum: all students are required to take the following courses for a letter grade, unless previous course work has fulfilled these requirements.

   Biology 203: Advanced Genetics
   Biology 214: Cell Biology of Physiological Process
   Biochemistry 201: Advanced Molecular Biology
   A fourth course is selected from the student’s area of specialization.

2. Second Year: each student must pass a two-part qualifying exam.

   c) Lab Rotations: successful completion of rotations in three different laboratories is required of all first-year students. As lab space is limited, students with a definite interest in a particular lab should make arrangements as early as possible. Written petitions for exemptions to requirements “Core Curriculum” and “Lab Rotations” are considered by the Advising Committee. Approval is contingent upon special cir-cumstances and is not routinely granted.

   d) Dissertation Lab: by the end of Spring Quarter, each first-year student is expected to have selected a lab in which to perform dissertation research and to have been accepted by the faculty member in charge. Students and faculty must wait until April 15 to discuss the choice of a dissertation lab. In consultation with that faculty member (who at this point becomes the student’s adviser), the student chooses a projected field of expertise that is broader than the research of the adviser’s lab, such as Developmental Biology or Plant Biology. Students electing to do a summer rotation at the Hopkins Marine Station may postpone selection of a lab for their dissertation research until the end of Summer Quarter.

   e) Seminar: each student must present a public seminar that is evaluated by two faculty members. Evaluation consists of meeting with each faculty member within one week following the seminar to obtain feedback and signatures. Faculty may require an additional seminar presentation.
3. First Year: each entering student is assigned a supervisory committee of three faculty members whose function is to develop an appropriate schedule of required and recommended courses and to meet once each quarter with the student during the first year.

b) Area Proposal: before the end of Winter Quarter of the second year, the student must prepare and submit a paper, which outlines the student's projected dissertation research. The written proposal should be submitted in the form of a grant application, including references, plans for specific experiments, and discussion of the interpretation of possible experimental results. The written proposal must be turned in to the chair of the Graduate Studies Committee by the end of Autumn Quarter. Before the end of Winter Quarter, the student is examined orally on the contents of the written proposal and on general knowledge in the student's projected field of expertise, including important cognate areas. The oral examination is administered by the Dissertation Advising Committee (consisting of the adviser and three other faculty members who have agreed to serve on the committee) and one representative from the Graduate Studies Committee. (Three to five representatives from the Graduate Studies Committee are chosen to be available for these committees.)

b) Dissertation Proposal: before the end of Spring Quarter of the second year, the student must prepare and submit a dissertation proposal that outlines the student's projected dissertation research. An expert assessment of the current literature is expected. After submission of the proposal to the Dissertation Advising Committee, an oral examination is held. The student's adviser is not present at the examination, which is administered by the other members of the Dissertation Advising Committee and the Graduate Committee representative.

Advancement to candidacy is contingent on satisfactory completion of both proposals and oral exams. The deadline for completion is mid-May, before the annual faculty meeting devoted to evaluation of student progress. Failure to complete these requirements on schedule results in the withholding of graduate stipend.

3. Third Year and Beyond:

a) Dissertation and Dissertation Defense: the finished dissertation must be turned in to the student's Reading Committee at least one month before the oral exam is planned. The Reading Committee is comprised of at least three faculty members, two of whom must be Stanford Academic Council members, and is generally comprised of members who have served on the Oral Examination Committee. At least three weeks before the oral exam, the student checks in with the committee and must incorporate any changes they require by the time of the exam. The exam cannot be formally scheduled or publicly announced until the student receives comments; however, the student should make informal arrangements with the committee earlier to ensure that everyone is available on the projected date. A minimum of three weeks is required by the Student Services office to publicize the exam and schedule appropriate rooms.

b) First-Year Paper: each student must prepare and submit a paper, before the end of Spring Quarter their first year, that is evaluated by the advising committee. This paper should be a step toward the development of a dissertation proposal and may consist of an analysis of new data or a literature review and synthesis. Evaluation is in written form by two faculty members.

2. Second Year: the student is expected to write a major dissertation proposal. The proposal is evaluated by a committee of three faculty (the Dissertation Advising Committee) in an oral presentation. This is to be completed by the end of Spring Quarter of the second year. Advancement to candidacy depends on satisfactory completion of the dissertation proposal. Failure to complete these requirements on schedule will result in withholding of the graduate stipend.

3. Third Year and Beyond:

a) Dissertation and Dissertation Defense: at least one month before the oral exam takes place, the student must submit his or her dissertation to the Dissertation Advising Committee, which then becomes the Dissertation Reading Committee. At least two weeks before the oral exam, the student must incorporate into the dissertation any changes required by the committee. The exam cannot be formally scheduled or publicly announced until that time.

Residency Requirement—A minimum of nine quarters of full-time graduate registration is required of each candidate. The department normally accepts only full-time students for study leading to the Ph.D. degree.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

Additional courses not listed here are frequently offered by selected postdoctoral or advanced Ph.D. personnel in the areas of their special research competence. They are listed in the quarterly Time Schedule, with course descriptions available in the Student Services office.

INTRODUCTORY

2. Current Research Topics in Biological Sciences—Primarily for sophomores, enrollment limited to prospective and declared Biological Sciences majors. Weekly seminars by faculty on current research in biological sciences. Molecular biology and genetics; theory and mathematics in biology; ecology, physiology, and the environment; molecular and cellular aspects of neurobiology, immunology, and developmental biology; biological chemistry; behavioral biology; evolution.

1 unit, Aut, Win (Staff)
8S. Introduction to Human Physiology—Preparation for the college premedical curriculum through an overview of human physiology. Topics: biochemistry, nervous system, respiratory system, major organs, metabolism, and disease. Prerequisite: one year of high school chemistry. Recommended: anatomy or general biology.

3 units, Sum (Staff)

STANFORD INTRODUCTORY SEMINARS

Enrollment in seminars 11 through 37 are either open primarily to freshmen or sophomores. See http://www.stanford.edu/group/introsems/ for applications or more information.

11N. Stanford Introductory Seminar: Biotechnology in Everyday Life—Preference to freshmen. The science making transgenic plants and animals possible. Current and future applications of biotechnology, and the ethical issues raised. GER:2a (DR:5)

3 units, Aut (Walbot)

12N. Stanford Introductory Seminar: The Origin of Species—Preference to freshmen. Close reading of Darwin’s Origin of Species and additional secondary sources. Focus is on the logic of Darwin’s argument (what was the best evidence for evolution at the time the book was written?). What were the weakest points and missing pieces? How does each chapter contribute to the overall argument? How was Darwin’s thinking influenced by social conditions in his day? Oral presentations and a paper required. GER:2a (DR:5)

3 units, Spr (Ehrlich)

14N. Stanford Introductory Seminar: Plants and Civilization—Preference to freshmen. Lectures, readings, and discussions on the role of plants in the development of civilization. Topics: the use of forests, woodlands and grazing lands, centers of origins and spread of crops, the development of grains and fruits, viticulture, the spice route, the use of plants as medicine, fungi in human affairs, the global spread of weeds, engineering plants for the future. GER:2a (DR:5)

3 units, Spr (Mooney)

15N. Stanford Introductory Seminar: Environmental Literacy—Preference to freshmen. Lack of public understanding of the details of most environmental problems is cited as a cause of environmental deterioration. Good citizenship requires literacy about the elements of the scientific and decision making processes that accompany most environmental issues: what can happen, what are the odds, how can the credibility of various sources of expertise for the above be assessed, what components of several examples of environmental debates deal with factual and theoretical issues, and which are the political value judgments? Student-led discussions, student peer review and revised term papers, and oral paper presentation. GER:2a (DR:5)

3 units, Win (Schneider) alternate years, not given 2000-01

16N. Stanford Introductory Seminar: Island Ecology—Preference to freshmen. Introduction and illustration of the ways that ecologists think about the world. Focus is on the Hawaiian Islands: their origin, geology, climate, the evolution and ecology of their flora and fauna, and the distribution and functioning of Hawaiian ecosystems. The reasons for the concentration of threatened and endangered species in Hawaii, the scientific basis for their protection and recovery. The ways in which knowledge of island ecosystems can contribute to ecology and conservation biology on continents. GER:2a (DR:5)

3 units, Win (Vitousek)

17N. Stanford Introductory Seminar: Assesment of Chronic, Low-Level Environmental Risks—Preference to freshmen. How society views risks, especially chronic, low-level risks to the environmental and public health, and how those attitudes are translated into public policies. The contrast between the public perception of risks and those of “experts,” and how such views are weighted in the development of laws and regulations. The roles of litigation and regulation as alternative solutions to the external costs of private activity. Students examine case studies individually or in small groups. GER:2a (DR:5)

3 units, Aut (Kennedy)

18N. Stanford Introductory Seminar: Plant Genetic Engineering—Preference to freshmen. Flavr-Savr tomatoes, Round-Up Ready soybeans, plastic plants. Lectures, readings, and discussions about genetically modified plants. A survey of crop modifications that have been made or are currently in development. Discussions of the scientific basis of genetic engineering in plants and its social, economic, and environmental consequences. Oral presentations and short term papers.

3 units, Win (C. Somerville, S. Somerville)

19N. Stanford Introductory Seminar: Sex and Gender—An Evolutionary Perspective—Preference to freshmen. Themes: the feminist literature on gender and its social construction, mathematical theory for the evolution of sexual reproduction, and case studies of gender characteristics among animals and plants. Evolutionary studies from biology contribute to the understanding of gender, a topic mostly considered in the humanities and social sciences. Readings/discussion, term paper. Computer programming. GER:4c (DR:1)

3 units, Win (Roughgarden)

21N. Stanford Introductory Seminar: Readings in Molecular Biology and Genetics—Preference to freshmen. In-depth discussion of original research papers, parallel to what is being lectured on concurrently in Bio. 52. How to critically read original research papers to interpret and evaluate experimental findings on your own. Corequisite: 52.

3 units, Win (Baker)

22Q. Stanford Introductory Seminar: Infection and Immunity—Preference to sophomores. The causes and prevention of infectious diseases, focusing on the interplay between pathogens and the immune system that determines the outcome of the disease. The basic principles of microbiology, immunology, and epidemiology. Discussion of diseases of the past and present (including AIDS, TB, and malaria); the roles of geographical, societal, and biological factors in disease spread and prevention. Primary scientific literature, student-led discussions, and written reports. Prerequisite: good biology background, AP biology or introductory college biology (52 or 53, or Human Biology 2A, 3A).

3 units, Spr (Jones)

23N. Stanford Introductory Seminar: Experimental Strategy in Microbiology—Preference to freshmen. Scientific experimental strategy is taught through examination of classic and modern papers in microbiology. Topics: design, the importance of controls, and the formulation of hypotheses. Readings from original literature (translated to English) including Pasteur, Koch, Beijerinck, and Winogradsky; genetic studies by Jacob, Delbruck, etc.; and recent papers on molecular genetics. Reading papers from older literature allows exploration of the scientific process by students in the beginning of the Biological Sciences core. Corequisite: 52.

3 units (Long)


3 units, Spr (Kopito)

26N. Stanford Introductory Seminar: Maintenance of the Genome—Preference to freshmen. Focus is on systems that scan the cellular DNA
27N. Stanford Introductory Seminar: Nature and Nurture in Brain Development—Preference to freshmen. The brain consists of billions of neurons that are precisely interconnected in circuits that ultimately underlie our ability to think, behave, and perceive the world around us. During development, these neurons are born, migrate into position, and extend axons over long distances in order to contact appropriate target cells, wiring themselves into a particular circuit. The wiring of the brain is influenced by innate, genetically-driven processes and by our life experiences. The biological mechanisms that guide the development of neuronal circuits in animal model systems and humans. The relative influences of nature and nurture on neural development. Readings from the primary scientific literature focus for student discussions. Co-requisite: 53.

3 units, Spr (McConnell)

29N. Stanford Introductory Seminar: The Outer Limits of Life—Preference to freshmen. Introduction to the diversity of microbial life, emphasizing microbes that define the biochemical limits of life and which have unique life histories. Topics: microbial evolution and early life; life at extremes of temperature, pH, salinity, radiation and pressure; microbial life deep in the earth’s crust; life without oxygen; intimate associations between microbes and other organisms; applications of microbial diversity research in engineering, medicine, and astrobiology. Discussion, oral presentation, and short term paper. GER:2a (DR:5)

3 units, Win (Bohannan)


3 units, Aut (Gordon)

CORE

44X, Y. Core Experimental Laboratory—Two quarters of lab projects provide a working familiarity with the concepts, organisms, and techniques of modern biological research. Emphasis is on experimental design, analysis of data, and written and oral presentation of the experiments. Lab fee. Prerequisites: Chemistry 31, 33. Recommended: Biological Sciences or Human Biology core and statistics; 44X and Y should be taken sequentially in same year. (WIM)

44X. 4 units, Win (Staff)
44Y. 4 units, Spr (Staff)

51, 52, 53. Principles of Biology—Comprehensive study of the principles of modern biological sciences, taken in sequence, preferably in the sophomore year. Biology majors must take for a letter grade. Prerequisites: Chemistry 31, 33, 35; Mathematics 19, 20, 21, or 41, 42.

51. Evolution, Genetics, and Ecology—Core lectures on evolution, genetics, and ecology. Topics: diversity and the history of life; the physical and chemical basis of life; structural genetics; evolutionary genetics; the origin of species and natural selection; population, community, and ecosystem ecology. Prerequisites: see above.

5 units, Aut (Watt, Simon, Gordon, Vitousek)

52. Biochemistry, Molecular Biology, and Cell Biology—Core lecture on the biochemical and structural basis of cell function, emphasizing macromolecules (proteins, lipids, carbohydrates, and nucleic acids) and how their structure relates to function and to higher order assembly. Topics: enzyme structure, activity and kinetics, metabolism, hormone control, and cell structure and function. Prerequisites: see above.

5 units, Win (Cytcer, Macdonald, Simoni)

53. Development and Physiology of the Organism—Core lecture on plant and animal development and physiology. Topics: basic concepts in determination, differentiation, and morphogenesis; neurobiology, endocrinology, and immunology; the principles underlying the exchanges of mass and energy between organisms and their environments; the organ system specializations, which utilize these principles in adapting organisms to different environments. The mechanism by which the function of each system is controlled and regulated. Prerequisites: see above.

5 units, Spr (Luo, Sapolsky, Jones, Heller)

INTERMEDIATE UNDERGRADUATE AND GRADUATE

110. Vertebrate Biology—(Enroll in Human Biology 110.) 3-4 units (Porzig) not given 1999-2000

110L. Vertebrate Biology Lab—(Enroll in Human Biology 110L) 3 units (Porzig) not given 1999-2000

112/212. Human Physiology—The functioning of organ systems, emphasizing mechanisms of control and regulation. Topics: structure and function of endocrine and central nervous systems, cardiovascular physiology, respiration, salt and water balance, exercise and gastrointestinal physiology. Lectures/discussion. Prerequisite: Biological Sciences or Human Biology core.

4 units, Win (Heller, Harris) alternate years, not given 2000-01

117. Biology and Global Change—(Same as Earth Systems 111.) The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisites: Biological Sciences or Human Biology core or graduate standing in any department.

3 units, Win (Matson, Vitousek, Mooney)


4 units, Win (Mooney, Berry, Field) alternate years, not given 2000-01

125. Ecosystems of California—The principles of ecosystem functions, with emphasis on the vegetation components and on California systems. Prerequisite: 33 or 51, or Human Biology 2A.

3-4 units, Spr (Mooney)

128. Cell Biology: Molecular Organization—The biochemistry and biophysics of macromolecules, emphasizing how macromolecules interact to form complex cellular structures. Topics: protein biosynthesis and
129. Cell Biology: Cellular Dynamics—The principles of eukaryotic cellular function, emphasizing how cellular structures carry out important cell processes. Topics: cell cycle, mitosis, cytoskeleton and cell motility, cell-cell interactions, and signal transduction. Experimental logic and interpretation of experimental results. Prerequisite: Biological Sciences Core.
4 units, Win (Kopito, Frydman)

130. Algae/Fungi—Introduction to these groups, their utilization in molecular biology in studying biological problems, and their ecological significance. Lectures, lab, field trips. Prerequisite: Biological Sciences core or consent of instructor.
4 units, Win (Grossman) alternate years, not given 2000-01

132. Developmental Genetics—The uses of the tools of modern genetics to understand outstanding questions in developmental biology.
3 units, Win (Baker)

133. Genetics of Prokaryotes—Analysis of prokaryotic genes and genomes with emphasis on the evolution of genetic systems. Prerequisite: 52.
3 units, Aut (Campbell)

134. Replication of DNA—Modes of DNA replication and their control in prokaryotic and eukaryotic systems. Emphasis is on experimental approaches and their limitations. Critical review of current literature in seminar format. Lectures and student reports on specialized topics. Enrollment limited to 14 advanced undergraduates. Prerequisites: 52 and/or consent of instructor.
3 units, Aut (Hanawalt)

137. Plant Genetics—Gene analysis, mutagenesis, and transposable elements; developmental genetics of flowering and embryo development; biochemical genetics of plant metabolism; lessons from transgenic plant studies. Prerequisites: 51, 52, 53, or consent of the instructor.
3 units, Spr (Walbot)

138. Ecology and Evolution of Plants—Introduction to the basic principles of ecology and evolutionary biology, focusing on plants. Topics: plants in the environment, population dynamics, natural selection in plant populations, the origin and maintenance of diversity, speciation, extinction, conservation of plant populations. Limited enrollment, lab with field trips and independent projects. Prerequisite: 51 or consent of the instructor. Recommended: statistics.
3-5 units, Spr (Ackerley) alternate years, not given 2000-01

139. Biology of Birds—The ways birds interact with their environments and each other, emphasizing studies that had impact in the fields of population biology, community ecology, and evolution. Students become familiar with local bird communities; emphasis is on field research. One one-hour lecture and one three to five hour lecture or field trip per week. Enrollment limited to 20. Prerequisites: 51 or equivalent, and consent of instructor. Recommended: birding experience.
3 units (Ehrlich) alternate years, given 2000-01

140. Population Biology of Butterflies—Lectures, field studies of the dynamics and genetics of butterfly populations, life histories, and resource utilization. The evolution and taxonomy of this group of insects, which has become a key research tool in population biology. Lab includes field work on Euphydryas populations now under study on campus and elsewhere in California. Students must register both quarters for field work credit. Prerequisites: 51, and consent of instructor.
2-5 units (Ehrlich) alternate years, given 2000-01

141. Biostatistics—Introduction to the statistical analysis of biological data. Lectures, discussion, and student exercises.
4-5 units, Win (Feldman)

4 units, Aut (Roughgarden)

144. Conservation Biology—(Enroll in Human Biological Sciences 119.)
3-4 units, Win (Boggs, Launer)
advanced undergraduates and graduate students, focusing on cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: cell biology of the neuron, wiring of the neuronal network, synapse structure and synaptic transmission, signal transduction in the nervous system, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Prerequisite for undergraduates: Biological Sciences core or equivalent, plus at least one of 118, 128, 129, or 153, or consent of the instructors.

4 units, Au (Luo, Schulman)

158. Developmental Neurobiology—Lecture/seminar for advanced undergraduates and coterminus master's students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Enrollment limited to 75. Prerequisites: 53 or equivalent; and 153 or Neurobiology 200, or consent of instructor.

4 units (McConnell) alternate years, given 2000-01

184/284. Principles and Practices of Biosystematics—The basic principles and major operating procedures of systematic biology; the study of the classification of organisms and of the relationships among them. Concepts and issues common to the study of all organisms; examples from particular groups of creatures.

4 units (Watt, Gosliner, Jablonski, Ackerly) alternate years, given 2000-01

HOPKINS MARINE STATION

Note that several of these courses can be used to fulfill department menu requirements and that completion of the Biological Sciences core is a prerequisite for all of these courses. For course descriptions, see Hopkins Marine Station section.

56H. Seminar: History and Philosophy of Science
2 units, Spr (Somero)

160H/260H. Cell Physiology
4 units, Win (Epel)

161H/261H. Invertebrate Zoology
5 units, Win (Watanabe)

162H/262H. Comparative Animal Physiology
5 units (Block) alternate years, given 2000-01

163H/263H. Principles of Oceanic Biology
4 units, Win (Denny, Somero)

164H/264H. Marine Botany
4 units (Staff) alternate years, given 2000-01

165H/265H. Air and Water
3 units (Denny) alternate years, given 2000-01

166H/266H. Locomotion
3 units, Win (Denny) alternate years, not given 2000-01

167H/267H. Nerve, Muscle, and Synapse
5 units, Win (Gilly)

168H/268H. Seminar: Cellular Signal Transduction—(AU)
1 unit, Spr (Thompson)

169H/269H. Neurobiology and Behavior
5 units, Win (Thompson)

170H/270H. Seminar: Topics in Marine Biology
1 unit, Win (Staff)

171H/271H. Ecological and Evolutionary Physiology
4 units (Somero) given 2000-01

172H/272H. Marine Ecology
5 units, Win (Staff)

173H/273H. Marine Conservation Biology
3 units (Block) alternate years, given 2000-01

174H/274H. Chance in Biology: Experimental Design and Probability
3 units, Spr (Denny, Watanabe)

175H. Problems in Marine Biology
12 units, Spr (Gilly, Levine, Somero, Epel Thompson, Watanabe)

179H. Subtidal Communities
6 units, Sum (Watanabe)

180H/280H. Problems in Subtidal Ecology
6 units, Sum (Watanabe)

238H. Biomechanics of Intertidal Organisms
5 units (Denny) alternate years, not given 2000-01

277H. Biomechanics and Ecological Physiology of Intertidal Communities
4 units (Denny, Somero) alternate years, given 2000-01

UNDERGRADUATE, INVOLVING INDIVIDUAL WORK

Students majoring in Biological Sciences are encouraged to pursue directed reading and research opportunities. An introduction to research is provided by Bio. 2.

191. Research in Bird Biology—Semi-independent field research in ornithology, emphasizing ecological relationships. Projects complement on-going research, planned and carried out by the student in consultation with the instructor. Results are written in publication format. Enrollment limited. Prerequisites: 51, concurrent or subsequent enrollment in 139, and consent of instructor.

3 units, Win, Spr (Ehrlich)


1 unit, Aut, Win, Spr (Staff)

194/294. Seminar in Environmental Policy Research—Principles of and current problems in environmental policy. Lectures, student presentations, and intensive library research or participation in group research project required. May be repeated for credit. Prerequisite: consent of instructor.

3 units, Spr (Ehrlich) alternate years, not given 2000-01

198. Directed Instruction/Reading—May be taken as a prelude to research. Read/discuss biology-related literature with a faculty sponsor, possible participation in a lab or research group seminars, and library research. Credit for work arranged with out-of-department instructors is restricted to Biological Sciences majors and requires department approval. See http://www.stanford.edu/dept/biology/undergrad/honors/, Research and Honors under “Research Courses” for information on re-
search sponsors, units, petition instructions, deadlines, credit for summer research, and out-of-Stanford research.

198I. Directed Instruction/Reading—For work done under supervision of Hopkins Marine Station faculty.

199. Undergraduate Research—Individual research taken by arrangement with in-department or out-of-department instructors. Credit for work arranged with out-of-department instructors is restricted to Biological Sciences majors and requires department approval. See http://www.stanford.edu/dept/biology/undergrad/honors/, Research and Honors under “Research Courses” for information on research sponsors, units, petition instructions, deadlines, credit for summer research, and out-of-Stanford research.

199H. Undergraduate Research—For undergraduate research done under supervision of Hopkins Marine Station faculty.

ADVANCED UNDERGRADUATE AND GRADUATE

203. Advanced Genetics—(Same as Genetics 203.) Explores the genetic toolbox. Examples of analytic methods and modern synthetic genetic manipulation, including original papers. Emphasis is on use of genetic tools in dissecting complex biological pathways, developmental processes, and regulatory systems. Graduate students in biological sciences welcome; those with minimal experience in genetics should prepare themselves by working out problems in Suzuki, et al, or Hartl, et al.

4 units, Aut (Botstein, Kim, Stearns, Villeneuve)

205. DNA Repair and Mutagenesis—Interactions of endogenous and environmental mutagens with DNA. Responses of living systems to damaged DNA, including molecular mechanisms for DNA repair and recombinational modes. Inducible repair responses and "error-prone" mechanisms. Human hereditary deficiencies in DNA repair that predispose to cancer. The relationships of DNA repair to mutagenesis and carcinogenesis. Lectures/discussion of selected topics and review of current research literature. Prerequisites: 52, 118, and/or consent of instructor.

3 units, Spr (Hanawalt)

207. The Life and Death of Proteins—How proteins are made and degraded in the cell. Critical reading/discussion of primary literature. Selected "case studies" follow the evolution of scientific ideas, and evaluate how different experimental approaches can contribute to our understanding of a biological problem. Topics: protein folding and assembly, mechanisms of chaperone action, sorting into organelles and the ubiquitin-proteasome pathway. Enrollment limited to 20.

3 units, Spr (Frydman)

208. Developmental Biology—(Enroll in Developmental Biology 210.)

5 units, Spr (Fuller, Crabtree, Stuart Kim, Kingsley, Nusse, Scott, Seung Kim, Talbot)

209. Advanced Neurosciences Laboratory—The use of equipment and techniques required to record and analyze extracellular and intracellular activity in vertebrates, or other state-of-the-art neuroscience techniques. In-depth training in a subset of these techniques as applied to a specific research project. Students present/critically evaluate representative neuroscience methodologies in weekly discussion groups. Enrollment limited to 10; admission by application (available in Student Services office). Prerequisites: Biological Sciences core, Biochemistry 201.

4 units, Win (Heller, Grahn)

213. Viruses—Principles of virus growth, genetics, architecture, and assembly. The relation of temperate viruses and other epimemes to the host cell. Prerequisite: 52. Recommended: 118.

3 units, Spr (Campbell)

214. Cell Biology of Physiological Processes—(Same as Molecular and Cellular Physiology 221.) The basic mechanisms of membrane and cellular bioenergetics in relation to physiological processes. Emphasis is on the regulatory and signaling mechanisms involved in coordinating complex cellular phenomena, such as cellular organization, function, and differentiation. Topics: cellular compartmentalization, transport and trafficking of macromolecules, organelle biogenesis, cell division, motility and adhesion, and multicellularity. Prerequisites: Biological Sciences core, Biochemistry 201.

5 units, Win (Kopito, W. Nelson)

215. Biochemical Evolution—Lectures/discussion covering biochemical viewpoints on diverse aspects of the evolutionary process. Topics: prebiotic biochemistry and the origins of life; adaptive organization of metabolism; enzyme polymorphisms and other biochemical aspects of population genetics; macromolecular phylogeny and protein clocks. Prerequisites: Biological Sciences core or substantial equivalent.

3 units, Aut (Watt)

216. Ecosystem Ecology and Global Biogeochemistry—Nutrient cycling and the regulation of primary and secondary production in terrestrial, freshwater, and marine ecosystems; land-water and biosphere-atmosphere interactions; global element cycles and their regulation; human effects on biogeochemical cycles. Prerequisite: graduate standing in science or engineering; consent of instructor for undergraduates or coterminal students.

3 units (Vitousek) alternate years, given 2000-01

217. Climate Theory, Modeling, Applications, and Implications—(Same as Civil Engineering and Environmental 263S.) The history of the coevolution of climate and life. Theories of climate, external and internal climatic forcings, definitions of climate and the climate system, and rationale for climatic modeling. Hierarchy of climatic models; interactions among atmosphere, biosphere, oceans, hydrosphere, and cryosphere. Climatic predictability; implications of predictions and relevance to current controversies. Prerequisites: Biological Sciences core or Civil and Environmental Engineering 163, and math through differential equations, or consent of instructor.

3 units, Win (Schneider) alternate years, not given 2000-01

218. Atmosphere Biosphere Interactions—Interactions between the atmosphere and biosphere: biophysical and biochemical interactions, atmospheric effects on biospheric processes and biogeochemistry, biophysical effects on the radiation balance and water cycle of the atmosphere, equilibrium states of the coupled system, and interactions that lead to global change including land use changes and elevated atmospheric carbon dioxide concentrations. Prerequisites: Biological Sciences core or Civil and Environmental Engineering 163, and math through differential equations, or consent of instructor.

3 units Aut (Staff)

230. Molecular and Cellular Immunology—For graduate students and advanced undergraduates. Basic components of the immune system: structure and functions of antibody molecules; cellular basis of immunity and its regulation; molecular biology of antigen recognition structures; genetics of immunity and disease susceptibility. Emphasis is on key experimental approaches that have advanced our understanding. Prerequisites for undergraduates: Biological Sciences or a Human Biology core, or consent of instructor.

4 units, Aut (Jones)

237. Introduction to Biotechnology—(Enroll in Chemical Engineering 450.)

3 units, Spr (Robertson)

249. Neural Basis of Sleep and Circadian Rhythms—How the activity of the brain is affected by changes in the sleep/wake state. The neurochemistry of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiolog-
ical phenomena of sleep homeostasis, REM-sleep regulation, circadian rhythms, hibernation, and anesthesia. Enrollment limited to 30. Prerequisite: basic understanding of the nervous system (at least one of 53, Human Biology 4A, Psychology 70, or consent of instructor).
4 units (Heller, Edgar) alternate years, given 2000-01

252. Gene Action—Instructor/student presentations of selected studies on gene structure and function, and regulation of gene expression in prokaryotes. Prerequisites: Biochemistry 200 and 203 or equivalent; consent of instructor.
3 units, Spr (Yanofsky)

256. Plant Physiology—Physiological functions of land plants from analytical and quantitative points of view; photosynthetic energy and gas exchange; water and photosynthate long-distance transport; mineral nutrient ion uptake and transport; growth at cellular and organismal levels, and its hormonal regulation; responses to light, gravity, temperature, etc. Prerequisite: Biological Sciences core.
4 units, Win (Roy)

258. Neural Development—Seminar for graduate students, with optional lectures that meet jointly with 158. See 158.
4 units (McConnell) alternate years, given 2000-01

280A. Environmental Microbiology I—(Enroll in Civil and Environmental Engineering 274A.)
3 units, Aut (Spormann)

280B. Environmental Microbiology II—(Enroll in Civil and Environmental Engineering 274B.)
3 units, Win (Spormann)

280C. Environmental Microbiology Laboratory—(Enroll in Civil and Environmental Engineering 274C.)
3 units, Spr (Spormann)

283. Theoretical Population Genetics—Detailed survey of models in population genetics. Selection, random drift, gene linkage, migration and inbreeding, and the influence they have on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisite: consent of instructor.
1 unit, Aut (Feldman)

290. Teaching of Biological Science—Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. Prerequisite: consent of instructor.
1-5 units, Aut, Win, Spr (Staff)

291. Development and Teaching of Core Experimental Laboratories—Preparation for teaching the core experimental courses (44X and 44Y). Emphasis on lab, speaking, and writing skills. Focuses on updating the lab to meet the changing technical needs of the students. Must be taken prior to teaching either of the above courses. Prerequisite: selection by instructor.
2 units, Aut, Win (Staff)

PRIMARILY FOR GRADUATE STUDENTS

300. Research—For graduate students only. Individual research taken by arrangement with in-department or out-of-department instructors. Master's students: credit for work arranged with out-of-department instructors is restricted to Biological Sciences students and requires an approved department petition. See http://www.stanford.edu/dept/biology/undergrad/honors/, Research and Honors under "Research Courses" for information on research sponsors, units, petition instructions, deadlines, credit for summer research, and out-of-Stanford research.
1-3 units (Mooney, Berry, Staff) given 2000-01

301. Current Topics in Molecular, Cell, Developmental, Genetic, and Integration Biology—Enrollment limited to Biological Science Ph.D. students in the first year of graduate study. Lectures in areas of faculty's current research interests first three weeks.
1 unit, Aut (Staff)

302. Current Topics in Population Biology—Required of first-year graduate students in population biology and open to all graduate students. Discussion of the major conceptual issues and developing topics in population biology.
1 unit, Win (Staff)

303. Concepts in Population Biology—Required of first-year graduate students in population biology and open to all graduate students. Discussion of the major conceptual issues and developing topics in population biology.
1 unit, Win (Staff)

304. Concepts in Population Biology—Required of first-year graduate students in population biology and open to all graduate students. Discussion of the major conceptual issues and developing topics in population biology.
1 unit, Spr (Staff)

305. Seminar on DNA Repair and Genetic Toxicology—Enrollment limited to graduate students and advanced undergraduate students doing research in this field. Literature review and discussion of current research, emphasizing experimental approaches for studying DNA damage processing in bacteria, yeast, and mammalian cells. Prerequisite: consent of instructor.
1-3 units, Aut, Win, Spr (Hanawalt)

306. Current Topics in Integrative Organismal Biology—Enrollment limited to graduate students doing research in this field.
1 unit, Aut (Staff)

307. Seminar in Microbial Ecology and Evolution—Discussion of recent and classical research papers in microbial ecology and evolution, and presentation of research in progress by participants. Prerequisite: consent of instructor.
1-3 units (Watt) given 2000-01

315. Seminar in Biochemical Evolution—Literature review and discussion of current topics in biochemical evolution and molecular evolutionary genetics. Prerequisite: consent of instructor.
1-3 units (Watt) given 2000-01

325. Professional Responsibility and Academic Duty—Seminar for dissertation-level Ph.D. candidates who intend academic careers. Topics: teaching and preparation for it, obligations to students, faculty governance, obligations to the institution and conflict of interest, consulting, research and research funding, regulation of the conduct of research, roles of reviewers and editors, intellectual property and academic authorship, misconduct in research, constraints on freedom of publication. Class participation and final paper required. Enrollment limited to 25. Prerequisite: consent of instructor.
3 units, Aut (Kennedy)

333. Seminar in Evolutionary Ecology—Literature review and research discussion on a selected topic in ecology and evolution. Student participation required. Prerequisite: consent of instructor.
1-3 units (Ackerly) alternate years, given 2000-01

3 units (Mooney, Berry, Field) alternate years, given 2000-01

342. Plant Biology Seminar—Topics announced at the beginning of
346. Advanced Seminar in Molecular Biology—Enrollment limited to graduate students directly associated with departmental research groups in genetics or molecular biology.
1-3 units, Aut, Win, Spr (Long, Campbell, Sporman, Grossman, Yanofsky)

360. Frontiers in Interdisciplinary Biosciences—(Enroll in Biochemistry 459.)
1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

383. Seminar in Population Genetics—Literature review and research discussion of current problems in the theory and practice of population genetics and molecular evolution. Student participation required. Prerequisite: consent of instructor.
1-3 units, Aut, Win, Spr (Fieldman)

384. Seminar in Theoretical Ecology—(Same as Geophysics 185Y.) Discussion of recent and classical research papers in ecology, and presentation of work in progress by participants. Prerequisite: consent of instructor.
1-3 units, Spr (Roughgarden)

DIVISION OF MARINE BIOLOGY
HOPKINS MARINE STATION

Emeritus: (Professor) John H. Phillips, Jr.; (Professor-Research) R. Paul Levine
Director: Dennis A. Powers (on leave 1999-2000)
Acting Director: George N. Somero
Professors: Mark W. Denny, David Epel, William F. Gilly, Dennis A. Powers, George N. Stuart H. Thompson
Associate Professor: Barbara A. Block
Courtesy Professor: Irving L. Weissman
Lecturer: James M. Watanabe

The Hopkins Marine Station is at Pacific Grove, on the south side of Monterey Bay, 90 miles from the main University Campus. The 11-acre grounds, on the main portion of Cabrillo Point, include a sheltered landing place and storage for small boats. Buildings include the Lawrence Blinks Laboratory, Alexander Agassiz Laboratory, Jacques Loeb Laboratory, Harold A. Miller Library, Monterey Boat Works, Walter K. Fisher Laboratory, Tuna Research and Conservation Center, and De Nault Family Research Building. The 15,000 volume library subscribes to approximately 450 journals, and its collections are particularly strong in embryology, marine biology, microbiology, and oceanography.

The station is open during the entire year and maintains a permanent staff of resident investigators and technical assistants. The staff is supplemented by visiting faculty members, especially during the summer. There are facilities for visiting investigators and for elementary and advanced instruction in biology. For further information, write Hopkins Marine Station, Pacific Grove, CA 93950.

COURSES

56H. Seminar: History and Philosophy of Science—The nature of scientific inquiry, its logic, historical patterns, and sociology. Emphasis is on the unique aspects of the biological sciences.
2 units, Spr (Somero)

160H/260H. Cell Physiology—(Graduate students register for 260H.) The structures and processes that control life at the cellular level. Topics: membrane structure and function, signal transduction, the cytoskeleton, transport processes, cell division, cell-cell interactions, and motility. Similar to Bio. 121 but using marine examples. Prerequisites: Biology Core or consent of instructor.
4 units, Win (Epel)

161H/261H. Invertebrate Zoology—(Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine form examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Prerequisites: Biology core or consent of instructor.
5 units, Win (Watanabe)

162H/262H. Comparative Animal Physiology—(Graduate students register for 262H.) Physiological principles are examined using the diversity of solutions apparent in vertebrates and invertebrates, and focusing on how animals work. Topics: physiology of respiration, circulation, energy metabolism, thermoregulation, osmotic regulation, muscle physiology, and locomotion. Labs introduce physiological measurements with animals, discussion sections emphasize current topics in evolutionary and ecological physiology. Prerequisites: Biology core.
5 units (Block) alternate years, given 2000-01

163H/263H. Principles of Oceanic Biology—(Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Recommended: Physics 21 or 51, Chemistry 31, Biology Core, or consent of instructor.
4 units, Win (Denny, Somero)

164H/264H. Marine Botany—(Graduate students register for 264H.) Introduction to plants in the sea. Phytoplankton and oceanic productivity, macrophytes and nearshore ecology; marine angiosperms from taxonomical, physiological, and ecological perspectives. Lectures, lab. Prerequisites: Biology Core or consent of instructor.
4 units (Staff) alternate years, given 2000-01

165H/265H. Air and Water—(Graduate students register for 265H.) Introduction to environmental physics. The physical properties of life’s fluids compared and contrasted. How and why life has evolved differently on land than in water. Topics: density, viscosity, diffusion, thermal properties, sound, light, evaporation, and surface tension. Recommended: Physics 21, 23, or 51, 53; calculus; Biology Core; or consent of instructor.
3 units (Denny) alternate years, given 2000-01

166H/266H. Locomotion—(Graduate students register for 266H.) How animals and plants swim, crawl, run, and fly. The principles of fluid and solid mechanics determine the possibilities and limitations of organismal motion. Recommended: Physics 21 or 51, Biology Core, or consent of instructor.
3 units, Win (Denny) alternate years, not given 2000-01

167H/267H. Nerve, Muscle, and Synapse—(Graduate students register for 267H.) Fundamental aspects of membrane excitability and conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Prerequisites: Physics 23, 28, 43, or equivalent; Chemistry 31, 135; calculus; or consent of instructor.
5 units, Win (Gilly)

168H/268H. Seminar: Cellular Signal Transduction—(Graduate students register for 268H.) Lecture/seminar, group discussions. Focus is on
169H/269H. Neurobiology and Behavior—(Graduate students register for 269H.) The neural mechanism responsible for generating animal behavior. Topics: neuronal excitability, synaptic plasticity, signal transduction, and neural circuits. Lectures, discussions, demonstrations, and lab. Prerequisites: Biology Core or consent of instructor.
5 units, Win (Thompson)

170H/270H. Seminar: Topics in Marine Biology—(Graduate students register for 270H.) A specific topic of current interest to marine science is explored through discussion of the primary literature. Prerequisites: Biology Core or consent of instructor.
1 unit, Win (Staff)

171H/271H. Ecological and Evolutionary Physiology—(Graduate students register for 271H.) The interplay between environmental factors (e.g., temperature, light, nutrient supply, salinity, and oxygen availability) and adaptive change at the physiological level. Emphasis is on marine species and the roles played by physiological adaptations in establishing their distribution and performance. Prerequisites: Biology core or consent of instructor.
4 units (Somero) given 2000-01

172H/272H. Marine Ecology—(Graduate students register for 272H.) Introduction to the principles of ecology as applied to life in the sea. Population dynamics, community ecology, and the effects of man on the oceans. Lectures, lab. Prerequisites: Biology core or consent of instructor.
5 units, Win (Staff)

173H/273H. Marine Conservation Biology—(Graduate students register for 273H.) Offered with the support of the Pew Conservation Trust. The science of preserving marine diversity and the major conservation issues associated with marine ecosystems. Topics: the decline of open fisheries, salmon conservation, bycatch issues in fisheries, the use of marine reserves, marine invasions and pollution, and global warming. Guest lecturers from other universities who specialize in marine conservation.
3 units (Block) alternate years, given 2000-01

174H/274H. Chance in Biology: Experimental Design and Probability—(Graduate students register for 274H.) Random behavior on the part of molecules, organisms, and the environment is an integral part of life. Introduction to the study of chance effects in a biological context. Topics: the use of statistics in the proper design and analysis of experiments and the use of probability theory to predict the effects of chance in diffusion, action potentials, chemotaxis, sight, hearing, and predator-prey interactions. Prerequisites: Biology Core or consent of instructor.
3 units, Spr (Denny, Watanabe)

175H. Problems in Marine Biology—Designed primarily to engage advanced undergraduates in research. Lectures, lab work, field studies, and individual problems. Prerequisites: junior or senior standing and consent of instructors.
12 units, Spr (Epel, Gilly, Levine, Somero, Thompson, Watanabe)

198H. Directed Instruction/Reading—May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research. Credit for work arranged with out-of-department instructors restricted to Biological Sciences majors and requires department approval.
Aut, Win, Spr, Summer—both terms (Staff)

199H. Undergraduate Research—For experience in biological research, qualified undergraduate students may undertake individual work in the fields listed under 300H. Arrangements must be made by consultation or correspondence.
Aut, Win, Spr, Summer—both terms (Staff)

200H. Research—Graduate study involving original work may be undertaken with members of the staff in the fields indicated:
B. Block: Comparative Vertebrate Physiology—biomechanics, metabolic physiology and phylogeny of pelagic fishes, evolution of endothermy.
M. Denny: Biomechanics—the mechanical properties of biological materials and their consequences for animal size, shape, and performance.
W. Gilly: Neurobiology—analysis of giant axon systems in marine invertebrates from molecular to behavioral levels.
R. P. Levine: molecular biology and biochemistry of biomineralization.
G. Somero: Ecological and Evolutionary Physiology—adaptations of marine organisms to the environment: temperature, pressure, desiccation, and oxygen availability.
S. Thompson: Neurophysiology—neuronal control of behavior and mechanisms of ion permeation, signal transduction, calcium homeostasis, and neurotransmission.
J. Watanabe: Marine Ecology—kelp forest ecology and invertebrate zoology.

SUMMER PROGRAM
The summer program is open to all advanced undergraduate, graduate, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine life. Application blanks and further information may be obtained by writing to Hopkins Marine Station, Pacific Grove, CA 93950. Completed applications should be submitted by March 31. Applications received later are considered if space is still available.

The Summer Quarter is divided into two terms. It is possible to register for either term, or for the full quarter. Registration is possible for only one course during each term.

FIRST TERM

179H. Subtidal Communities—Lectures, lab, and field trips treating shallow water marine communities. Emphasis is on local habitats and the introduction of physical environmental parameters, community composition, aspects of the biology of constituent species, and methods for subtidal studies. Prerequisites: SCUBA certification, SCUBA equipment, ocean diving experience, and some background in biology.
6 units (Watanabe)

238H. Biomechanics of Intertidal Organisms—Introduction to the mechanical design of wave-swept organisms, emphasizing the ecological implications of wave forces. The theories of water waves, fluid dynamics, and solid mechanics; the design of materials, structures, whole organisms, and communities. Recommended: background in invertebrate zoology, algology, or intertidal ecology; basic physics and calculus.
5 units (Denny) alternate years, not given 2000-01
277H. Biomechanics and Ecological Physiology of Intertidal Communities—Introduction to the mechanical and physiological design of wave-swept organisms. How different abiotic stresses (wave exposure, wind speed, temperature, light) influence marine animals and plants, and adaptive responses to these stresses. Lab introduces methods for measuring environmental stress and organismal responses. Recommended: background in algology, intertidal ecology, or invertebrate zoology; basic physics and calculus.

4 units (Denny, Somero) alternate years, given 2000-01

SECOND TERM

180H/280H. Problems in Subtidal Ecology—(Graduate students register for 280H.) Group and individual research projects focus on shallow water marine communities, emphasizing the importance of identifying a relevant problem through review of the scientific literature, formulating an adequate research plan, and collecting data in the field. Lectures/discussions focus on proper experimental design, data analysis, and critiques of selected papers from the scientific literature. Prerequisites: 179H or consent of instructor; SCUBA certification, SCUBA equipment, and ocean diving experience.

6 units (Waitanabe)

BIOPHYSICS PROGRAM

Professors: Richard W. Aldrich (Molecular and Cellular Physiology), Steve Block (Applied Physics), Steven Boxer (Chemistry), Martin J. Brown (Radiation Oncology), Steven Chu (Applied Physics), Sebastian Doniach (Applied Physics), Philip C. Hanawalt (Biological Sciences), Keith O. Hodgson (Chemistry), Wray H. Huestis (Chemistry), Oleg Jarzetzky (Molecular Pharmacology), Ron Kopito (Biological Sciences), Roger D. Kornberg (Structural Biology), Michael Levitt (Structural Biology), Harden M. McConnell (Chemistry), David B. McKay (Structural Biology), W. E. Moerner (Chemistry), Norbert Pelc (Radiology), Ed Solomon (Chemistry), James A. Spudich (Biochemistry, Developmental Biology)

Associate Professors: Gilbert Chu (Oncology), Amato Giaccia (Radiation Oncology), David Heeger (Psychology), Daniel Herschlag (Biochemistry), Jody Puglisi (Biochemistry), William Weis (Structural Biology)

Assistant Professors: Jody Puglisi (Biochemistry), William Weis (Structural Biology)

The Biophysics Program offers instruction and research opportunities leading to the Ph.D. in Biophysics. Students admitted to the program may perform their graduate research in any appropriate department.

GRADUATE PROGRAM

For information of the University’s basic requirements for the Ph.D. degree, see the “Graduate Degrees” section of this bulletin.

A small number of highly qualified applicants are admitted to the program each year. Applicants should present strong undergraduate backgrounds in the physical sciences and mathematics. The graduate course program, beyond the stated requirements, is worked out for each student individually with the help of appropriate advisers from the Committee on Biophysics. The requirements and recommendations for the Ph.D. degree include:

1. Training in physics or chemistry equivalent to that of an undergraduate physics or chemistry major at Stanford.
2. Completion of the following courses (or their equivalents):
   a) Biophysics 250
   b) Biochemistry 200, 201
   c) Chemistry 131, 171, 173, and 175
   d) Structural Biology 241 and 242
   e) Additional courses as required for the individually tailored program
3. Proficiency in one or more foreign languages and/or a computer language may be required at the discretion of the major professor.
4. Opportunities for teaching are available during the first nine quarters, at the discretion of the advising committee.
5. The student must prepare a Dissertation Proposal defining the research to be undertaken, including methods of procedure. This proposal should be submitted by Winter Quarter of the third year, and it must be approved by a committee of at least three members including the principal research adviser and at least one member from the Committee on Biophysics. The candidate must defend the dissertation proposal in an oral examination. The Dissertation Reading Committee normally evolves from the Dissertation Proposal Review Committee.
6. The student must present a Ph.D. dissertation as the result of independent investigation and expressing a contribution to knowledge in the field of biophysics.
7. The student must pass the University oral examination, taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the research is presented by the candidate.

COURSES

205. DNA Repair and Mutagenesis—(Enroll in Biological Sciences 205.)

3 units, Spr (Hanawalt)

210. Advanced Topics in Membrane Biochemistry—(Enroll in Biochemistry 210.)

4 units (Pfeffer)

210A. Principles of Cell Physiology—(Enroll in Molecular and Cellular Physiology 210.)

4 units, Spr (Aldrich, Lewis)

214. Physical and Chemical Principles of Biochemistry—(Enroll in Biochemistry 214.)

4 units, Spr (Herschlag)

225. Molecular Motor Proteins and the Cytoskeleton—(Enroll in Biochemistry 225, Developmental Biology 225.)

3 units, Win (Spudich), Spr (Robertson)

228. Protein and Nucleic Acid Structure, Dynamics, and Engineering—(Enroll in Structural Biology 228.)

3 units, Win (Levitt)

232. Macromolecular Structure: Diffraction Methods and Diffraction Results—(Enroll in Structural Biology 232.)

3 units, Win (Weis, McKay)

237. Introduction to Biotechnology—(Enroll in Biochemistry 237, Biological Sciences 237, Chemical Engineering 450, Civil and Environmental Engineering 237, Developmental Biology 237, Structural Biology 237.)

3 units, Spr (Robertson)


3 units, Aut (Baldwin, Puglisi, Weis)

242. Methods in Molecular Biophysics—(Enroll in Structural Biology 242.)

3 units, Win (Baldwin, McKay, Puglisi, Weis)

250. Seminar in Biophysics—All graduate students in Biophysics must participate. Presentation of current research projects and results by all faculty in the Biophysics Program.

1 unit, Aut, Win (Staff)


255. Responsible Conduct of Research—All graduate students must complete.

Win

289. Biophysical Chemistry—(Enroll in Chemistry 289.)
3 units (Staff) not given 1999-2000

291. Biophysical Chemistry—(Enroll in Chemistry 291.)
3 units (Staff) not given 1999-2000

3 units (Solomon) alternate years, given 2000-01

300. Research
(Staff)

Other biophysics courses in related departments:
Chemistry 251, Neurobiology 216.

Other recommended courses:
Biological Sciences 230, 252; Biochemistry 200; Chemistry 271, 273, 275; Physics 170, 171, 230, 231, Structural Biology 211.

CHEMISTRY*


Chair: Barry M. Trost


Associate Professors: Christopher E. Chidsey, Chaitan Khosla, T. Daniel P. Stack

Assistant Professors: Hongjie Dai, Justin DuBois, Vijay S. Pande, Thomas J. Wandless

Courtesy Professors: Curtis W. Frank, Alice P. Gast, Robert J. Madix

Courtesy Associate Professor: Daniel Herschlag

Courtesy Assistant Professors: Stacey F. Bent, Karlene A. Cimprich

Lecturer: Jonathan Touster

* The curriculum leading to the B.S. degree in Chemical Engineering is described in the "School of Engineering" section of this bulletin.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

Entrance Preparation—Students intending to major in chemistry are expected to have entrance credit in the preparatory subjects of chemistry, physics, and mathematics (including algebra and plane trigonometry). Those who do not have entrance credit or equivalent training in these subjects, particularly mathematics, may experience some difficulty in meeting the department requirements for graduation in four years, especially if they expect to pursue a program leading to professional certification by the American Chemical Society or to the B.S. degree with Honors. A year or more of secondary school preparation in German is also desirable.

Minimum Requirements—University Writing and General Education Requirements; Mathematics 41, 42, 51, 53; Physics 41, 43, 45, 46, 47, 48; Chemistry 31, 33, 35, 36, 131, 132, 133, 134, 151, 153, 171, 173, 174, 175, 176. In addition, Computer Science 106A, 106B, and a reading knowledge of scientific German is strongly recommended for students planning graduate study. Students interested in attending overseas campuses should consult their advisers as early as possible to avoid scheduling problems. Note that it is particularly convenient to attend an overseas campus during Spring Quarter of the second or third year, since the courses listed in this quarter may be delayed to subsequent years without disadvantage. No required course may be taken on a credit/no credit basis.

TYPICAL SCHEDULE FOR A FOUR-YEAR PROGRAM

FIRST YEAR

Course No. and Subject  
Chem. 31. Chemical Principles 4  
Chem. 33. Structure and Reactivity 4  
Chem. 35. Monofunctional Compounds 4  
Chem. 36. Chemical Separations 4  
Math. 41, 42. Calculus, Linear Equations 5  
Writing and General Education Requirements or Electives* 6  
Totals 15 15 15

SECOND YEAR

Chem. 131. Polynuclear Compounds 3  
Chem. 132. Qualitative Organic Analysis 5  
Chem. 133. Special Topics in Organic Chemistry 3  
Chem. 134. Theory and Practice of Quantitative Chemistry 5  
Chem. 136. Synthesis Laboratory (elective) 3  
Math. 53. Differential Equations 5  
Physics 41, 43, 45-46. Mechanics, Electricity, and Magnetism 3  
Electives* 3  
Totals 16 15 15

THIRD YEAR

Chem. 151, 152. Inorganic Chemistry 3  
Chem. 171, 173, 175. Physical Chemistry 3  
Chem. 174, 176. Physical Chemistry Laboratory 5  
Physics 47-48. Light and Heat 5  
Electives* 7  
Totals 15 15 15

FOURTH YEAR

Electives* 15 15 15

* Elective courses must be used to complete the University Writing, General Education, and Language Requirements. They may also be used to broaden one's background in science and nonscience areas and to provide an opportunity for advanced study in chemistry. Courses offered by other departments that may be of interest to chemistry majors include Biochem. 200, 214; Biol. Sci. 31, 32, 33; Chem. Eng.; 20, 120, 130; Civ. & Envir. Eng. 170, Comp. Sci. 106A, B; Econ. 1; English 191; Engr. 50; Geo. & Envr. Sci. 278; Mat. 44, 106, 109B, 111, 131, 132, Mat. Sci. & Engr. 50; Physics 110, 111, 132, Stat. 60, 108, 116.

MINORS

Courses required for a minor are Chemistry 33, 35, 36, 130 or 132, 131, 134, 151, 171 and their Mathematics (19, 20, 21 or 41, 42) and Physics (41, 43, 45, 47) prerequisites (no substitutions). No course for the minor may be taken on a credit/no credit basis.

AMERICAN CHEMICAL SOCIETY CERTIFICATION

Students who wish to be certified as having met the minimum requirements of the American Chemical Society for professional training must complete, in addition to the above requirements, at least 6 units from Chemistry 136 and/or 190; and at least 3 additional units from one of the following: Chemistry 136, any chemistry course numbered above 200 for which permission to register had been granted by the instructor, Biochemistry 200, or an advanced course in mathematics or physics. A reading knowledge of German or Russian is strongly recommended.

HONORS PROGRAM

A limited number of undergraduates may be admitted to the Chemistry honors program at the beginning of the senior year. Those completing the program satisfactorily receive the B.S. degree in Chemistry with Honors.

Admission to the program requires a grade point average (GPA) of at least 3.0 on all course work in the University. In addition to the minimum requirements for the B.S. degree, the student must complete 9 units of Chemistry 190 to be taken 3 units per quarter for three quarters during the junior/senior years; and 9 additional units (including 3 units in chemistry) from Biochemistry 200, 214; Chemistry 221, 223, 225, 251, 253, 255, 271, 273, 275, 297; Mathematics 131, 132; Physics lecture courses numbered greater than 100; or other advanced courses approved by the
department’s Undergraduate Study Committee. Students may not overlap (“double-count”) courses for completing honors, major, minor, and coterminous requirements. An overall grade point average (GPA) of 3.3 in all chemistry, mathematics, and physics course work including 9 (most recent) units in Chemistry 190 is required for a degree with honors.

Students who wish to be admitted to the honors program should register in the department undergraduate office in Mudd 283 at the beginning of the senior year. Those who do not meet all of the above formal requirements may petition the department for admission.

TEACHING CREDENTIALS

The requirements for certification to teach chemistry in the secondary schools of California may be ascertained by consulting the section on credentials under the “School of Education” section of this bulletin and the Credential Administrator of the School of Education.

GRADUATE PROGRAMS

The University’s basic requirements for the M.S., M.A.T., and Ph.D. degrees are discussed in the “Graduate Degrees” section of this bulletin.

GENERAL REQUIREMENTS

Qualifying Examinations—Each new graduate student must take qualifying examinations on entrance. These examinations consist of three written exams of two hours each in the fields of inorganic, organic, and physical chemistry, and cover such material as ordinarily is given in a rigorous one-year undergraduate course in each of these subjects. Students majoring in biophysical chemistry must pass examinations in biophysical and physical chemistry, and either organic or inorganic chemistry. Students who fail to pass these examinations in the Autumn Quarter are required to repeat them during the first week of the Winter Quarter. All qualifying examinations are given the week before instruction begins in Autumn Quarter, and must be taken at that time.

Satisfactory performance is required for permission to begin dissertation research and to continue work for an advanced degree. Students on full-time fellowships may complete all requirements for the Ph.D. degree in nine quarters. Students on research or teaching assistantships may complete their requirements in fifteen quarters.

Candidates for advanced degrees must have a minimum grade point average (GPA) of ‘B’ for all chemistry lecture courses as well as for all courses taken during graduate study. Required courses may not be taken with the credit/no credit option. All students are expected to give full time to graduate work once they have begun dissertation research. All prospective Ph.D. candidates, regardless of the source of financial support, are required to gain teaching experience as an integral part of graduate training. During the period in which a dissertation is being read by members of the faculty, candidates must be available for personal consultation until the dissertation has had final department approval.

MASTER OF SCIENCE

Applicants for the M.S. degree in Chemistry are required to complete, in addition to the requirements for the bachelor’s degree, a minimum of 36 units of work and an M.S. thesis. Of the 36 units, approximately two-thirds must be in the department and must include at least 12 units of advanced course work in chemistry exclusive of the thesis. Of the 12 units, at least 3 units must be from Chemistry 221, 223, 225, 251, 253, 255, 271, 273, 275, or 297.

MASTER OF ARTS IN TEACHING (CHEMISTRY)

In cooperation with the School of Education, the department offers a program leading to the Master of Arts in Teaching (Chemistry). This degree is for candidates who have a teaching credential and wish to strengthen further their academic preparation. The program consists of a minimum of 25 units in the teaching field and 12 units in the School of Education. Detailed requirements are outlined under the “School of Education, Master of Arts in Teaching” section of this bulletin. Not offered 1999-2000.

DOCTOR OF PHILOSOPHY

Graduate students are eligible to become formal candidates for the Ph.D. degree after passing the department qualifying examinations, satisfactorily completing most of the formal lecture course requirements, and beginning satisfactory progress on a dissertation research project. They then file for admission to candidacy for the Ph.D. degree. This filing must be done before June of the second year of graduate registration.

After passing the departmental qualifying examinations, students select research advisers by first interviewing at least ten members of the Chemistry faculty about their research. Students then file an Application to Start Research form with the Department of Chemistry Graduate Study Committee and begin research on their Ph.D. dissertation under the supervision of an adviser. All students in good standing are required to start research by the end of the Winter Quarter of the first year of graduate registration.

There is no foreign language requirement for the Ph.D. degree.

Candidates for the Ph.D. degree are required to participate continually in the department seminar (Chemistry 300), and in the division seminar of the major subject. In addition, continuous enrollment in Chemistry 301 is expected after the student has passed the qualifying examinations and chosen a research supervisor. As part of graduate training, Ph.D. candidates are required to gain experience as teaching assistants.

Before candidates may request scheduling of the University oral examination, clearance must be obtained from the major professor and the chair of the department’s Graduate Study Committee. Conditions that must be fulfilled before clearance is granted vary with the different divisions of the department and may be ascertained by consulting the chair of the committee.

It is the policy of the department to encourage and support in every possible way the pursuit of research and other advanced work by qualified students. Information about staff members with lists of their recent research publications is found in Chemistry at Stanford and the Directory of Graduate Research published by the American Chemical Society.

COURSE REQUIREMENTS

Students major in inorganic, organic, and physical, or biophysical chemistry. All graduate students are required to take six graduate-level courses (course numbers greater than 199) of at least 3 units each in chemistry or related disciplines (for example, biochemistry, electrical engineering, mathematics, pharmacology, physics, and so on), to be selected in consultation with their research adviser and the Graduate Study Committee. At least four of these courses should be taken in the first year.

In addition, students majoring in Organic Chemistry must take 3 units in Chemistry 231 in the second year and 3 units in 233 in the second and third year. Required courses must be taken for a letter grade.

Students majoring in inorganic, physical or biophysical chemistry, or chemical physics and entering after 1998 must meet with their Reading Committee between the middle of their third year and the end of their fourth year to present past research and to propose and discuss ideas and research goals for the future. A written report of approximately two pages is given to the committee members prior to the mandatory meeting. The meeting consists of a 15-minute presentation plus discussion. The student and/or committee may ask for additional meetings prior to the thesis defense.

CHEMICAL PHYSICS

Students with an exceptionally strong background in physics and mathematics may, upon special arrangement, pursue a program of studies in chemical physics.

Ph.D. MINOR

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in chemistry must complete, with a GPA of 3.0 or higher, 20 graduate-level units in chemistry.
FELLOWSHIPS AND SCHOLARSHIPS

In addition to school fellowships and scholarships open to properly qualified students, there are several department fellowships in chemistry. Undergraduate scholarships are administered through the Financial Aid Office. Teaching assistantships and research assistantships are open to graduate students. Graduate fellowships, scholarships, and teaching assistantships are administered through the Department of Chemistry.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

Note—Lab fees, against which charges are made for breakage, are a minimum of $35 per quarter. Students taking courses with an * must preregister in the Department of Chemistry.

UNDERGRADUATE

22N. Stanford Introductory Seminar: The Frontiers of Science—Preference to freshmen. Expands the research focus of Chem. 32. Materials from readings on research breakthroughs, research seminars, and Ph.D. oral examinations campus-wide are integrated in discussions on the nature of modern research. Prerequisite: 32 or equivalent.

2 units, Win (Collman)

23N. Stanford Introductory Seminar: Chemistry and Biology—Preference to freshmen. An enrichment of introductory organic chemistry with biological applications. A clinically important molecule is selected to illustrate important contributions that biology has made to chemistry and vice versa. Topics: structure elucidation of complex molecules, chemical and biological synthesis of complex molecules, mechanism of action, and drug or agrochemical development. Prerequisite: 33 or equivalent.

2 units, Spr (Khosla)

24N. Stanford Introductory Seminar: Nutrition and History—Preference to freshmen. Intended to broaden the introductory chemistry experience (31, 32, or 33 would be useful). The biochemical basis of historically important nutritional deficiencies (vitamins, minerals, starvation, metabolic variants that predispose to disease) and environmental toxins is related to physiological action and the sociological, political, and economic consequences of its effect on human populations. Prerequisite: high school chemistry. GER:2a (DR:5)

3 units, Sum (Huestis)

26N. Stanford Introductory Seminar: Macromolecules—Is Bigger Better?—Preference to freshmen. Enrichment of the basic knowledge of chemistry with big molecules (31, 33, or equivalent would be helpful). An aspect of macromolecules, or polymers, is that some of their properties depend strongly on local chemical structure, whereas other properties can be described almost independently of their chemical structure. This mix of chemistry and physics is central to understanding the behavior of large molecules. The general features responsible for unusual properties in natural and man-made macromolecules and why polymers are replacing more traditional materials. Prerequisite: high school chemistry. GER:2a (DR:5)

3 units, Spr (Waymouth)

30. Introduction to Chemistry—Preparation for 31. For students with limited background in chemistry and mathematics. Introduction to chemical principles: moles, valence, stoichiometry, definitions, problem solving, quantitative skills.

3 units, Aut (Chidsey)

*31. Chemical Principles—For students with substantial chemistry background. Preparation for chemistry, chemical engineering, medicine, biochemistry, biology, and related fields. Atomic and molecular orbital theory, periodicity, bonding properties of matter, stoichiometry.

Recitation. Prerequisites: high school chemistry and algebra. Recommended: high school physics. GER:2a (DR:5)

4 units, Aut (Boxer, Stack)

Win (Fayer)

Sum (Staff)

*32. The Frontiers of Chemical Science—For students with AP Chemistry scores of 4 or 5 who wish to develop a deeper understanding. Complements a previous rigorous introduction to chemistry; encompasses structure and reactivity, and cuts across the traditional subdivisions of chemistry. Recent advances in structures, analytical methodologies, catalysis, redox phenomena, organometallic, and bio-inorganic chemistry. Lab and recitation. GER:2a (DR:5)

5 units, Aut (Collman, Zare)

*33. Structure and Reactivity—Organic chemistry, functional groups, hydrocarbons, stereochemistry, thermochemistry, kinetics, chemical equilibria. Recitation. Prerequisite: 31, 32, or an AP Chemistry score of 4 or 5. GER:2a (DR:5)

4 units, Win (Wandless, Stack)

Spr (Wender)

Sum (Staff)

*35. Organic Monofunctional Compounds—Organic chemistry of oxygen and nitrogen aliphatic compounds. Recitation. Prerequisite: 33.

4 units, Aut (Waymouth)

Spr (DuBois, Huestis)

Sum (Staff)

*36. Chemical Separations—Techniques for separations of compounds: distillation, crystallization, extraction, and various chromatographic procedures. Lecture treats the theory; lab provides practice. Prerequisites: 33 and concurrent or previous enrollment in 35.

3 units, Spr (Touster)

Sum (Staff)

110. Directed Instruction/Reading—Undergraduates pursue a reading program under supervision of a faculty member in Chemistry; may also involve participation in lab. Prerequisites: superior work in 31 or 32, and 33; approval of the instructor and of the Chemistry Undergraduate Study Committee.

1-2 units (Staff)

*130. Theory and Practice of Identification—For students in biomedical sciences; Chemistry majors take 132. Lectures on theory and interpretation of ultraviolet, infrared, nuclear magnetic resonance, and mass spectral data. Lab involves identification of unknowns and components of a mixture using derivatives and spectra. Lab. Prerequisites: 35, 36 (36 and 130 should be taken in consecutive years). Corequisite: 131.

4 units, Aut (DuBois, Touster)

*131. Organic Polyfunctional Compounds—Aromatic compounds, polysaccharides, amino acids, proteins, natural products, dyes, purines, pyrimidines, nucleic acids, and polymers. Prerequisite: 35.

3 units, Aut, Win (Huestis, Touster)

*132. Qualitative Organic Analysis—Required of and limited to chemistry majors; others may be admitted with consent of instructor. Separation of mixtures of organic compounds and identification of the components using rational synthesis and analysis of spectral data. Lab. Prerequisites: 35, 36, and concurrent registration in 131.

5 units, Aut (DuBois, Touster)


3 units, Win (Smith, Goldstein)
134. Theory and Practice of Quantitative Chemistry—Methods include gravimetric, volumetric, spectrophotometric, and electrometric. Lab. Prerequisite: 130 or 132. (WIM) 3 units, Win (Zare)

135. Physical Chemical Principles—Terminal physical chemistry for non-chemistry majors. Emphasis is on portions of physical chemistry most useful for students of the life sciences. Introduction to chemical thermodynamics, heterogeneous equilibria, thermodynamics of solutions, electrolytes, chemical kinetics, macromolecular solutions, and colloidal dispersions. Prerequisites: 31, calculus. 3 units, Win (Pecora)

136. Synthesis Laboratory—Advanced synthetic methods in organic and inorganic laboratory chemistry. Prerequisites: 130 or 132, 131. 3 units, Spr (Touster)

151. Inorganic Chemistry I—Systematic introduction to the theories of electronic structure, stereochemistry, and symmetry properties of inorganic and organometallic molecules. Topics: ionic and covalent interactions, electron-deficient bonding, and elementary ligand field and molecular orbital theories. Emphasis is on the chemistry of the metallic elements. Prerequisites: 35, 171. 3 units, Win (Collman)

153. Inorganic Chemistry II—Systematic presentation of the theoretical aspects of inorganic chemistry. Group theory; many electron atomic theory; molecular orbital theory, emphasizing general concepts and group theory; ligand field theory; application of physical methods to predict the geometry, magnetism, and electronic spectra of transition metal complexes; and theoretical aspects of electron transfer reactions. Prerequisites: 151, 173. 3 units, Spr (Solomon)

171. Physical Chemistry—Chemical thermodynamics; fundamental principles, Gibbbsian equations, equilibrium conditions, phase rule, systematic deduction of equations, gases, solutions. Prerequisites: 35; Mathematics 41, 42; Physics 41, 43, 45; and previous or concurrent registration in Physics 47. 3 units, Aut (Fande)

173. Physical Chemistry—Introduction to quantum chemistry; the basic principles of wave mechanics, the harmonic oscillator, the rigid rotator, infrared and microwave spectroscopy, the hydrogen atom, atomic structure, molecular structure, valence theory. 3 units, Win (Boxer)

174. Physical Chemistry Laboratory—Thermodynamics, transport, and rotation-vibration spectroscopy. Experimental techniques include electronics, potentiometry, amperometry, calomelometry, and Fourier-transform infrared spectroscopy. Lab tours and supporting lectures on experimental techniques used in research projects at Stanford. Lab. Prerequisites: 134, 171, previous or concurrent enrollment in 173; Mathematics 53, 103 or 113; and Physics 45, 46. Recommended: Physics 47. 4 units, Win (Chidsey)

175. Physical Chemistry—Introduction to kinetic theory and statistical mechanics: molecular theory of matter and heat, transport phenomena in gases, Boltzmann distribution law, partition functions for ideal gases. Introduction to chemical kinetics: measurement of rates of reactions, relationship between rate and reaction mechanism, consideration of specific reactions, transition-state theory of reaction rates. Prerequisite: 173. 3 units, Spr (Moerner)

176. Physical Chemistry Laboratory—Use of chemical instrumentation to study fundamental areas of physical chemical time-dependent processes. Experiments include reaction kinetics, fluorimetry, and nuclear magnetic and electron spin resonance spectroscopy. Lab. Prerequisites: 173, 174, previous or concurrent enrollment in 175. 3 units, Spr (Dai)

GRADUATE

Undergraduates may register for chemistry courses numbered above 200 only if admitted to the honors program or by consent of the instructor.

221. Advanced Organic Chemistry—Molecular orbital theory and orbital symmetry. Thermochemistry and thermochemical kinetics. Unimolecular reaction rate theory. Methods of determining organic reaction mechanisms from a theoretical and experimental point of view. Prerequisites: 133, 175. 3 units, Aut (Brauman)

223. Advanced Organic Chemistry—Continuation of 221 with emphasis on physical methods. Prerequisite: 221 or consent of instructor. 3 units, Win (Wandless)

225. Advanced Organic Chemistry—Continuation of 223. Organic reactions, new synthetic methods, conformational analysis, and exercises in the syntheses of complex molecules. Prerequisite: 223 or consent of instructor. 3 units, Spr (Wender)

227. Selected Topics in Organic Chemistry—May be repeated for credit. Possible topics: synthetic organic chemistry, photochemistry, inorganic-organic chemistry, bio-organic chemistry, reaction mechanisms, stereochemistry, structural chemistry of organic and biological molecules. 3 units (Staff)

229. Organic Chemistry Seminar—Attendance required of all graduate students majoring in organic chemistry. Students giving seminars register for 231. 1 unit, Aut, Win, Spr (Brauman)

230. Organic Chemistry Seminar Presentation—Required of all graduate students majoring in organic chemistry for the year in which they present their organic seminar. Second-year students must enroll all quarters. 1 unit, Aut, Win, Spr (Brauman)

232. Protein Science and Engineering—(Same as Chemical Engineer 452.) The physio-chemical interactions that govern structure and the function of proteins. Topics: protein function and structure, techniques for probing protein structure and function, mechanisms of protein function, design of proteins with novel properties. Examples from literature on enzymes. Recommended: background in physical and organic chemistry. 3 units, Win (Khosla)

233. Creativity in Organic Chemistry—Required of all second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report and two research proposals is practiced and criticized. Second-year students must enroll autumn and spring, 3rd year students must enroll winter. 1 unit, Aut, Win, Spr (Brauman)

235. Applications of NMR Spectroscopy—The uses of NMR spectroscopy in chemical and biochemical sciences, emphasizing data acquisition for liquid samples and including selection, setup, and processing of standard and advanced experiments. 3 units, Win (Keifer)

251. Selected Topics in Advanced Inorganic Chemistry—May be repeated for credit. Prerequisites: one year of physical chemistry, consent of instructor. 3 units (Staff) not given 1999-2000

279
253. Advanced Physical Inorganic Chemistry—Electronic structure and physical properties of transition metal complexes. Ligand field and molecular orbital theories, magnetism and magnetic susceptibility, electron paramagnetic resonance (including hyperfine interactions and zero field splitting) and electronic absorption spectroscopy (including vibrational interactions). Prerequisite: 153 or the equivalent.
3 units (Solomon) alternate years, not given 2000-01

257. Research Proposals in Inorganic Chemistry—May be required of second-year students in inorganic chemistry at the discretion of the research adviser. Research progress reports and research proposals are presented in oral and written form. Writing ability, oral defense, and scientific content is criticized.
1 unit, Aut, Win, Spr (Staff)

259. Inorganic Chemistry Seminar—Attendance required of all graduate students majoring in inorganic chemistry.
1 unit, Aut, Win, Spr (Staff)

271. Advanced Physical Chemistry—The principles of quantum mechanics. General formulation, mathematical methods, and elementary applications of quantum theory to the structure of atoms and molecules, including variational procedures, perturbation theory, operator and matrix methods, theory of angular momentum, and elements of the electronic structure of atoms. Prerequisite: 175.
3 units, Aut (Foyer)

273. Advanced Physical Chemistry—Topics in advanced quantum mechanics: vibrations and rotations of polyatomic molecules (normal modes, anharmonicity, wavefunctions and energy levels of rigid rotations, vibration-rotation interaction), \textit{ab initio} electronic structure theory (Hartree-Fock, configuration interaction, multiconfiguration self-consistent-field, and many-body perturbation theory techniques), angular momentum theory (operators and wavefunctions, Clebsch-Gordan coefficients, rotation matrices), time-dependent quantum mechanics (time evolution operator, Feynman path integrals, scattering theory, Born approximation, Lipmann-Schwinger equation, correlation functions), interaction of radiation and matter (semiclassical and quantum theories of radiation, transition probabilities, selection rules). Prerequisite: 271 or Physics 230.
3 units, Win (Dai)

275. Advanced Physical Chemistry—The basic principles and methods of statistical mechanics from the ensemble point of view, statistical thermodynamics, heat capacities of solids and polyatomic gases, chemical equilibria, equations of state of fluids, phase transitions. Prerequisite: 271.
3 units, Spr (Pande)

277. Selected Topics in Physical Chemistry—Possible topics: structure elucidation using diffraction techniques, advanced statistical mechanics, crystal field theory, advanced quantum mechanics, magnetic relaxation, advanced thermodynamics, chemical applications of group theory. May be repeated for credit. Prerequisite: 275 or consent of instructor.
3 units (Staff)

279. Physical Chemistry Seminar—Required of all graduate students majoring in physical chemistry.
1 unit, Aut, Win, Spr (Staff)

283. Research Proposals in Physical Chemistry—May be required of 2nd- and 3rd-year graduate students at the discretion of the research adviser. Students present research proposals and progress reports on their research in physical chemistry, using oral and written forms. Topics may be drawn from the student’s research of a related area in physical chemistry. Written form, oral presentation, and scientific merit are evaluated.
1 unit, Aut, Win, Spr (Staff)

287. Biophysical Chemistry—The theoretical and experimental aspect of biophysical phenomena, emphasizing membrane biophysics and membrane biology. Pre- or corequisites: 171 and 173, or the equivalent.
3 units (Staff) not given 1999-2000

289. Biophysical Chemistry—Experimental methods in biophysics. Emphasis is on spectroscopic techniques including magnetic resonance and optical methods. Prerequisite: 287.
3 units (Staff) not given 1999-2000

291. Biophysical Chemistry—Special topics in biophysical chemistry. Pre- or corequisites: 171 and 173, or the equivalent.
3 units (Staff) not given 1999-2000

293. Structural Inorganic Chemistry—Structural biophysical chemistry, x-ray crystallography, and related techniques as used in biophysical research. Electron and optical microscopy and neutron diffraction. Prerequisite: 291 or consent of instructor.
3 units (Staff) not given 1999-2000

3 units, Spr (Kool)

297. Bio-Inorganic Chemistry—Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents.
3 units (Solomon) alternate years, given 2000-01

299. Teaching of Chemistry—Required of all teaching assistants in chemistry. Techniques of teaching chemistry by means of lectures and labs.
1-3 units, Aut, Win, Spr (Staff)

300. Department Colloquium—Required of all graduate students.
1 unit, Aut, Win, Spr (Staff)

301. Research in Chemistry—Required of all graduate students who have passed the qualifying examination. Open to qualified graduate students with the consent of the major professor. Research seminars and directed reading deal with newly developing areas in chemistry and experimental techniques. May be repeated for credit. Students register giving section number of staff member and number of units agreed upon.
2 units, Aut, Win Spr (Staff)

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.
1 unit, Aut, Win Spr (Spudich, Robertson, Chu, Mobley)

RESEARCH AND SPECIAL ADVANCED WORK
190. Introduction to Methods of Investigation—Limited to undergraduate students admitted under the honors program or by special arrange-
lectuate students are encouraged to undertake research, or advanced lab work, and a number of units agreed upon. For research and special work, students register for 200 (190, if undergraduate), giving section number of staff member under whom work is carried on and number of units agreed upon. (Staff)

CLASSICS

Emeriti: (Professors) Mark W. Edwards, Michael H. Jameson, Edward Spofford, Michael Wigodsky
Chair: Susan A. Stephens
Graduate Director: Andrea W. Nightingale
Undergraduate Director: Joseph G. Manning
Professors: Alessandro Barchiesi, Andrew M. Devine, Richard P. Martin, Marsh H. McCall, Jr., Ian Morris (Classics, History), Michael Shanks, Susan A. Stephens, Susan Treggiari (Classics and, by courtesy, History)
Associate Professors: Jody Maxmin (Art and Art History, Classics), Andrea W. Nightingale (Classics, Comparative Literature), M. Rush Rehm (Drama, Classics)
Assistant Professors: Joseph G. Manning, Reviel Netz, Yasmin Syed
Courtesy Professors: George Brown, Robert C. Gregg, Ian Hodder, Valentin Y. Mudimbe
Lecturers: Barbara Clayton, Maud Gleason
Acting Assistant Professors: Walter Scheidel, Jennifer Trimble
Visiting Professor: Eric Gruen
Visiting Assistant Professor: Joy Connolly

UNDERGRADUATE PROGRAMS

The Department of Classics offers courses on all aspects of Greek and Roman culture: art and archaeology, cultural studies, history, language, literature, and philosophy. The department offers five majors in Classics (Ancient History, Classical Studies, Greek, Greek and Latin, and Latin) which vary in the number of language courses they require; each of these majors can be completed in conjunction with a second major in the sciences or other humanities departments.

The major in Classics affords an opportunity to develop a competence in the classical languages; an appreciation, comprehension, and enjoyment of classical literature; and an understanding of the history and culture of the ancient world. The department is interested in students who wish to do their major work in Classics and in students who wish to relate work in Classics to work in other departments.

BACHELOR OF ARTS

Prospective majors in Classical Studies, Greek, and Latin (options 1, 2, and 3) are encouraged to declare at the beginning of the junior year but are urged to discuss their plans with the undergraduate director as early as possible. Students who choose to major in Greek and Latin (option 4) should begin the curriculum as soon as possible, since it is difficult to complete the language requirements without an early start; those with no previous knowledge of Latin or Greek should begin study in the freshman year or as early as possible in the sophomore year.

To declare the major, a student must fill out the Declaration of Major form in the Registrar’s Office and meet with the undergraduate director in the Department of Classics. At that time, the undergraduate director assigns each student a department adviser who helps to prepare a program of study; students should meet with their advisers at least once a quarter. Each student’s progress towards fulfillment of the major requirements is recorded in a file kept in the main office. It is the student’s responsibility to work with his or her adviser in keeping this file up to date.

The A.B. degree may be earned by fulfilling the requirements for one of the five following majors:

1. Classical Studies: at least 60 units, including at least two courses in Latin or Greek at the 100 level or higher, or one course in one of the languages at the 100 level or higher plus the series 1, 2, 3, or 51 and 52 in the other language (or an equivalent approved by the department). In addition, students are required to take the Majors Seminar (378-176) and at least one course in each of the following five groups: ancient history, art and archaeology, literature in translation, philosophy, religion and mythology. Students are strongly urged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. This major is recommended for students who wish to study the classical civilizations in depth but do not wish to study the languages to the extent required by options 2, 3, and 4. It is not suitable for students who wish to do graduate work in Classics or to teach Latin or Greek in high school, as the language work is insufficient for these purposes.

2. Greek: at least 60 units, including a minimum of 31 units in Greek courses at the 100 level or higher (it is recommended that one of these courses be Greek 175A, although this course should not be attempted until students have completed three years of Greek). In addition to courses in Greek, students are required to take the Majors Seminar (378-176) and at least one course in each of the following three groups: history and/or archaeology, literature in translation, and religion and/or philosophy. The introductory sequence (1, 2, 3, or 51 and 52) or one 100-level course in Latin is recommended. Beginning courses in Greek, if required, may be counted towards the total of 60 units. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are strongly urged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region.

3. Latin: at least 60 units, including a minimum of 31 units in Latin courses at the 100 level or higher (it is recommended that one of these courses be Latin 175A, although this course should not be attempted until students have completed three years of Latin). In addition to courses in Latin, students are required to take the Majors Seminar (378-176) and at least one course in each of the following three groups: history/archaeology, literature in translation, and philosophy/religion. The introductory sequence (1, 2, 3, or 51 and 52) or one 100-level course in Greek is recommended. Beginning courses in Latin, if required, may be counted towards the total of 60 units. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are strongly urged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region.

4. Greek and Latin: at least 60 units, including 30 units in Greek courses and the same number in Latin. It is recommended that students take Greek 175A or Latin 175A (or both), although these courses should not be attempted until students have completed three years of the respective language. All students are required to take the Majors Seminar (378-176); it is strongly recommended that students take a course in ancient history. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are strongly urged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region.

5. Ancient History Major: at least 60 units of approved courses. All courses counted for the degree must be taken for a letter grade. Students must satisfy four requirements:

a) Writing in the Major (WIM) Requirement: this is fulfilled by taking the Majors Seminar (5 units), Interpreting Antiquity (378-176).

b) Depth Requirement. A major must take at least 40 units of ancient history and civilization courses, drawn from courses with 371 and 378 prefixes. The courses chosen must be approved in advance by the undergraduate director. With the approval
of the instructor and the undergraduate director, students may substitute graduate seminars in ancient history for some of these courses.

c) Breadth Requirement. Each student must take at least 4 units in each of the following areas: archaeology and art; comparative ancient civilizations; historical and social theory. The courses chosen must be approved in advance by the undergraduate director, and will normally be chosen from the list of recommended courses below:

1. Archaeology and Art, for example, any course with the 372 prefix; Cultural and Social Anthropology 1/100, 90, 92, 211, 253, 272, 275; Archaeology 33; Art and Art History 100A, B, or C, 120A, 200, 200C.

2. Comparative Ancient Civilizations, for example, Anthropological Sciences 4, 7, 10, 103, 106, 150; History 192A.

3. Historical and Social Theory: for example, Cultural and Social Anthropology 1/101, 90; History 173C, 202; Sociology 1, 114, 136, 140, 142, 170.

Students are strongly urged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region.

Note 1: University credit earned by placement tests or advanced placement work in secondary school is not counted towards any major program in the department; work done in other universities or colleges is subject to department evaluation.

Note 2: A letter grade is required in all courses taken for the minor. No course receiving a grade lower than 'C' is counted toward fulfilling major requirements.

MINORS

The undergraduate director meets with each student who opts for a minor to discuss his/her chosen curriculum and assigns the student an adviser in the relevant field. Students are required to work closely with their advisers to create a cohesive curriculum within each area. Students may organize their curriculum according to different principles: for example, they may wish to focus on a specific historical period (Classical Athens, Imperial Rome), or on a specific theme or topic (women in antiquity). After consulting with the adviser, each student must submit (in writing) a "Proposed Curriculum" to the undergraduate director. Students may proceed with the minor when the undergraduate director has approved the proposal. Courses offered in Greek and Latin above the 100 level may count toward the minor, provided the subject matter is suitable. Students may choose between three minors in Classics:

1. **Classical Languages**: students are required to take a minimum of five courses in Greek or in Latin plus the Majors Seminar (378-176). Students wishing to combine Greek and Latin may only do so if courses for one of the two languages are all above the 100 level; for example, Greek 51, 52, plus Latin 103, 111, 175.

2. **History**: students are required to take a minimum of five courses in history, art history, and archaeology plus the Majors Seminar (378-176). Courses offered in Latin and Greek that focus on historical topics or authors may count toward the minor.

3. **Literature and Philosophy**: students are required to take a minimum of five courses in classical literature or philosophy plus the Majors Seminar (378-176). Courses offered in Latin and Greek that focus on philosophical or literary topics or authors may count toward the minor.

All students minoring in Classics are required to take the Majors Seminar (378-176), Interpreting Antiquity, which is writing intensive.

HONORS PROGRAMS

A minimum grade point average (GPA) of 'B+' in Classics courses is required for students to enroll in the honors program. To be considered for honors in Classics, the student must select a professor who can supervise him or her on this honors thesis. Together with the supervisor, the student writes a two- to three-page proposal at the beginning of the senior year. The proposal should outline the project in detail, list relevant courses that have been taken, and name the supervisor. The department gives approval only if it is satisfied that the student has a sufficient basis of knowledge derived from department course work in the general areas the thesis covers (that is, course work in art, Greek, and/or Latin language, history, literature, philosophy, and so on). If the proposal is approved, the student may sign up for Undergraduate Thesis (378-199) during one or two quarters of the senior year for a maximum of 6 units a term, up to an overall total of 10 units. Honors are awarded only if the essay receives a grade of 'B+' or higher from the supervisor and a second reader.

HUMANITIES

For majors in Classics with appropriate interests, the honors program in Humanities is available, a description of which is found under the "Interdisciplinary Studies in Humanities" section of this bulletin.

OVERSEAS STUDIES

**Funding**—Students whose record in Classics indicates that they are fully qualified for a given program may apply for funding from the Department of Classics. Students must submit a proposal to the undergraduate director, which should include an itemized list of expenses based on the fees charged by the program (that is, room, board, tuition, and other expenses). Limited funding is available each year; preference is shown to students with strong records.

**Programs**—

1. **Rome**: Classics majors are encouraged to apply for the Intercollegiate Center for Classical Studies (ICCS) in Rome. Duke University manages the center for about 50 constituent colleges and universities. It is open to Sanford majors in Classics, History, and Art History. All students receive full credit at Stanford and may be applied to the respective major. Students interested in this program should consult the undergraduate director and the ICCS representative in the Department of Classics as early as possible in their career at Stanford to plan their course preparation and application. Competition is strong and applicants are expected to have taken one or more courses in Roman history and at least two years of Latin before they arrive in Rome. Brochures are available at the department office.

   Other programs offer a quarter, semester, or summer session in Rome. Interested students are urged to visit Bechtel International Center.

2. **Greece**: students are encouraged to apply for the summer session at the American School of Classical Studies in Athens. The school is recommended principally for Classics majors with at least two years of ancient Greek. A student wishing to apply should prepare by taking courses in Greek history, archaeology, and art; beginning Modern Greek is strongly recommended. Applicants should see the undergraduate director early in the academic year. Other programs offer a quarter, semester, or summer session in Greece. Interested students are urged to visit Bechtel International Center.

GRADUATE PROGRAMS

MASTER OF ARTS

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

Students who have completed an undergraduate major in Classics (Greek and/or Latin) or its equivalent may be accepted as candidates for the A.M. degree in Classics or A.M. in Classics in the field of Greek and Latin, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis of examination). Students without an undergraduate major in Classics may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing at least 18 units of graduate courses and 18 units of work at the 140 level or above.

2. Satisfactory completion of one Greek course at the 100 level (if the undergraduate major has been Latin) or one Latin course at the 100 level (if the undergraduate major has been Greek).
3. Passing an examination testing the candidate's ability to translate into English from a selected list of Greek and/or Latin authors.
4. Satisfactory completion of the 275A, B sequence in at least one language (Latin or Greek).
5. Writing a thesis, or passing of an examination on a particular author or topic, or written work having been accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent.
6. Reading knowledge of French or German.
7. Completion of a Program Proposal for a Master's Degree form in the first quarter of enrollment.

Candidates for the Ph.D. degree may also (on the recommendation of the department) become candidates for the A.M. degree. In their case, requirement 5 above is waived provided that they have completed some work beyond the course requirements listed under requirements 1 and 2 above.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

All candidates for the Ph.D. degree in Classics must fulfill the following requirements:

1. Complete at least three years (nine quarters) of full-time work, or equivalent, in study beyond the bachelor's degree. This must include the 175-205 sequence and the 202-203 sequence (unless the student is exempted by examination) and normally at least twelve graduate seminars acceptable to the department, in addition to the doctoral dissertation. At least three consecutive quarters of graduate work and the final units of credit in the program must be taken at Stanford. More detailed information on the Ph.D. program is available from a brochure in the Department of Classics office.

2. Candidates are required to pass examinations as follows:
   a) Reading examinations in French and German. In some circumstances Italian may be substituted for French. Students should plan to satisfy this requirement as soon as possible, normally no later than the end of the second year.
   b) Translation examinations into English from a prepared set of Greek and Latin authors. These examinations must be taken at the end of the first year and at the end of the second year as part of the requirement for the 202-203 sequence.
   c) General examinations in four of the following fields: Greek literature, Latin literature, ancient philosophy, Greek history, and Roman history. At least one field must be historical and another must be literary. Students select the fields in consultation with the graduate director no later than June of the second year of graduate study. Three of the fields are tested by written examination combined with a supplemental general oral examination. General examinations must be taken in October of the third year.
   d) The University oral examination on the candidate's dissertation. The examinations in translation from Greek and Latin authors must be taken at the end of the first and at the end of the second year of graduate work, the general written and oral examinations in October of the third year, and the University oral examination at the end of the dissertation. In preparing for the general examinations, candidates are expected to make full use of relevant secondary material in modern languages. They should therefore plan to satisfy the requirements in French and German as soon as possible, preferably before the translation examinations. Except in very special circumstances, candidates may not take the general examinations until the modern language requirements have been completed.

3. Each candidate, after passing the general examination, selects a dissertation director who must be a member of the Academic Council. In consultation with the dissertation director, the candidate prepares a statement of the dissertation topic to be submitted for approval by the Graduate Committee. When the statement of the dissertation topic has been approved, the candidate, the dissertation director, and the Graduate Committee collaborate to select an appropriate dissertation committee.

4. All students are required to undertake the equivalent of four one-quarter courses of teaching under department supervision. This teaching requirement must be completed during the second and third years of study.

Ph.D. MINOR

For a graduate minor, the department recommends at least 20 units in Latin or Greek at the 100 level or above, and at least one course at the graduate (200) level.

CLASSICS AND A MINOR FIELD

The Ph.D. in Classics may be combined with a minor in another field, such as anthropology, history, humanities (see below), classical linguistics (see below), or philosophy. Requirements for the minor field vary, but might be expected to involve about six graduate-level courses in the field and one written examination, plus a portion of the University oral exam. Such a program is expected to take five years. The department encourages such programs for especially able and well prepared students and is normally able to offer one fellowship each year to support a student in the fifth year of a combined program. The following timetable would be typical for a five-year program:

First Year: course work, almost entirely in Classics. One translation exam taken in June. One or both modern language exams taken.
Second Year: course work, both in Classics and the minor field. Second translation exam completed. French and German exams completed.
Third Year: course work, both in Classics and the minor field. General examinations in Classics.
Fourth Year: remaining course work, both in Classics and the minor field. General examination in the minor field. Preparation for dissertation.
Fifth Year: dissertation, University oral examination.

GRADUATE PROGRAM IN HUMANITIES

The Department of Classics participates in the Graduate Program in Humanities leading to the joint Ph.D. degree in Classics and Humanities. For a description of that program see the "Interdisciplinary Studies in Humanities" section of this bulletin.

COMPARATIVE LITERATURE

The Department of Classics cooperates closely with the graduate program in the Department of Comparative Literature. Interested students should consult the chair of the department.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

GREEK

UNDERGRADUATE

Students whose major work is in another department and who wish to fulfill a departmental foreign language requirement by taking Greek should consult their departmental advisers to determine the precise nature of that department's requirements.

Courses in Greek all have department prefix 373.

1. First-Year Greek—For beginners.
   5 units, Aut (Clayton)

2. First-Year Greek—Continuation of 1.
   5 units, Win (Clayton)

3. First-Year Greek—Continuation of 2.
   5 units, Spr (McCall)

10. Intensive First-Year Greek—Intensive beginning Greek equivalent to 1, 2, 3. The goal is the reading of easy classical or New Testament
Greek by the end of the quarter. Short readings in philosophical Greek are included.

8-9 units, Sum (Staff)

51/52. Accelerated First-Year Greek
10 units, given 2000-01

INTERMEDIATE/ADVANCED

Students are admitted to these courses by completing Greek 3, 10, or 51-52, or on the basis of previous work done in secondary school or elsewhere. Usually two to three years of secondary school Greek qualifies a student for 101, three to four years for 111. Students with previous knowledge of Greek should consult the undergraduate director in Classics to determine the course for which they are best suited.

Students whose major work is in another department and who wish to fulfill a departmental foreign language requirement by taking Greek should consult their department advisers to determine the precise nature of that department's requirements. Most departments are satisfied if part of the series 101, 102, 103 is completed.

101. Second-Year Greek—Selections from Plato, Xeophon, Lucian. 5 units, Aut (Coty)

102. Second-Year Greek—Greek Tragedy, one play. 5 units, Win (Kleps)

103. Second-Year Greek—Homer, selected books from the Odyssey. 5 units, Spr (Martin)

104. New Testament Greek 2-3 units, given 2000-01

111. Third-Year Greek—Poetry 3-5 units, Aut (Prince)

112. Third-Year Greek—Prose. 3-5 units, Win (Serfass)

113. Third-Year Greek—Plato. 3-5 units, Spr (Netz)

175/275A,B. Greek Syntax—(First-year graduate students register for 275.) The nuances of Greek syntax and style, stylistic analysis of selected prose authors, techniques of sight-translation, and the writing of idiomatic Greek prose. Begins the 5th week of the Winter Quarter and continues through the end of the Spring Quarter. Prerequisite for undergraduates: three years of Greek.

2 units, Win (Syed) (Sweeks) 4 units, Spr (Syed)

370. Advanced Greek Prose or Verse Composition 2-3 units, any quarter (Staff)

LATIN

UNDERGRADUATE

Students whose major work is in another department and who wish to fulfill a departmental foreign language requirement by taking Latin should consult their department's advisers to determine the precise nature of those requirements. Most departments are satisfied if part of the series 101, 102, 103 is completed.

Courses in Latin have department prefix 375.

1. First-Year Latin—For beginners. 5 units, Aut (Henchy)

2. First-Year Latin—Continuation of 1. 5 units, Win (Henchy)

3. First-Year Latin—Continuation of 2. 5 units, Spr (Henchy)

10. Intensive First-Year Latin—Intensive beginning Latin equivalent to 1, 2, 3; or 51 and 52. The goal is the reading of easy Latin prose and poetry by the end of the quarter.

8-9 units, Sum (Staff)

51. First-Year Latin—Accelerated. 6 units, given 2000-01

52. First-Year Latin—Accelerated; continuation of 51. 6 units, given 2000-01

INTERMEDIATE/ADVANCED

Students are admitted to these courses by completing Latin 3, 10, 51, and 52, or on the basis of previous work done in secondary school or elsewhere. Usually two to three years of secondary school Latin qualifies a student for 101, three to four years for 111. Students with previous knowledge of Latin should consult the undergraduate director in Classics to determine the course for which they are best suited. Students whose major work is in another department and who wish to fulfill a departmental foreign language requirement by taking Latin should consult their department’s advisers to determine the precise nature of those requirements. Most departments are satisfied if part of the series 101, 102, 103 is completed.

101. Second-Year Latin—Poetry and prose of the Republic. 5 units, Aut (Treggiari)

102. Second-Year Latin—Poetry and prose of the Empire. 5 units, Win (Hawkins)

103. Second-Year Latin—Selections from Vergil, Aeneid, selected books. 5 units, Spr (Connolly)

111. Third-Year Latin—Poetry, lyric. 3-5 units, Aut (Barchiesi)

112. Third-Year Latin—Poetry. 3-5 units, Win (D. Smith)

113. Third-Year Latin—Poetry. 3-5 units, Spr (Clayton)

175/275A,B. Latin Syntax—(First-year graduate students register for 275.) Intensive review of Latin syntax. Begins in Autumn Quarter and ends the 5th week of the Winter Quarter. Prerequisite for undergraduates: minimum of three years of Latin.

4 units, Aut (Devine) 2 units, Win (Devine) (five weeks)

177. Introduction to Paleoigraphy and Codicology—(Enroll in English 209.) 4-5 units, Aut (Brown)

370. Advanced Latin Prose or Verse Composition 2-3 units, any quarter (Staff)

GRADUATE

These courses have department prefix 378.

202A,B,C, 203A,B,C. Survey of Greek and Latin Literature—Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material is in roughly equal proportions, poetry and prose organization is generic. Non-Classics majors may take one or more quarters without the language component.
202A. Epic
4-5 units, given 2000-01

202B. Ancient Philosophy
4-5 units, given 2000-01

202C. Greek Drama
4-5 units, given 2000-01

203A. History
4-5 units, Aut (Scheidel)

203B. Lyric and Bucolic
4-5 units, Win (Martin)

203C. Rhetoric
4-5 units, Spr (Connolly)

205A.B. The Semantics of Grammar—Supplements Latin and Greek
275, providing an introduction to the grammatical encoding of semantic and informational meaning. Topics: case, gender, tense, and aspect. A theoretical background for teachers of Greek and for the analysis of literary and non-literary texts.
2 units, Aut (Devine)
1 unit, Win (Devine)

Some of the above courses may be continued the following quarter by arrangement with the instructor. This usually requires the writing of an extended research paper based on work directly related to the course.

COURSES IN TRANSLATION

UNDERGRADUATE

These courses have department prefix 378.

1. An Introduction to Ancient Egyptian Hieroglyphics—The ancient Egyptian writing system has more than 3,000 years of continuous development covering stories, letters, and documents concerning the history of women, law, economics, and medicine. Introduces the language and its scripts to be able to read basic texts and inscriptions. The legacy of the ancient Egyptian language and Egyptian texts to the classical world and beyond.
3-4 units, given 2000-01

2. Introduction to Coptic—The Coptic language is the final stage of ancient Egyptian. It is a key language for the study of early Christianity and the survival pagan culture in Egypt, and the key to the decipherment of the Rosetta Stone and Egyptian hieroglyphic writing. The basic grammar and, as time permits, some important literature preserved in Coptic (the "New Testament" and the "Saying of the desert fathers").
3-4 units, Aut (Manning)

12. Greek Tragedy—The tragedies produced in 5th-century Athens represent a moment in the history of human creativity. Introduces the range and depth of Greek tragedy. Twelve plays by Aeschylus, Sophocles, and Euripides are studied with Aristotle’s Poetics and Aristophanes’ Frogs. Emphasis is on the power and complexity of the poetry, the connections to 5th-century social and political issues, and the performance conditions and conventions of the ancient theater. GER:3a (DR:7)
3-5 units, given 2000-01

16N. Stanford Introductory Seminar: Bimillennium, High and Low Life in Rome 2000 Years Ago—Preference to freshmen. The evidence for how people of different classes, from slaves and laborers to senators and the emperor, lived in the time of Augustus. Topics: the City of Rome and its monuments, demographic factors, living conditions, status and wealth, work, leisure, family, marriage, and sexual life.
3-4 units, Aut (Treggiari)

18. Greek Mythology—The heroic and divine in the literature, mythology, and culture of archaic Greece. Interdisciplinary approach to study of individuals and society. Illustrated lectures. Selected readings, in translation, of Homer, Hesiod, Herodotus, and the poets of lyric and tragedy. GER:3a (DR:8)
3-4 units, Spr (Syed)

20N. Stanford Introductory Seminars: Love and Death in Epic
Poetry—Preference to freshmen. Great epics: Homer’s Iliad and Odyssey, Virgil’s Aeneid and Derek Walcott’s Omeros (which won the Nobel Prize). Epic poems deal with central issues of human life: love, death, and the meaning of life. What is a hero, and how do the different works celebrate and/or criticize different heroic attributes? What sorts of gods inhabit the world of the epic? What roles do women play in heroic narratives, and what is their status in relation to the male characters? How do these poems deal with the subject of war and human violence? In a world of suffering and loss, what gives human life significance and value? What happens when an epic is set in Rome instead of Greece or in contemporary St. Lucia (a Caribbean Island) instead of ancient Greece or Rome? How do the different cultures in which these authors lived affect the form and substance of the epic?
3-4 units, Win (Nightingale)

21N. Stanford Introductory Seminar: Love as an Art Form in Latin
Poetry and the European Novel—Preference to freshmen. Can love be taught? Two texts from different historical periods conceptualize love as a teachable art form: Ovid’s didactic poem The Art of Love and Choderlos de Laclos’ epistolary novel Les Liaisons Dangereuses. These are contrasted with contemporaneous depictions of love as a romantic experience (the poetry of Catullus and Propertius and Jane Austen’s Sense and Sensibility). Do ideas about the nature of love change over time? Are they influenced by the politics of the time in which they are written? What roles do literary factors such as generic convention and literary tradition play in the depiction of love?
3-4 units, Aut (Syed)

30Q. Stanford Introductory Seminar: Literature and Culture of Modern Greece—Preference to sophomores. Focus is on modern Greece since its establishment as a nation. Discussion and analysis of literary works of prominent authors, films, and documents highlight issues related to Greek institutions, social structures, traditions, and culture. Emphasis is on topics of ethnicity, Greek heritage and national identity, kinship and gender issues, and migration patterns. GER:3a (DR:7)
3-5 units, Aut (Prionas)

117. Gender, Violence, and the Body in Ancient Religion—Greek religious rites of gender reversal; Bacchanalian ecstasy in Greece and Rome; exquisite suffering, martyrdom as erotic spectacle; harlots of the desert who mortified the flesh; holy anorexia: the search of medieval women for spiritual transcendence. The changing meanings assigned to the body in the ancient world’s search for holiness; why contact with the divine was often manifested violently, and how ancient concepts of gender informed ritual practice, and how Christianity’s idealization of the suffering body offered new problems and possibilities for women. GER:3b,4c (DR:9)
3-4 units, Aut (Stephens, Gleason)

137. The Greek Invention of Harmony and Proportion—A painting by Leonardo, a Bach fugue, and Einstein’s theory of relativity represent the idea that the universe embodies certain simple, mathematical relations, which offer the key to truth and beauty. This idea arose in classical Greece, through the twin concepts of harmony and proportion. Where did such ideas come from, and what was their original significance? The way Greek science and culture mutually reinforced each other, in a wide range of beliefs about proportions: between geometrical figures or inside cities, in the human body, or on the guitar. Proportion and harmony, for the Greeks, connected the abstract and the concrete and led to intellectual and aesthetic breakthroughs: perspective painting, Western musical harmony, the idea of mathematical physics, etc. By understanding the historical background to such developments, strands in contemporary culture from the “arts” and “the sciences” are recognized as essentially belonging together.
4 units, Spr (Netz)
139. Medicine in Ancient Greece and Rome—Contemporary medical practice traces its origins to the creation of “Scientific Medicine” by Greek doctors, e.g., Hippocrates and Galen. Is this something modern medicine can be proud of? The scientific achievements and the ethical limitations of ancient medicine. Contemporary ideas and practices that had their beginning in the ancient world, a world where “scientific medicine” was no more than another form of “alternative medicine.” “Scientific Medicine” had to compete in the marketplace of ideas, struggling to be recognized where the boundaries between the scientific and social aspects of medicine were difficult to draw. This background for the creation of modern medicine helps us understand better the interaction between medicine and society in our own culture. GER:3b (DR:9)
4 units, Aut (Netz)

169. Introduction to the Ethics of Socrates, Plato, and Aristotle—The ethical philosophy of Socrates, Plato, and Aristotle, and its relation to traditional Greek notions of goodness and happiness. The ideological systems (gender, sexuality, race, and class) which these thinkers set out to corroborate or contest. The nature of philosophic language and its relation to other kinds of discourse (especially poetry and rhetoric). GER:3a (DR:8)
4-5 units, Win (Nightingale)

176. Majors Seminar: Interpreting Antiquity—The field of Classics, including an introduction to basic theoretical issues in classical literature, history, and philosophy. The evolution and coherence of the discipline of classics, and the various ways in which antiquity was/is appropriated by post-classical cultures. (WIM)
3-5 units, Spr (McCall)

CLASSICS/HISTORY

These courses have department prefix 371.

17N. Stanford Introductory Seminars: Decoding Ancient Egypt—Preference to freshmen. The ancient Egyptian hieroglyphic writing systems are one of the world’s oldest and longest lasting languages, and one of the most efficient modes of communication ever invented. How the writing system was deciphered by Champollion in the context of 19th-century European cultural history. The basic hieroglyphic signs and the grammar of ancient Egypt. Emphasis is on the discussion of the Egyptian writing system, analysis of actual Egyptian texts and museum objects, and their relationship to ancient Egyptian history and culture. At the end of term, students can read a variety of Egyptian texts.
3-4 units, Spr (Manning)

18N. Stanford Introductory Seminars: All is a Number—Preference to freshmen. Did Pythagoras really say, “All is a number?” What could that mean? The diverse ways Greeks used numbers and thought about them. How to count the Greek way, and how to use the Greek Abacus. What was the role of numbers in Greek economic, political, and social life? What were the ideas the Greeks first developed concerning numbers, starting with Pythagoras and the Pythagoreans. How was Greek thinking about the role of numbers in the universe at the root of Western sciences and mysticism?
3-4 units, Win (Netz)

101. History of Greece—The social, political, economic, and cultural history of ancient Greece, from the fall of the Bronze Age palaces (c.1200 B.C.) to the death of Alexander the Great (323 B.C.). Focus is on the class and gender structures of Athenian democracy, and on the struggles for power between the Greek city-states. Readings from original sources in translation.
4-5 units, Aut (Scheidel)

4-5 units, Win (Scheidel)

101A. Reading Tutorial in History—in Greek.
3-4 units, any quarter (Staff)

102. Roman History I: The Republic—How did Rome grow from a village to the capital of a Mediterranean empire? The underlying factors of culture, customs, and structures of Rome in the context of a world of tribes and city-states. For the later period, contemporary texts.
4-5 units, Win (Scheidel)

103. Roman History II: The Empire—The Roman Empire from the dictatorship of Julius Caesar and the Principate of Augustus through the consolidation of the system and the brink of its later crisis. Emphasis on the achievement of Augustus in establishing a constitutional system, the Principate, which gave relative peace and security to the Roman world for 250 years; the subsequent history of the Julio-Claudian dynasty; the life and culture of the empire (Mediterranean lands and Europe) during the first two centuries A.D.; the contribution of Rome to the cultures of western Europe and its successors (e.g., literature, architecture, science, the transmission of Greek and Judeo-Christian ideas, and the acculturation of Romans to non-Romans and the non-transmission of Roman culture elsewhere). Contemporary texts and archaeological data where possible. GER:3b (DR:9)
4-5 units, Spr (Treggiari)

105. History and Culture of Egypt—Survey of the history and culture of ancient Egypt from the pre-dynastic, 3100 B.C., through the early Christian period, A.D. 500. Emphasis is on historical development and continuity and the contribution of Egyptian culture to other Mediterranean societies. GER:3b,4a (DR:2 or 9)
4-5 units, Spr (Manning)

108A. Reading Tutorial in Late Antiquity—in Greek or Latin.
3-4 units, any quarter (Staff)

121. Slavery Ancient and Modern—How and why slave labor became important in some societies; the relationships between slavery, serfdom, and free labor; the violent domination of slaves; slave resistance and rebellion; and the collapse of servile economies. Emphasis is on comparative approaches; case studies from ancient Greece and Rome and modern Africa and America.
3-4 units, given 2000-01

CLASSICS, ART/ARCHAEOLOGY

Courses in Classical Art and Archaeology have department prefix 372.

33. Landscape: From Fine Art to Archaeology—Landscape is about people’s relationship with environment, land, place, and history. How range of disciplines and media since the 18th century have approached this complex and evocative idea. The aim is to explore interdisciplinary links and to locate this contentious ideological field in its historical and intellectual context. Topics: landscape in paintings, modes of visiting European romanticism, contemporary land and environmental art, new human geographies of place, landscape architecture, and garden design, anthropological perspectives on people’s relationships with land, and landscape archaeology. GER:3b (DR:9)
4-5 units, Win (Shanks)

34. The City of Rome: A Social Topography—Traditional Roman topography presents the city of Rome as an assemblage of individual monuments. The history and significance of the ancient city range from the period of Roman state formation, its emergence as caput mundi in the Late Republic and Early Empire, and its ultimate transformation into a Christian City. These developments are explored spatially and socially, emphasizing a range of material evidence and to historical and literary sources in urban design, public and private architecture, supply systems, entertainment facilities, and the provisions for death that shaped and changed the city, over time, in terms of Roman social organization and lived experience.
4-5 units, Aut (Trimbile)

100A. Archaic Greek Art—(Same as Art and Art History 100A.)
4 units, Aut (Maxmin)
History 100B.

Art History 202C.

CoUoquium: Aspects of Later Greek Art—(Same as Art and Art History 100C.)

Museum ART AND ARCHAEOLOGY (372)

candidates from other departments, advanced classics majors, and oth-

301. Hellenistic Poetry

4-5 units, Win (Stephens)

303. Art in Roman Empire: Ideology, Place, and the Individual—

What do images do in an imperial system? How do they do it? Modern

and ancient thinking about the role of images in the public spaces of the

early and high Roman Empire. Drawing on new works of art and the

religious practices of cultural politics in Italy, N. Africa, Egypt, Asia

Minor, and Roman Greece, examines the role of images in framing

imperial meaning and the shaping of individual responses. Selected

images and their context of viewing, and discussion in terms of ideology,

reception, tensions of the empire and place, and individual agency.

4-5 units, Spr (Trimble)

304. Thinking through Archaeology: Key Issues in Theory—Archae-

ological theory is a major area of international debate in the discipline.

The cutting edge of archaeology is inseparable from the development of

a sophisticated body of thought and principles aimed at understanding

archaeologists and the material remains of society. Theory equips

students with the tools for understanding. Practicing archaeologists are

critically aware of their character as human science. The place of the

archaeology in a contemporary (post) modern and postcolonial world.

4-5 units, Win (Shanks)

LATIN (375)

322. Roman Epic: Statius' 'Achilleid'—Detailed reading of the epic frag-

ment 'Story of Achilles or Achilleid', composed at the end of the Domitianic

period, in the mid-90s BC. The text focuses on gender and sexual differ-

cences and the recapitulation in miniature of virtually the whole epic tra-
dition of Greece and Rome. Discussions, and varied presentations on the

anti-epic within epic, on gender and genre, on Imperial projects of man-

hood, on Greek myth in Roman art and poetry, and on programmatic writing.

4-5 units, Aut (Barchiesi)

GENERAL (378)

300. Ancient Economies—Surveys recent literature and problems in the

structure of ancient economies, from the classical economies of Greece

and Rome to Hellenistic economic structures, including Ptolemaic Egypt.
The classic account of Moses Finley, how new and reinterpreted docu-

mentary evidence and archaeology have shaped new understandings in

the ways in which the ancient economies worked and how they differ from

each other and from modern ones. Attention to theory and to an exami-
nation of the texts which have shaped the theory. Required review of a

body of literature on one aspect of the ancient economy and research paper.

4-5 units, Aut (Manning)

302. Classical Archaeology: Experiences of the Discipline—The re-

mains of Classical Greece still fascinate and have generated a global

culture. How archaeologists have dealt with the ancient Greek world. The

history and workings of a discipline, of communities of academics. The

thesis that archaeologists deal with source materials and that these require

interpretations. How interpretation proceeds depends upon the charac-
ter of the evidence, the ideas and preconceptions of the archaeologist, and

their interests and aims. Interpretations differ and change. The experi-

ence of archaeology is not a set of static images of past gone, but a pro-
cess of detection and supposition, following connections, constructing

plausibilities forever rooted in uncertainty.

4-5 units, Aut (Sanks)

303. Art in Roman Empire: Ideology, Place, and the Individual—

What do images do in an imperial system? How do they do it? Modern

and ancient thinking about the role of images in the public spaces of the

early and high Roman Empire. Drawing on new works of art and the

religious practices of cultural politics in Italy, N. Africa, Egypt, Asia

Minor, and Roman Greece, examines the role of images in framing

imperial meaning and the shaping of individual responses. Selected

images and their context of viewing, and discussion in terms of ideology,

reception, tensions of the empire and place, and individual agency.

4-5 units, Spr (Scheidel)
SCHOOL OF HUMANITIES AND SCIENCES

AFFILIATED DEPARTMENT OFFERINGS

COMPARATIVE LITERATURE

218. Latinity and Vernacularity
5 units, Win (Mallette)

CULTURAL AND SOCIAL ANTHROPOLOGY

92. Introduction to Approaches in Archaeology
5 units, Win (Hodder)

272. Objectification: The Study of Material Culture
5 units, Spr (Hodder)

275. Archaeology and Globalism
5 units, Win (Hodder)

COMMUNICATION

Emeriti: (Professors) Elie Abel, Richard A. Brody; (Professors—Teaching) Ronald Alexander, Marion Lewenstein
Chair: Kristine Samuelson
Director, Institute for Communication Research: Byron B. Reeves
Director, John S. Knight Fellowships for Professional Journalists: James V. Risser
Director, Documentary Film and Video: Jan Krawitz
Director, Journalism: Theodore L. Glasser
Director, Media Studies: Henry Breitrose
Deputy Director, John S. Knight Fellowships for Professional Journalists: James Bettinger
Professors: Henry S. Breitrose, Steven H. Chaffee (on leave Autumn), Theodore L. Glasser, Shanto Iyengar (on leave Winter), Jan Krawitz (on leave Spring), Byron B. Reeves, Donald F. Roberts, Kristine Samuelson
Associate Professor: Clifford I. Nass
Assistant Professors: François Bar (on leave), Laura Lecats (on leave)
Professor (Teaching): James V. Risser
Consulting Professor: Jon Else
Visiting Professors: Dale Maharidge, William Woo
Lecturer: Lynn Rampoldi-Hnilo

The Department of Communication engages in research in communication and offers curricula leading to the A.B., A.M., and Ph.D. degrees. The A.M. degree prepares students for research on mass media or for careers in journalism or documentary film and video. The Ph.D. degree leads to careers in teaching and research-related specialties. The Institute for Communication Research offers research experience primarily to advanced Ph.D. students.

The John S. Knight Fellowship Program brings promising mid-career professional journalists to the University to study for nine months in a nondegree program. Six International Fellows sponsored by Reuters Foundation, the Knight Foundation, and others join twelve U.S. journalists.

ADMISSION

Prospective Undergraduate Students—Write to the University’s Office of Undergraduate Admissions, Stanford University, Stanford, California 94305.

Prospective Graduate Students—Write to Graduate Admissions, the Registrar’s Office, Stanford University, Stanford, CA 94305-3005. Online application also readily available via the web http://www.applyweb.com/aw/stanford.

The department requires that applicants for graduate admission submit verbal and quantitative scores from the Graduate Record Examination (GRE). Admission to each graduate degree program is competitive based on the pool of applicants each year rather than on standard criteria that can be stated in advance.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

PREPARATION

Before declaring the major, students must have completed or be concurrently enrolled in Communication 1, 106 or 108; and Statistics 60 or Psychology 10. Students interested in declaring the major should speak to the student services administrator in building 120, room 434 during the scheduled office hours.

PROGRAM OF STUDY

The undergraduate curriculum is intended for liberal arts students who wish to develop a fundamental understanding of communication in society, drawing on the perspective of the social sciences. Undergraduate students majoring in communication are expected to become acquainted with the fundamental concerns, theoretical approaches, and methods of the field, and to acquire advanced knowledge in one or more of the subareas of communication institutions, processes, and effects.

While the department does not attempt to provide comprehensive, practical training at the undergraduate level, the curriculum provides opportunities for professional practice including courses in print and broadcast journalism, and internships.

The department is committed to providing students with the analytical and critical skills that are necessary for future success, be it in graduate programs, professional schools, or immediate career entry.

The major is structured to provide several levels of study: a core curriculum, intended to expose students to a broad-based understanding of communication theory and research, and a number of intermediate-level options and electives. Majors also have the opportunity to do advanced research in the form of senior projects and honors theses.

All undergraduate majors are required to complete a set of either Communication courses which include 1, Mass Communication and Society (5 units); 104, Writing and Reporting the News (WIM, 5 units), 106, Communication Research Methods (5 units); and 108, Communication Process and Effects (5 units).

Students must also complete an introductory course in statistics (typically Psychology 10 or Statistics 60) in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding.

In addition to the core courses and the statistics requirement, undergraduate majors select courses from the areas described below. Many of the courses require core courses as prerequisites.

Area I: Communication Processes and Effects—Area I emphasizes ways in which communication scholars conduct research in, and consider the issues of, human communication. These studies aim to provide expert guidance for social policy makers and media professionals. A minimum of two courses must be taken from Communication 130, 137, 155, 160, 166, 169, 170, 172.

Area II: Communication Systems/Institutions—Area II considers the roles and interaction of institutions such as broadcasting, film, journalism, constitutional law, and business within communication and mass communication contexts. A minimum of two courses must be taken from Communication 116, 122A or B, 125, 131, 133, 141A or B, 142, 178, 183.

To be recommended for the A.B. degree in Communication, the student must complete at least 60 units (approximately twelve courses) in the department. No more than 10 units of transfer credit or Summer Session may be applied to meet department requirements. Communication majors must receive a letter grade for all communication courses unless they are offered only for satisfactory/no credit (S/NC).

MINORS

PREPARATION

Before declaring the minor, students must have completed or be concurrently enrolled in Communication 1, 106 or 108; and Statistics 60 or Psychology 10. Students interested in declaring the minor should visit the registrar’s web site (www-Ireland.stanford.edu/dept/registrar) to apply for the minor.
The minor is structured to provide a foundation for advanced course work in communication through a broad-based understanding of communication theory and research.

The minor in Communication consists of three introductory Communication core courses which include 1, Mass Communication and Society (5 units); 106, Communication Research Methods (5 units); and 108, Communication Process and Effects (5 units).

In addition to core courses, the minor requires a minimum of five intermediate-level elective courses in the department. The department also requires completion of or concurrent registration in an introductory statistics course (Statistics 60, 70, or Psychology 10) prior to registration in Communication 106, Communication Research Methods. It is strongly recommended that the course in statistics be taken as early as possible, preferably in the Autumn Quarter of the junior year.

Students interested in declaring a minor must do so no later than registration in the Autumn Quarter of the junior year. Core courses are offered only once annually, and they constitute a sequence.

Prerequisite: introductory statistics course (for example, Psychology 10)

Core Courses: Communication 1, 106, 108

Area I, Communication Processes and Effects. A minimum of one course from Communication 130, 137, 155, 160, 166, 169, 170, 172

Area II, Communication Systems and Institutions. A minimum of one course from Communication 116, 122A,B, 125, 131, 133, 141A,B, 142, 178, 183

Plus three elective courses

Some courses are not given every year. Refer to program handout and the Time Schedule for details.

HONORS PROGRAM

The honors program provides undergraduates the opportunity to undertake a significant program of research in an individual professor/student mentoring relationship. The aim is to guide students through the process of research, analysis, drafting, rethinking, and redrafting, which is essential to excellence in scholarship. Working one-on-one with a faculty adviser, seniors may earn between 5 and 15 Communication units, culminating in an honors thesis. In order to be eligible for the honors program, interested majors must have: (1) successfully completed both a research methods and statistics course, (2) selected an adviser, and (3) submitted an application to the department by the end of their junior year. Applications may be picked up outside of room 110 of Building 120.

A final copy of the honors thesis must be read and approved by the adviser and submitted to the department by the eighth week of Spring Quarter (exact date to be arranged). It becomes part of a permanent record held by the department. Honors work may be used to fulfill Communication elective credit but must be completed and a letter grade submitted prior to graduation. A student failing to fulfill all honors requirements may still receive independent study credit for work completed and it may be applied toward fulfilling major requirements.

The designation "graduation with honors" is awarded by the Department of Communication to those graduating seniors who, in addition to having completed all requirements for the Communication major:

1. Complete an honors thesis
2. Maintain a distinguished grade average in all communication course work
3. Are recommended for distinction by the Communication faculty

COTERMINAL PROGRAM

The Department of Communication offers students who are completing an A.B. in another department a coterminal program with an A.M. emphasis in Media Studies: applications can be picked up at Degree Progress, the Registrar’s Office, room 132, Old Union.

Applications for coterminal study must be submitted at least four quarters in advance of the expected master’s degree conferment date. Stanford undergraduates may apply as early as the eighth quarter (or upon completion of 105 units), but no later than the eleventh quarter of undergraduate study. Requirements include: Application for Admission to Coterminal Master’s Program form, preliminary program proposal, statement of purpose, three letters of recommendation from Stanford professors, and a current Stanford transcript. GRE scores are required; a request must be submitted to Graduate Admissions, Registrar’s Office. Coterminal applications are submitted directly to the department. Review procedures and the Graduate Admissions Committee determines criteria.

GRADUATE PROGRAMS

MASTER OF ARTS

University requirements for the master’s degree are described in the “Graduate Degrees” section of this bulletin.

The department awards terminal A.M. degrees in two fields: Journalism and Documentary Film, and Video Production and Directing. Applicants for each program, and for doctoral work, are evaluated for admission on different criteria. A student may complete more than one A.M. degree in the department, but course work applied to the requirements for one A.M. degree may not be applied to a second. All work to fulfill graduate degree requirements must be in courses numbered 100 or above.

Students who complete an A.M. degree and who desire entry into the Ph.D. program must file a Graduate Program Authorization Petition application, which can be picked up at Graduate Degree Progress, room 132, Old Union. Such students are considered alongside all other doctoral applicants.

DOCUMENTARY FILM AND VIDEO

The graduate program in documentary film and video is a master’s program designed to train students in the conceptual and craft skills for the production of nonfiction film and video.

RESIDENCY

The program requires continuous enrollment for a period of two academic years, with a completion date of June in the second year.

Students proceed through the program as a cohort. The degree requires three full terms of registration in the first year. In the second year, full-time registration is required in Autumn Quarter, with half-time registration the remaining two quarters. Full-time registration consists of a minimum of 11 units; half-time registration consists of 9 units. The residency requirement is calculated on the basis of terms of registration and not on the basis of total number of units earned. The program does not allow for leaves of absence.

CURRICULUM

The curriculum is intended to teach an array of technical and conceptual skills as well as relevant historical and theoretical knowledge.

First-Year Curriculum—

Autumn Quarter
202A. Graduate Colloquium in Film and Television
222A. Documentary Film
223A. Documentary Film/Video Directing I
224A. Film Production I

Winter Quarter
222B. Documentary Colloquium in Film and Television
223B. Documentary Film/Video Directing II
224B. Film Production II
Elective (3-4 units)

Spring Quarter
222C. Graduate Colloquium in Film and Television
223C. Documentary Film/Video Directing III
224C. Film Production III
Elective (3-5 units)

Second-Year Curriculum—

Autumn Quarter
202A. Graduate Colloquium in Film and Television
222B. Documentary Film
292A. Documentary Film/Video A.M. Project Seminar I
Elective (1-4 units)

Winter Quarter
222B. Graduate Colloquium in Film and Television
292B. Documentary Film/Video A.M. Project Seminar II

Spring Quarter
202C. Graduate Colloquium in Film and Television
292C. Documentary Film/Video A.M. Project Seminar III
EQUIPMENT AND SUPPLIES

The department maintains film and video production facilities for teaching and research purposes. However, the costs of supplies and processing services are the responsibility of the students.

In the first year, students purchase a "course kit" at the beginning of each quarter which includes sufficient materials to complete the assignments. Once students have depleted the supplies in the course kit, subsequent purchases are made at outside vendors. The expense for normal film processing is included in the course kit fee during the Autumn and Winter Quarters, but each student sets up an account directly with a film lab during the Spring Quarter. In the second year, students are responsible for purchasing all materials and setting up their own accounts for necessary services during the production of the A.M. project. Students are given a partial list of vendors, online facilities, and motion picture laboratories.

Material costs are approximately $1,800 for the first year of residence. In the second year, costs vary depending on subject, format/length, and logistics, but $5,000 is typically the minimum average cost of an A.M. project.

A.M. PROJECT

In the second year of the program, each student produces an A.M. project which consists of a 15-20 minute film or video documentary. In order for students to have sufficient time to complete their own A.M. projects and gain the experience of assisting others, shooting must begin prior to Thanksgiving break, and shooting days are limited to a total of ten.

Students own their own work, but the department reserves the right to use student projects for non-profit University-related purposes.

In order to graduate, students must deposit with the faculty adviser a Beta SP copy of their film or video project and a revised final budget that reflects the projected and actual cost of their production. In the case of video, the Beta SP copy must be made once the film is printed and in the case of film, the Beta SP copy must be made from the on-line master. Students must contact the department's Student Services Administrator during the quarter in which they expect to graduate in order to determine what needs to be done to file for graduation. Students working in film may not have completed their final printing work prior to the end of the Spring Quarter. It is therefore possible for a student to officially graduate in the Summer Quarter immediately following their enrollment in Communication 292C, although they will not have access to facilities during this period. No extensions or leaves of absence are granted.

All A.M. projects must be completed by the end of the Spring Quarter of the second year. In the case of video, the student must have completed on-line editing, and in the case of film, the student must have completed the final sound mix. The A.M. projects are screened for the public during Commencement weekend.

JOURNALISM

The graduate program in Journalism is designed for students with an interest in the news-editorial area of journalism. Applicants are not required to have previous education or experience in journalism.

The master's degree requires a minimum of 47 units, including 4 units dedicated to a master's project. All courses must be selected in consultation with (and approved by) an academic adviser. An advisory committee must approve amendments to or deviations from the approved Program Proposal in writing. To remain in good standing, students must maintain a grade point average (GPA) of 'B.' Students who do not remain in good standing may not be able to complete the program. The students share a core of communication courses as follows:

- 204. Writing and Reporting the News
- 207. Editing the News
- 216. Media Law
- 217. Journalism and the Internet
- 225. Perspectives on American Journalism
- 275. Reporting of Public Affairs
- 290. A.M. Project
- 291. Graduate Journalism Seminar

Students are required to take a minimum of four additional courses, two in specialized writing and two in communication. The two specialized writing courses must be chosen from the following:

- 236. Broadcast Journalism
- 250. Magazine Writing
- 277. (Specialized writing course)
- 277A. Opinion Writing
- 277G. Social Issues Reporting
- 280. Film Criticism

Two communication courses must be chosen from the following:

- 206. Communication Research Methods
- 208. Communication Process and Effects
- 222. Documentary Film
- 231. Media Ethics and Responsibility
- 233. Communication and Culture
- 241. History of Film
- 242. Broadcast in America
- 260. The Press and the Political Process
- 269. Computers and Interfaces
- 270. Communication and Children
- 272. Communication Psychological Processing

There will be curriculum changes, effective with the 2000-01 class in next year's bulletin.

MEDIA STUDIES

The Media Studies master's program provides a broad introduction to scholarly literature in mass communication. This one-year program is designed primarily for students without prior academic work in communication, experienced media professionals who wish academic preparation for teaching, or coterminal students at Stanford.

Media Studies students must complete 42 units in Communication related areas in the social sciences and humanities, maintaining high academic standing throughout. In consultation with professors, students must also complete extensive projects in two of the required communication courses listed below.

Required core courses:

- 206. Communication Research Methods
- 208. Communication Process and Effects
- 204. Writing and Reporting the News
- 216. Media Law
- 217. Journalism and the Internet
- 225. Perspectives on American Journalism
- 231. Media Ethics and Responsibility
- 241. History of Film
- 242. Broadcast in America
- 260. The Press and the Political Process
- 269. Computers and Interfaces: Psychological and Social Issues
- 270. Communication and Children I
- 271. Communication and Children II
- 272. Communication Psychological Processing
- 318. Doctoral Research Methods I
- 319. Doctoral Research Methods II

Additional courses are selected in consultation with an academic adviser. A course in statistical methods is strongly recommended.
The Media Studies program is in its last year, and will not be offered 2000-01.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

The department offers the Ph.D. in Communication Theory and Research. First-year students are required to complete introductory courses in communication theory and research, research methods, and statistics. These core courses are grounded in the social science literature emphasizing how people respond to communication and media and how media institutions function. In addition, Ph.D. students must complete a minimum of three literature survey courses and three advanced seminars in communication and related departments. Each student builds a research specialty relating communication to current faculty interests in such areas as ethics, ethnic identity, human-computer interactions, information processing, information technology, law, and politics and voting. Regardless of the area of specialization, the Ph.D. program is designed primarily for students interested in teaching and research careers or policy formation positions.

The Ph.D. program encompasses four years of graduate study (subject to completion of the A.B. degree) during which, in addition to fulfilling University residency requirements, Ph.D. candidates are required to:

1. Complete all departmental course requirements with above average graduate grades, normally defined as a minimum grade point average (GPA) of 3.5. Currently these courses include Communication 206, 208, 311, 317, 318, 319, and a sequence in statistics (for example Statistics 160) that includes multiple regression and complex analysis of variables.
2. Pass the general qualifying examinations by the end of the second academic year of study and pass a specialized area examination by the end of the third academic year of study.
3. Demonstrate proficiency in tools required in the area of research specialization. Chosen with the advice of the faculty, such tools may include advanced statistical methods, computer programming, a foreign language, or other technical skills.
4. Complete two predissertation research projects.
5. Teach or assist in teaching at least two courses, including Communication 1.
6. Complete a dissertation satisfactory to an advisory committee of three or more faculty members.
7. Pass the University oral examination, which is a defense of the dissertation.

Because the multifaceted nature of the department makes it possible for the Ph.D. student to emphasize several areas of communication study, there tend to be several “typical” programs of course work followed by students, depending on their specialties. Variation in course programs worth occurs after the first year of graduate study; the first year is devoted primarily to the “core” courses required of all doctoral students.

In addition, students must complete other advanced Communication theory and research courses preparatory to their particular specializations. Specification of these courses depends on (1) individual student needs to prepare for preliminary and area examinations, and (2) the requirements of the particular area of emphasis chosen by the student.

Ph.D. candidacy is valid for five years. Extensions of candidacy are rarely granted and require reexamination.

Ph.D. MINOR

Candidates for the Ph.D. degree in other departments who elect a minor in Communication are required to complete a minimum of 20 units of graduate courses in the Department of Communication, including a total of three theory or research methods courses, and are examined by a representative of the department. A department adviser in consultation with the individual student determines the particular communication theory and methods courses.

THE INSTITUTE FOR COMMUNICATION RESEARCH

The institute is an office of project research for the faculty of the Department of Communication and operates under grants to faculty from foundations, communication media, and other agencies. Research assistantships are often available to qualified Ph.D. students in communication.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

PRIMARILY FOR UNDERGRADUATES

1. Mass Communication and Society: Media Technologies, People, and Society—Open to non-majors. Introduction to the fundamental concepts and contexts of communication. A topics-structured orientation emphasizing the field and the scholarly endeavors represented in the department. Lectures and discussion sections. GER:3b (DR:9)
   5 units, Aut (Nass, Reeves)

101. Film Aesthetics—(Graduate students register for 201.) Theoretical, historical examination of the nature of the film medium. Emphasis is on the problems of aesthetics and communication from the viewpoints of practitioner, critic, and audience.
   5 units (Staff) not given 1999-2000

104. Reporting and Writing the News—Reporting and writing, emphasizing various forms of journalism: news, interpretation, features, opinion. Detailed criticism of writing. Prerequisite: typing speed of 35 wpm. (WIM)
   5 units, Win, Sum (Staff)
   Spr (Maharidge)

106. Communication Research Methods—(Graduate students register for 206.) The conceptual and practical concerns underlying commonly used quantitative approaches (experimental, survey, content analysis, and field research) in communication. Students become acquainted with the techniques of research so they may become intelligent consumers and practitioners of research. Lectures and discussion sections. Recommended: 1 or Psychology 1. GER:3b (DR:9)
   5 units, Win (Staff)

108. Communication Process and Effects—(Graduate students register for 208.) The process of communication theory construction, including a survey of social science paradigms and major theories of communication. Lectures/discussion. Recommended: 1 or Psychology 1. GER:3b (DR:9)
   4 units, Aut (Rampoldo-Hnilo)

113Q. Stanford Introductory Seminar: Online Media, the Future of News in a Democracy—More people are turning to the internet for their news. Will this impact the way they respond to democratic institutions? Class participates in research on this question. Discussion of the history of news presentation via computers and methods by which subjects access this news, and related topics, is followed by selection, taping, and analysis of subjects’ behavior.
   1-3 units, Win (Lewenstein)

116. Media Law—(Graduate students register for 216.) Preference to Communication seniors. Law and government regulation impacting on journalists. Topics: libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, broadcast regulation, etc. Prerequisite: consent of instructor.
   5 units, Aut (Staff)

117. Journalism and the Internet—(Graduate students register for 217.) Preference to Communication seniors. The implications of new
media for journalists. Professional and social issues related to the
Internet as a case of new media deployment, as a story, as a research and
reporting tool, and as a publishing channel. Seminar discussion and
hands-on practicum. Prerequisite: consent of instructor.
5 units, Aut (Sandvig)

122A. Documentary Film—(Graduate students register for 222A.)
Analysis of the techniques and strategies of films designed to effect
attitudinal and behavioral change. Prerequisite: consent of instructor.
5 units, Aut (Breitrose)

122B. Documentary Film—(Graduate students register for 222B.)
Issues in contemporary documentary film/video including objectivity/
subjectivity, ethics, censorship, representation, reflexivity, responsibil-
ity to the audience, and authorial voice. The viewing and analysis of films
has a parallel focus on form and content. Prerequisite: consent of
instructor.
5 units (Krawitz) alternate years, given 2000-01

125. Perspectives on American Journalism—(Graduate students reg-
ister for 225.) Survey of issues, ideas, and concepts in the development
of American journalism, emphasizing the role of the press in society,
the meaning and nature of news, and professional norms that influence
conduct in and outside of the newsroom. Prerequisite: 1 or junior
standing. GER:3b (DR:9)
5 units, Win (Glasser)

130. Language and Interpersonal Communication—(Graduate stu-
dents register for 230.) Theory and research regarding language and
interpersonal communication. Issues on the above in relationships
(initiation, maintenance, deterioration); gender; persuasion; and decep-
tion (use and detection).
5 units (Staff) not given 1999-2000

131. Media Ethics and Responsibility—(Graduate students register
for 231.) The development of professionalism among American journal-
ists, emphasizing the emergence of objectivity as a professional and the
epistemological norm. An applied ethics course where questions of
power, freedom, and truth autonomy are treated normatively so as to
foster critical thinking about the origins and implications of commonly
accepted standards of responsible journalism.
5 units, Spr (Glasser)

133. Communication and Culture—(Graduate students register for
233.) The relationship between communication and culture, emphasizing
the mass media and their symbolic import. GER:3b (DR:9)
5 units (Glasser) not given 1999-2000

136. Broadcast Journalism—(Graduate students register for 236.)
Preference to Communication Seniors. Survey of broadcast journalism,
focusing on commercial and public broadcast news outlets. Students are
introduced to broadcast newswriting and prepare tapes for radio news
broadcast. Lab. Prerequisite: 104.
5 units, Spr (Staff)

137. U.S. Communication Policy—(Graduate students register for
237.) Policy issues surrounding the emergence of a National Information
Infrastructure (NII) in the U.S. Adopting a pluri-disciplinary approach,
examines the historical context of the policy debate, the technical and
business aspects of the networking transformation underway, and its
economic and social dimensions. GER:3b (DR:9)
5 units (Bar) not given 1999-2000

141A. History of Film: The First 50 Years—(Graduate students register
for 241A.) Studies in the development of the motion picture as an art form
and cultural industry. Lab. Screenings of films announced in class.
GER:3b (DR:9)
5 units (Breitrose) alternate years, given 2000-01

141B. History of Film: The Second 50 Years—(Graduate student
register for 241B.) The evolution of the motion picture as an art form in
art and culture industry in the U.S. and other nations from 1941. Topics:
the battle of the studio system, the impact of WW II, the rise and fall of
auteur cinema, television, industrial concentration and its effects, and the
"high concept" film. Mandatory evening screenings.
5 units, Win (Breitrose)

142. Broadcasting in America—(Graduate students register for 242)
The development of American broadcasting and its contemporary prob-
lems.
5 units, Win (Breitrose)

149Q. Stanford Introductory Dialogue: Interethnic Communi-
ation—Preference to sophomores. Students read, discuss, and participate
in ongoing research related to ethnic identity and communication. Coreq-
quisite: 155.
1 unit (Leets) alternate years, not given 2000-01

150. Magazine Writing—(Graduate students register for 250.) Practice
in writing magazine articles, with emphasis on marketing manuscripts,
Conference. Prerequisite: 104.
5 units (Staff) not given 1999-2000

155. Interethnic Communication—(Graduate students register for
255.) Working from an intergroup perspective, examines the influence of
ethnicity on the process of interpersonal communication. The problem
and opportunities inherent in communication among people from differ-
ent ethnic heritages and value orientations, and the steps relevant to
improving interethnic communication. GER:3b (DR:9)
5 units (Leets) not given 1999-2000

160. The Press and the Political Process—(Graduate students register
for 260.) Analysis of the role of mass media and other channels of
communication in political and electoral processes. GER:3b (DR:9)
5 units, Spr (Iyengar)

166. Communication Policy in Comparative Perspectives—(Gradu-
ate students register for 266.) A comparative overview of the ongoing
change in the communications policy environment of different countries.
How different nations are tackling the transformation, the reasons for
these differences, and the impact of distinct policy approaches on the
respective national economies and societies. GER:3b (DR:9)
5 units (Bar) not given 1999-2000

169. Computers and Interfaces: Psychological and Social Issues—
(Graduate students register for 269.) Interdisciplinary approach to issues
of human-computer interaction (primarily) and computers and society
(secondarily). General models of the link between technology, psychol-
ogy, and society, addressing the question of which is/are cause and which
is/are consequence. Issues: anthropomorphism and interface design;
what is a human; conversation and interfaces; metaphors in interfaces;
identity, privacy, and computing; and computer-mediated communica-
tion. GER:3b (DR:9)
5 units, Spr (Nass)

170. Communication and Children I—(Graduate students register
for 270.) Developmental approach to issues of human-computer interaction
(primarily) and computers and society (secondarily). General models of the
link between technology, psychology, and society, addressing the question
of which is/are cause and which is/are consequence. Issues: anthropomor-
phism and interface design; what is a human; conversation and interfaces;
metaphors in interfaces; identity, privacy, and computing; and computer-
mediated communication. GER:3b (DR:9)
4 units, Win (Roberts)

171. Communication and Children II—(Graduate students register for
271.) Research practicum; limited enrollment. Prerequisites: 170, consent
of instructor.
3 units, Spr (Roberts)
172. Psychological Processing—(Graduate students register for 272.) Examines the literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences between reading, watching, and listening. 

5 units, Win (Reeves)

177. Specialized Workshops—(Graduate students register for 277.) One or more classes are offered in specializations such as science or sports writing, or other areas. Organized around writing projects oriented toward the field of specialization.

177A. Opinion Writing—(Graduate students register for 277A.) 

5 units, Spr (Woo)

177B. Science Writing—(Graduate students register for 277B.) 

5 units (Staff)

177D. Environmental Reporting—(Graduate students register for 277D.) 

5 units (Staff)

177F. Feature and Analytical Writing—(Graduate students register for 277F.) 

5 units (Staff)

177G. Social Issues Reporting—(Graduate students register for 277G.) 

5 units (Staff)

177M. Medical and Health Care Reporting—(Graduate students register for 277M.) 

5 units, Win (Lehrman)

180. Film Criticism—(Graduate students register for 280.) A practical and critical view of film. Readings/discussion consider models of artistic and literary criticism as points of comparison. Weekly reviews stress the analysis of the films and a lucid writing style. Prerequisite: 101 or 141.

5 units (Breitrose) not given 1999-2000

183. Media Economics—(Graduate students register for 283.) The economics of communication media. A survey of the economic organization and characteristics of traditional communication sectors (newspaper publishing, film, broadcast and cable TV, telephony). The second half deals in greater detail with specific, cross-sector economic issues related to networks, media technologies, and digital convergence.

5 units (Bar) not given 1999-2000

185. Internship Experience—Professional experience in the media. Prerequisite: Communication major.

1-4 units, Aut, Win, Spr (Staff)

190. Senior Project—Research project or production of a finished piece of work in journalism or film. A combination of the senior project and an internship is possible. Prerequisite: senior standing.

3 units, Aut, Win, Spr (Staff)

195. Honors Thesis—Qualifies students to conduct communication research.

5-15 units, Aut, Win, Spr (Staff)

199. Individual Work—Communication majors with high academic standings are permitted to undertake individual work.

1-4 units, any quarter (Staff)

PRIMARILY FOR MASTER’S STUDENTS

201. Film Aesthetics—Graduate section; see 101.

202A,B,C. Graduate Colloquium in Film and Television—Topics in film and television focusing mainly on production-related issues. Prerequisite: A.M. student in film or television program.

1 unit, Aut (Samelson) 
Win (Krawitz) 
Spr (Breitrose)

204. Reporting and Writing the News—Reporting and writing, emphasizing the various forms of journalism: news, interpretation, features. Assignments are completed under realistic time and space constraints. Lectures and labs focus on the skills needed to produce polished, publishable material.

5 units, Aut (Risser)

206. Communication Research Methods—Graduate section; see 106.

4 units, Aut (Iyengar)

207. Editing the News—Copy editing, headline writing, news display, and photo cropping. Lab includes editing copy, Associated Press style, news circulation, and page make-up.

2 units, Aut (Woo)

208. Communication Process and Effects—Graduate section; see 108.

4 units, Aut (Rampoldo-Hnilo)

211. Mass Communication and Society—Graduate section; see 1.

4 units, Aut (Nass, Reeves)

216. Media Law—Graduate section; see 116.

4 units, Aut (Staff)

217. Journalism and the Internet—Graduate section; see 117.

4 units, Aut (Sandvig)

222A. Documentary Film—Graduate section; see 122A.

4 units, Aut (Breitrose)

222B. Documentary Film—Graduate section; see 122B.

223A. Documentary Film/Video Directing I—For graduate students. Emphasis is on conceptualizing and executing ideas for the production work done jointly with 224A, covering all aspects of preproduction at an introductory level. Prerequisite: admission to the A.M. Documentary Film and Video program.

5 units, Aut (Staff)

223B. Documentary Film/Video Directing II—For graduate students. Further professional training in preproduction and producing for motion pictures and television. Interview skills and other documentary directing techniques are developed utilizing video. Prerequisite: 223A. Corequisite: 224B.

5 units, Win (Staff)

223C. Documentary Film/Video Directing III—For graduate students. Further examination of structure, emphasizing writing and directing the documentary. Practical training in fundraising and distribution. Prerequisite: 223B. Corequisite: 223C.

5 units, Spr (Samelson)

224A. Documentary Film Production I—For graduate students. First of a three-quarter sequence leading to professional training in motion picture production. 16mm exercises and a short 16mm non-synchronous film with multiple sound tracks and effects. Corequisite: 223A.

5 units, Aut (Krawitz)

224B. Documentary Film Production II—For graduate students. Produce a short 16mm film exercise in color utilizing synchronous sound, with emphasis on observational filming techniques. Prerequisites: 223A, 224A. Corequisite: 223B.

5 units, Win (Krawitz)
224C. Documentary Film Production III—For graduate students. Final quarter of professional training in motion picture production. A five- to seven-minute, 16mm film utilizing skills acquired in 224A,B. Issues of documentary form and content. Prerequisites: 224A,B. Corequisite: 225C.
5 units, Spr (Staff)

225. Perspectives on American Journalism—Graduate section; see 125.
4 units, Win (Glasser)

226. Reconstructing Documentary Theory—Seminar addressing current controversies in the theory of documentary, drawing on the writings of Noel Carroll, Carl Plantinga, Leslie Woodhead, Trevor Ponek, Robert Rosenstone, etc. Topics: the rhetoric of non-fiction, the border between factual and fictional, subjectivity and objectivity, truth claims, reflexivity and the "art documentary." Prerequisite: graduate standing or consent of instructor.
3-4 units, Spr (Breitrose)

230. Language and Interpersonal Communication—Graduate section;
see 130.

231. Media Ethics and Responsibility—Graduate section; see 131.
4 units, Spr (Glasser)

233. Communication and Culture—Graduate section; see 133.
4 units (Glasser) not given 1999-2000

236. Broadcast Journalism—Graduate section; see 136.
4 units, Spr (Staff)

237. U.S. Communication Policy—Graduate section; see 137.
4 units (Bar) not given 1999-2000

241A. History of Film: The First 50 Years—Graduate section; see 141A.
4 units (Breitrose) not given 1999-2000

241B. History of Film: The Second 50 Years—Graduate section; see 141B.
4 units, Win (Breitrose)

242. Broadcasting in America—Graduate section; see 142.

4 units (Breitrose) not given 1999-2000

250. Magazine Writing—Graduate section; see 150.
4 units (Staff) not given 1999-2000

255. Interethnic Communication—Graduate section; see 155.
4 units (Leets) not given 1999-2000

260. The Press and the Political Process—Graduate section; see 160.
4 units, Spr (Iyengar)

266. Communication Policy in Comparative Perspectives—Graduate section; see 166.
4 units (Bar) not given 1999-2000

269. Computers and Interfaces; Psychological and Social Issues—Graduate section; see 169.
4 units, Spr (Nass)

270. Communication and Children I—Graduate section; see 170.
4 units, Win (Roberts)

271. Communication and Children II—Graduate section; see 171.

272. Psychological Processing—Graduate section; see 172.
4 units, Win (Reeves)

275. Reporting of Public Affairs—For graduate students. Coverage of traditional news beats, e.g., police, city hall, education, courts, and issue oriented coverage of policy area beats. Prerequisite: consent of instructor.
5 units, Win (Woo)

277. Specialized Workshops—Graduate section; see 177.
277A. Opinion Writing
4 units, Spr (Woo)
277B. Science Writing
277D. Environmental Reporting
277F. Feature and Analytical Writing
277G. Social Issues Reporting
277M. Medical and Health Care Reporting
4 units, Win (Lehrman)

280. Film Criticism—Graduate section; see 180.
4 units (Breitrose) not given 1999-2000

283. Media Economics—Graduate section; see 183.
4 units (Bar) not given 1999-2000

290. A.M. Project
4 units, Spr (Staff)

291. Graduate Journalism Seminar—Required of all A.M. journalism students. Discussions are devoted to preparation for the A.M. project and to current issues in the practice and performance of the press. Meets throughout the academic year.
1 unit, Aut, Win, Spr (Bettinger)

292A,B,C. Documentary Film and Video A.M. Project Seminar—Discussions devoted to A.M. projects and to current issues in the practice and performance of documentary film and video production.
6 units, Aut (Samuelson)
8 units, Win (Krawitz)
Spr (Staff)

299. Individual Work
1-4 units, any quarter (Staff)

PRIMARILY FOR DOCTORAL STUDENTS

301. Communication Curriculum Development and Pedagogy—Required of all second-year Ph.D. students.
1-3 units, Aut (Nass, Reeves)

1-3 units (Staff) not given 1999-2000

311. Theory of Communication—Required of all communication doctoral students. Approaches to communication theory, seminar and tutorial meetings, and extensive reading and papers. Prerequisite: Communication Ph.D. student, or consent of instructor.
4-5 units, Aut (Roberts)

317. Doctoral Research Methods I—Prerequisite: Ph.D. admission in Communication.
4 units, Win (Reeves)

318. Doctoral Research Methods II—Prerequisite: 317.
4 units, Win (Nass)
319. Doctoral Research Methods III—Prerequisite: 318.
   3-4 units, Spr (Iyengar)

330G. Seminar in Language and Interpersonal Communication—
   Limited to Ph.D. students. Advanced topics in language and interpersonal
   communication. Prerequisite: 230.
   1-3 units (Leets) not given 1999-2000

331G. Seminar in Communication/Media Ethics—Limited to Ph.D.
   students. Advanced topics in press ethics and responsibility. Prerequisi-
   site: 231 or consent of instructor.
   1-3 units (Glasser) not given 1999-2000

332G. Seminar in Communication and Culture—Limited to Ph.D.
   students. Advanced topics in communication and culture. Prerequisite:
   233 or consent of instructor.
   3-4 units (Glasser) alternate years, given 2000-01

355G. Seminar in Intergroup Communication—Limited to Ph.D.
   students. Advanced topics in intergroup communication. Prerequisite:
   255 or consent of instructor.
   1-3 units (Leets) alternate years, not given 2000-01

360A,B,C Seminar in Political Socialization—Students design a ques-
   tionnaire for the Kids Voting Project. Pre- or corequisite: 106 or 206.
   1-4 units (Staff) not given 1999-2000

360G. Seminar in Political Communication—Limited to Ph.D. stu-
   dents. Advanced topics in political communication. Prerequisite: 260 or
   consent of instructor.
   1-3 units (Iyengar) not given 1999-2000

365G. Interpersonal Communication—Limited to Ph.D. students.
   Prerequisite: consent of instructor.
   1-3 units (Leets) not given 1999-2000

369G. Seminar in Communication, Technology, and Society—Lim-
   ited to Ph.D. students. Advanced topics in communication, technology,
   and society. Prerequisite: 269 or consent of instructor.
   1-3 units, Spr (Nass)

370G. Seminar in Communication and Children—Limited to Ph.D.
   students. Advanced topics in communication and children. Prerequisite:
   270 or consent of instructor.
   1-3 units, Spr (Roberts)

372G. Seminar in Psychological Processing—Limited to Ph.D. stu-
   dents. Advanced topics in psychological processing. Prerequisite: 272 or
   consent of instructor.
   1-3 units, Win (Reeves)

374G. Seminar in Structure and Control of Communication—
   Limited to Ph.D. students. Advanced topics in the structure and control
   of communication. Prerequisite: 273 or consent of instructor.
   1-3 units (Glasser) not given 1999-2000

375. Communication Theory Review Seminar—Limited to Ph.D.
   students. Prerequisite: 311.
   3 units (Staff)

379. Communication: History and Evolution of the Field—The
   history and current status of the field of communication research.
   Prerequisite: graduate standing in Communication.
   3-4 units (Staff) not given 1999-2000

380A,B,C,D. Curriculum Practical Training—Practical experience
   in the communication industries. Prerequisites: graduate standing in
   Communication, consent of instructor.
   1-3 units, Aut, Win, Spr, Sum (Staff)

397. First Research Project—Individual research in lieu of master's
   thesis.
   3-6 units, Aut, Win, Spr (Staff)

398. Predissertation Research Project—Advanced research for Ph.D.
   candidates.
   3-6 units, Aut, Win, Spr (Staff)

399. Advanced Individual Work
   1-8 units, Aut, Win, Spr (Staff)

400. Dissertation Research
   6-10 units, Aut, Win, Spr (Staff)

AFFILIATED DEPARTMENT OFFERINGS

See individual department offerings for course descriptions of the
following, all of which are accepted for credit toward the Communica-

SLAVIC LANGUAGES AND LITERATURES

148. The Factory of the Eccentric Actor (1921-1929): Between The-
   ater and Film, Avant-Garde and Trivial Genres, East and West
   4 units, Aut (Bulgakowa)

166. Russia on the Silver Screen: U.S., Eastern European, and
   Émigré Cinema
   4 units, Spr (Bulgakowa)

OVERSEAS STUDIES

FLORENCE

52. Realism, Utopia, Myth, and Society in Italian Cinema: Bernar-
   do Bertolucci, Pier Paolo Pasolini, and Federico Fellini
   5 units, Win (Campani)

OXFORD

31. Media Accountability in Britain and the U.S.
   4 units, Aut (Glasser)

33. Mass Media in the Tradition of British Cultural Studies
   4 units, Aut (Glasser)

COMPARATIVE LITERATURE

Emeriti: (Professors) Joseph Frank, John Freccero, René Girard; (Cour-
tesy Professors) W. B. Carnochan, Gerald Gillespie

Chair: Seth Lerer

Director of Admissions: Hans U. Gumbrecht

Director of Graduate Studies: Monika Greenleaf (on leave Winter,
   Spring); Seth Lerer (Winter, Spring)

Director of Undergraduate Studies: Seth Lerer

Professors: John Bender (English, Comparative Literature), Russell
   Berman (German Studies, Comparative Literature), Hans U. Gumb-
   rech (French and Italian, Spanish and Portuguese, Comparative
   Literature; Kyoto, Spring), Seth Lerer (English, Comparative Literature),
   Herbert Lindenberger (English, Comparative Literature),
   Valentin Y. Mudimbe (French and Italian, Comparative Literature),
   Patricia Parker (English, Comparative Literature), Mary Louise Pratt
   (Spanish and Portuguese, Comparative Literature), Richard Rorty
   (Comparative Literature), Ramon Saldívar (English, Comparative
   Literature; on leave 1999-2000), Jeffrey Schnapp (French and Ita-
   lian, Comparative Literature)

Associate Professors: Monika Greenleaf (Slavic Languages and Litera-
   tures, Comparative Literature; on leave, Winter, Spring), Thomas
   Hare (Asian Languages, Comparative Literature), Elisabeth Mu-
   dimbe-Boyi (French and Italian, Comparative Literature; on leave
   1999-2000), Andrea Nightingale (Classics, Comparative Literature),
The interdisciplinary program in Comparative Literature (CL) admits students for the Ph.D. It works toward the Ph.D. in individual language departments and, in conjunction with the Humanities honors program, offers a concentration in comparative literature for undergraduates.

**UNDERGRADUATE PROGRAM**

**BACHELOR OF ARTS**

The undergraduate major in Comparative Literature is designed for students who combine the drive and ability to master foreign languages with a strong commitment to literary study. In all cases, students must do a substantial portion of their work in at least one foreign language. The major enables these students to pursue carefully constructed programs of study involving the in-depth study of literature in one or more languages not their own and the study of their literature of specialization, its theory, and its practice in relation to other literatures, communications media, and disciplines.

The major is distinct from those in the national literatures by its comparative scope, by the requirement of seminars that focus on fundamental theoretical questions regarding the nature of literature and literary inquiry, and by its requirement that students’ programs of study be structured around the exploration of a single literary genre, historical epoch, or theoretical problem. It differs from the “interdisciplinary” majors in English, and Modern Thought and Literature (MTL) by the requirement that every student’s program be anchored in the study of a literature other than that of his or her native language and, with specific regard to MTL, by its chronological scope.

The “comparative” aspect of each student’s program of specialization is fulfilled according to which of the two available tracks he or she elects to follow:

**Track A: The Literary Studies track** integrates in-depth work in a primary literature with extensive work in a second literature (in the original language) and complementary course work in an outside field.

**Track B: The Interdisciplinary track** integrates in-depth work in a primary literature with the focused study of literature in relation to other arts (film, music, painting, and so on), intellectual disciplines (anthropology, history, linguistics, philosophy, and so on), or comparative work in area studies.

An honors program is available in Comparative Literature for both of these tracks (see below) that integrates substantial in-depth work in a primary literature with extensive work in a second literature (in the original language) or discipline, but also requires the writing of a senior honors paper.

In both tracks, students work closely with the department’s Director of Undergraduate Studies in designing an individually tailored program of specialization involving two related areas of study. Individual study plans require considerable advance planning and must meet the approval of the Director of Undergraduate Studies.

**Declaring the Major**—As soon as a student knows that he or she would like to declare the Comparative Literature major (and no later than Autumn Quarter of the junior year), he or she should obtain an application form for the appropriate track (see below) from the Comparative Literature office. The completed worksheet (with prospective courses for future years) should be handed to the Director of Undergraduate Studies with an updated official transcript and the student’s advising file. The director should sign the worksheet, indicating his or her approval of the feasibility of the proposed program. This worksheet needs to be updated at least once during each academic year.

**Advising**—When a student declares Comparative Literature, he or she may choose to declare the Director of Undergraduate Studies as his or her adviser, since the director approves credit for all course work (including course work abroad). The adviser may also be a member of the core Comparative Literature faculty. If this occurs, the student must meet periodically with the Director of Undergraduate Studies to monitor his or her progress in the major and for all questions regarding the major’s requirements.

**Overseas Campuses and Abroad Programs**—The Department of Comparative Literature encourages time abroad, both for increased proficiency in language and the opportunity for advanced course work. Course work done at campuses other than Stanford’s is counted toward the major at the discretion of the Director of Undergraduate Studies and is contingent upon the University’s acceptance of classes for units. To that end, students abroad must make an effort to save all notes, papers, correspondence, and so on, to increase the chance of acceptance.

**Honors College**—The Department of Comparative Literature encourages all honors students to enroll in the honors college scheduled during the weeks preceding the beginning of every academic year. Applications to the college are available from the department administrator. The department has traditionally run its honors college in collaboration with Interdisciplinary Studies in Humanities.

**REQUIREMENTS**

**CORE FOR TRACKS A AND B**

All majors in Comparative Literature (including honors) are required to complete the following courses, the first as near as possible to the date of declaration and the second during the senior year. Together, these core seminars ensure that majors have been introduced to the framing propositions and principal methods of the discipline. More specifically these courses are designed to lead students to inquire about the historical standing of such concepts as the “literary,” the “aesthetic,” “criticism,” “genre,” “text,” and “theory.”

1. **CL 101, Seminar on Literature and the Institution of Literary Study** (5 units) provides students with an introduction to the comparative study of literature, to the history of poetic theory, and to the historical development of literary fields. It is concerned with addressing foundational questions such as: what kind of knowledge is literary knowledge and how has this knowledge been codified and categorized with respect to other forms of knowledge?

2. **CL 199, Senior Seminar on Literary Theory** (5 units) offers advanced students of comparative literature the opportunity for in-depth study of the evolution of modern literary theory and, particularly, of contemporary theoretical perspectives regarding the study of literary artifacts.

**TRACK A—LITERARY STUDIES**

Literary works are shaped by a complex interplay of historical forces and constraints, including contacts between differing cultures and traditions; the evolution of literary genres, practices, and conventions; shifts in media and technologies of reproduction and diffusion; and the imitation of model authors. By combining in-depth work in a primary literature with work in a second literature, this track emphasizes the study of such phenomena. It requires:

1. **Courses using materials in the original language:**
   a) Five of which make up an intellectually coherent program, in the literature of the first language A.
   b) Three are in the literature of language B. These course selections must be coordinated with the courses selected in the literature of language A in order that, taken together, they form a cohesive program of study focused on one of:
      1) a specific literary genre
      2) a historical epoch
      3) a theoretical question

Note: if either A or B is the student’s native language, further work must be done in a third language to the extent of at least one course in its literature. Literature courses usually begin after two years of college-level study. Bilingual students may count either tongue as “native” and the other as “acquired.” If language A, B, or C is Chinese, Japanese, Russian, or another language in which two years of language...
Comparative Literature

MINORS

The undergraduate minor in Comparative Literature (CL) represents an abbreviated version of the major. In all cases, students must do a substantial portion of their work in at least one foreign language.

All minors in Comparative Literature are required to complete CL 101, Seminar on Literature and the Institution of Literary Study (5 units). This provides an essential introduction to the framing propositions and principal methods of the discipline.

In addition, all minors must complete two courses in the literature of a language other than their native tongue. All materials in each course must be in the original language.

1. **Literary Studies Track**: integrates in-depth work in a primary literature with work in a second literature. Requirements are:
   a) Two courses in a second literature (this may include courses in translation, as well as courses in English and/or American literature).
   b) One additional course in Comparative Literature numbered 0-100

2. **Interdisciplinary Track**: integrates in-depth work in the primary literature with the focused study of literature in relation to another art or intellectual discipline. Requirements are:
   a) Two courses in a single discipline, or the cultural history of a single historical epoch.
   b) One additional course in Comparative Literature numbered 0-100.

The minor is modeled primarily on the structure and progression of the major (with the appropriate reduction in course and unit requirements, as stipulated by the Committee on Undergraduate Studies). It retains the distinction between the two CL tracks and enables students to design a course of study built around the core CL seminar.

The Director of Undergraduate Studies is responsible for evaluating all requests and individual study plans for the minor.

HONORS PROGRAM

The honors option is reserved for exceptionally motivated students who wish to undertake an even more intensive and extensive program of study leading to the writing of a senior honors paper. The program allows for either a "Literary Studies" or an "Interdisciplinary" emphasis and it requires:

1. Six courses, using materials in the original language and making up an intellectually coherent program in the literature of a language other than the student's native tongue. Bilingual students may satisfy this requirement in either of their original languages or in a third language.

2. One additional course in Comparative Literature numbered 0-100.

3. A third course in a language other than the student's native tongue.

4. An "outside" perspective on the student's field of specialization.

Note: It is worth emphasizing that, as even a cursory review of the Stanford Bulletin demonstrates, this track in no way overlaps with current offerings in the modern language and literature departments whose majors neither require nor encourage students to pursue an integrated program of interdisciplinary study in tandem with their specialization in a national literature field. What it provides is an opportunity which is elsewhere unavailable to Stanford undergraduates: namely, a major analogous to the "English with an Interdisciplinary Emphasis" track in the Department of English, yet grounded in the study of non-English literature(s) and offering broad training in literary theory.
further intellectual shape. One course from the CL 100 series (but not 101 or 199) may be counted under this rubric.

b) For an Interdisciplinary Emphasis: six courses as outlined in the general requirements for the Interdisciplinary Track (Track B), above. This course work must be shaped around the literature courses selected in item 1. It must either treat cogent analytic or thematic issues in the chosen discipline, or be directly relevant to the chosen historical specialization. Students who choose area studies for their interdisciplinary work must complete courses that include work outside a single area studies focus or that have a genuinely comparative aspect. Each of these six courses must be approved in advance by the Director of Undergraduate Studies.

3. One further course is required, usually in translation, on a literature distant from the two of the student’s concentrations, so as to provide an “outside” perspective on the student’s area of specialization.

4. During Spring Quarter of the junior year, a letter requesting admission to the honors program must be submitted to the department’s Director of Undergraduate Studies. This letter must be accompanied by:
   a) The completed, signed worksheet
   b) An updated transcript
   c) A sample seminar paper
   d) An intended plan of study for the senior year (drawn up according to the emphasis selected)
   e) A preliminary statement (two to five pages) regarding the proposed topic of the honors paper (elaborated in consultation with the Director of Undergraduate Studies)

   (In Spring Quarter of the junior year, the student may enroll for 2 units of credit for independent research in CL 194.)

   This application is voted on by the Comparative Literature honors committee, made up of the Director of Undergraduate Studies and the Chair of the Department of Comparative Literature. Should it be approved, a faculty tutor is appointed by the director according to the topic. At the appropriate time, a second reader is designated by the honors committee.

5. Once the request for admission to the honors track has been approved, the student may choose to enroll in a 5-unit tutorial (CL 195, graded credit/no credit) with a faculty member during Autumn Quarter of the senior year in order to refine the project description, begin all necessary research, and initiate the composition of the honors paper.

6. During Winter Quarter of the senior year, the student must enroll in a 5-unit independent study (CL 195) with his or her faculty tutor for purposes of drafting the honors paper. At the end of the quarter, a completed draft must be submitted to the tutor. If it meets his or her approval as is, two copies must then be forwarded to the honors committee which will decide on the basis of the paper’s quality whether or not the student is awarded honors. If the faculty tutor feels that the paper still requires rewriting at the end of Winter Quarter, the student may enroll for 2 units of independent study during Spring Quarter for purposes of final submission. In order to be considered for honors in Comparative Literature, two copies of the final paper must be submitted to the honors committee no later than the fifth week of Spring Quarter.

   Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but must be of appropriate comparative or theoretical scope and should reflect the student’s chosen emphasis. Quality (not quantity) is the key criterion. As a rule of thumb, however, they run in the range of 40-70 pages.

   Honors Awards—The two readers of any honors thesis in Comparative Literature may elect to nominate the thesis in question for University-wide awards if they feel that it is deserving. In addition, the department honors committee evaluates on a competitive basis the honors theses completed in a given year and nominates one for University-wide awards competitions.

GRADUATE PROGRAM

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

The Ph.D. program is designed for a small group of students whose linguistic background, breadth of interest in literature, and curiosity about the problems of literary scholarship and theory (including the relation of literature to other disciplines) make this program more appropriate to their needs than the Ph.D. in one of the individual literatures. Students take courses in at least three literatures (one may be that of the native language) to be studied in the original. The program is designed to encourage familiarity with the major approaches to literary study prevailing today.

Before starting graduate work at Stanford, students should have completed an undergraduate program with a strong background in one literature and some work in a second literature studied in the original language. Since the program demands an advanced knowledge of two non-native languages and a reading knowledge of a third non-native language, students should at the time of application have an advanced enough knowledge of one of the three to take graduate-level courses in that language when they enter the program. They should be making enough progress in the study of a second language to enable them to take graduate courses in that language not later than the beginning of the second year, and earlier if possible. Applicants are expected to take an intensive course in the third language before entrance.

A considerable part of a student’s work consists of individual study toward the oral examinations, for which each student devises reading lists in consultation with the graduate advisor. These examinations are centered on the study of particular periods, genres, and problems of literary study.

Students are admitted under a fellowship plan which attempts to integrate financial support and completion of residence requirements with their training as prospective university teachers. Tenure as a fellow, assuming satisfactory academic progress, is for a maximum of four years, graduate-level work in literature completed elsewhere being counted as part of this four-year period. The minimum teaching requirement is the same regardless of financial support. (For specific teaching requirements, see below.) Although financial support is limited to four years, the completion of requirements often requires five years. Students in the fifth year ordinarily apply for outside fellowships or for part-time teaching positions in language and literature departments at Stanford.

APPLICATION PROCEDURES

Competition for entrance into the program is keen. The program is kept small so that students have as much opportunity as possible to work in individual projects under faculty supervision throughout the period of study. No more than 16 students are in residence at any one time. The department does not plan to admit more than three or four new students for the class entering in September. Completed applications are due January 1. Because of the special nature of comparative literature studies, the statement of purpose included in the application for admission should contain the following information besides the general plan for graduate work called for on the application:

1. A detailed description of the applicant’s present degree of proficiency in each of the languages studied, indicating the languages in which the applicant is prepared to do graduate work at present and outlining plans to meet additional language requirements of the program.

2. A description of the applicant’s area of interest (for instance, theoretical problems, genres, periods) within literary study and the reasons for finding comparative literature more suitable to his or her needs than the study of a single literature. Applicants should also indicate what they think will be their primary field.

All applicants should arrange to have the results of the general section of the Graduate Record Examination sent to the Department of Comparative Literature.

Recommendations should, if possible, come from faculty in at least two of the literatures in which the student proposes to work.

Applicants must submit a copy of an undergraduate term paper which they consider representative of their best work.
DEGREE REQUIREMENTS

Residence—A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the A.B. degree. The student is expected to offer at least 72 units of graduate work in addition to the doctoral dissertation. At least three consecutive quarters of course work must be taken at Stanford.

Languages—Students must know three non-native languages, two of them sufficiently to qualify for graduate courses in these languages and the third sufficiently to demonstrate the ability to read a major author in this language. Only the third language may be certified by examination. The other two are certified by graduate-level course work specified below. Language preparation must be sufficient to support graduate-level course work in at least one language during the first year and in the second language during the second year. Students must demonstrate a reading knowledge of the third non-native language no later than the beginning of the third year.

Lectures made up of works written in the same language (such as Spanish and Latin American) are counted as one. One of the student’s three literatures usually is designated as the primary field, the other two as secondary fields, although some students may offer two literatures at the “primary level” (six or more graduate courses).

Teaching—Fellows, whatever their sources of financial support, are ordinarily required to undertake a total of five quarters of supervised apprenticeships and teaching at half time. Fellows must complete whatever pedagogy courses are required by the departments in which they teach. The department’s minimum teaching requirement is a total of three quarters.

Minimum Course Requirements—Students are advised that the range and depth of preparation necessary to support quality work on the dissertation, as well as demands in the present professional marketplace for coverage of both traditional and interdisciplinary areas of knowledge, render these requirements as bare minimum.

1. CL 369E.
2. A sufficient number of courses (six or more) in the student’s primary field to assure knowledge of the basic works in one national literature from its beginnings until the present.
3. At least two additional complementary courses, with most of the reading in the original, in each of two different national literatures. Students whose primary field is a non-native language are required to take two courses in one additional literature not their own.

Minimum course requirements must be completed before the student is scheduled to take the University oral examination. These requirements are kept to a minimum so that students have sufficient opportunity to seek out new areas of interest. A “course” is an offering of 3-5 units. Independent study may take the place of up to two of the required courses, but no more; classroom work with faculty and other students is central to the program.

Examinations—Three examinations are required. The third and last is the University oral examination. Students’ reading lists for each examination must be approved by an examination committee and by the graduate adviser. The examinations consist of the following, each of which takes the form of an oral colloquy between the student and a committee of faculty members with interests in the subject areas:

1. First One-Hour Examination: on a literary genre to consist of (a) a knowledge of a substantial number of literary works in a single genre, the list to include works from a number of centuries and from at least three national literatures, and (b) a grasp of the theoretical problems involved in dealing with this genre and with the question of genre in general. The examination must be taken no later than the beginning of the student’s second year of graduate work (or the third quarter of the first year for students who enter with a year of graduate work). Students may elect to take this section of the examination before the genre section, in which case it must be taken at the earlier time.
2. Second One-Hour Examination: on literary criticism and theory, to consist of the exploration of a specific problem proposed and defined by the student. The problem must be sufficiently wide-ranging to demand the reading of critical texts from a variety of periods. The examination must be taken no later than the first quarter of the student’s third year of graduate work (or the third quarter of the second year for students who enter with a year of graduate work). Students may elect to take this section of the examination before the genre section, in which case it must be taken at the earlier time.
3. University Oral Examination: on a literary period, to consist of in-depth knowledge of a period of approximately a century in three or more literatures with primary emphasis on a single national literature or, in occasional cases, two national literatures. The reading list covers chiefly the major literary texts of this period but may also include some studies of intellectual backgrounds and modern critical discussions of the period. Students must demonstrate a grasp of how to discuss and define this period as well as the concept of periods in general. This examination is not to be on the dissertation topic, on a single genre, or on current criticism, but rather on a multiplicity of texts from the period. Students whose course work combines an ancient with a modern literature have the option of dividing the period sections into two wholly separate periods.

Qualifying Procedures—The qualification procedures for students in Comparative Literature take place during the quarter in which the student takes the first Ph.D. examination. Ordinarily, this is the beginning of the second year, but students who enter with a year of graduate work elsewhere must take the examination no later than the third quarter of the first year. Any student may elect to take the examination during the third quarter of the first year.

Students are judged qualified to proceed to the Ph.D. on the basis of the first part of Ph.D. examination as well as other aspects of their work (for example, performance in courses, ability to do original research) that predict strong promise for their dissertations and future careers as scholars and critics. As soon as the student has completed the qualifying procedures, the chair recommends him or her for admission to candidacy for the Ph.D. At this time the student is also recommended for the Master of Arts degree in Comparative Literature if he or she has completed 36 units of work at Stanford and has not already completed an A.M. before entering the program.

Colloquium—The colloquium normally takes place in the quarter following the University oral examination. The colloquium lasts one hour, begins with a brief introduction to the dissertation prospectus by the student lasting no more than five minutes, and consists of a discussion of the prospectus by the student and the three readers of the dissertation. At the end of the hour, the faculty readers vote on the outcome of the colloquium. If the outcome is favorable (by majority vote), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory (by majority vote), the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second colloquium.

The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. It must be submitted in its final form to the readers no later than one week before the colloquium. A prospectus should not exceed ten double spaced pages, in addition to which it should include a working bibliography of primary and secondary sources. It should offer a synthetic overview of the dissertation, describe its methodology and the project’s relation to prior scholarship on the topic, and lay out a complete chapter by chapter plan.

It is the student’s responsibility to schedule the colloquium no later than the first half of the quarter after that quarter in which the student passed the University Oral Examination. The student should arrange the date and time in consultation with the department administrator and with the three examiners. The department administrator schedules an appropriate room for the colloquium.

Members of the dissertation reading committee ordinarily are drawn from the University oral examination committee, but need not be the same.

Ph.D. MINOR

This minor is designed for students working toward the Ph.D. in the various foreign language departments. Students working toward the Ph.D. in English are directed to the program in English and Compara-
tive Literature described among the Department of English offerings. Students must have:

1. A knowledge of at least two foreign languages, one of them sufficient to qualify for graduate-level courses in that language, the second sufficient to read a major author in the original language.

2. A minimum of six graduate courses, of which three must be in the department of the second literature and three in the Department of Comparative Literature, the latter to include a seminar in literary theory or criticism. At least two of the three courses in comparative literature should originate in a department other than the one in which the student is completing the degree. Except for students in the Asian languages, students must choose a second literature outside the department of their major literature.

COURSES

Courses meeting Writing in the Major requirements are indicated by (WIM).

CORE

These courses are aimed at freshmen and sophomores who are non-majors (and/or potential majors) and provide an entry point to the discipline of Comparative Literature.

All majors are required, as soon as possible after declaration, to successfully complete CL 101. During the senior year, majors enroll in 199.

20N. Stanford Introductory Seminar: Worlds (No Longer) Apart—Preference to freshmen. For those interested in reading literature and viewing films to make sense of historical and contemporary worlds. Literary narratives, films, documentaries, and videos examine the new textures of modern life, characterized by movements of people across nations and globe, shrinking under new global politics and economies and telecommunications. New forms of identity reflect the cultural changes of such movements. The narratives of Chinua Achebe, Junichiro Tanizaki, Amitav Ghosh, and Gabriel Garcia Marquez (with films and documentaries). The impact of re-drawn borders and immigration in the U.S. in works by Maxine Kingston, David Hwang, Bienvenido Santos, and Americo Paredes. Films from the Philippines and India, television in Kathmandu with Pico Iyer. GER:3a (DR:7)

3 units (Palumbo-Liu) not given 1999-2000

24Q. Stanford Introductory Seminar: Ethnicity and Literature—Preference to sophomores. What is meant by “ethnic literature”? Answers to that question propose a sense of the constituent terms developed, i.e., what is literature? How do such notions of literature enter into a particular dynamic when “what is ethnicity” is asked? How is “ethnic writing” different from non-ethnic writing, or is there such a thing as either? If “ethnicity” is accepted as an analytic perspective, how does it affect the way literature is read by ethnic peoples? Articles and works of fiction; films on the subject of ethnic literature and cultural politics. Goal: to understand better how ethnic literature represents the nexus of crucial social, historical, political, and personal issues. GER:4b (DR:3)

3-5 units, Aut (Palumbo-Liu)

25N. Stanford Introductory Seminar: Latin American Nobel Prize Winners—(Same as Spanish and Portuguese 125N) Preference to freshmen. An inquiry simultaneously into the powers of the artistic imagination and the dynamics of modern Latin American society and culture. The works of six Nobel Prize writers and intellectuals: Pablo Neruda, Gabriela Mistral, Octavio Paz, Gabriel Garcia Marquez, Miguel Angel Asturias, and Rigoberta Menchu. All write from deep connections to the tumultuous history of Latin America in this century. GER:3a (DR:7)

5 units, Spr (Pratt)

30N. Stanford Introductory Seminar: Opera and Literature—Preference to freshmen. Designed for students who desire an introduction to opera and who wish to enhance their responsiveness to music and to theatrical performance. Eight operas based on major literary texts are studied to gain an introductory knowledge and appreciation this form of classical music. The form’s beginnings around 1600 to the late 20th century, and the literary works that inspired their production (Rossini’s Barber of Seville, Mozart’s Marriage of Figaro, Monteverdi’s Orfeo, Bizet’s Carmen, Verdi’s Otello, Richard Strauss’ Salome, Alban Berg’s Wozzeck, and Benjamin Britten’s Death in Venice). Students watch videotapes or hear CDs before particular operas are taken up, and write short papers comparing aspects of the operas heard and literary works read. GER:3a (DR:7)

3-5 units, Aut (Lindemerger)

70N. Stanford Introductory Seminar: The Bible and World Culture—Preference to freshmen. The Bible is to many a little-known text, though it has been the foundation of major literary texts and political movements, art, and music. Its most influential portions are read, from Genesis through Apocalypse, and are considered in relation to, e.g., literary excerpts, music from Handel to reggae, anti-slavery and liberationist narratives, and the major speeches of Martin Luther King. GER:3a (DR:7)

3 units, Spr (Parker)

80N. Stanford Introductory Seminar: The Science Wars—Does Physics get Closer to Reality than Poetry?—Preference to freshmen. Do the truths of natural science correspond to the intrinsic nature of reality? Does reality have an intrinsic nature, or does it just have lots of different descriptions? Is scientific progress progress toward how things really are? Does postmodern relativism rot the mind and undermine the foundations of civilization? The answers introduce students to the study of philosophy. Readings E. O. Wilson, Consilience; A. J. Ayer, Language, Truth, and Logic; Hilary Putnam, Reason, Truth, and History; T. S. Kuhn, The Structure of Scientific Revolutions. GER:3a (DR:7)

5 units, Aut (Rorty)

84Q. Stanford Introductory Seminar: Shakespeare, Playing, Gender—Preference to sophomores. Focus is on several of the best-known and lesser-known plays of Shakespeare and on theatrical and other kinds of “playing” (the “purpose of playing”— Hamlet), and on ambiguities, and of gender and “playing gender” in particular. Topics: transvestism inside and outside of the theater, medical and other discussions of sex changes from female to male, hermaphrodites, and fascination with the “monstrous” more generally. Possible plays: The Taming of the Shrew, The Merry Wives of Windsor, Twelfth Night, As You Like It, A Midsummer Night’s Dream, Hamlet, Othello, The Tempest, Pericles, Antony and Cleopatra, and The Merchant of Venice. GER:3a,4c (DR:7)

3 units, Win (Parker)

85C. Aspects of Asian American Culture—The different dimensions of the contemporary Asian American cultural experiences in art, film, theater, television, literature, and pop culture. Analysis emphasizes issues of race, class, gender and sexuality, cultural resistance and empowerment, and ethnic identity and solidarity. Final project.

2 units, Aut (Palumbo-Liu, Staff)

86C. Asian Pacific Islander American Men: Contemporary Issues—Issues of men and gender among APIs. Student discussions and readings with films, panels, and workshops on sexuality, gangs, family, mixed race descent, interracial dating, community organizing, and mixed gender relations. Final project.

2 units, Win (Palumbo-Liu, Staff)

87C. Asian Pacific Islander Women: Contemporary Issues—Issues of women and gender among APIs. Student discussions and readings with films, panels, and workshops on domestic violence, sexuality, mixed race descent, interracial dating, community organizing, feminism, and mixed gender relations. Final project.

2 units, Spr (Palumbo-Liu, Staff)

91. Literary Institutions: A Comparative Approach—(Same as German Studies 126A.) Taught simultaneously at different overseas campus...
sites and at Stanford. The institutional structures and contexts for literature in different cultures, i.e., how literature is presented to the public at various levels. What sorts of literature are discussed in the press, and what issues are raised by such literary criticism? How is literature presented in schools? (Is it primarily the "local" national literature or is "world literature" read?) Do students read "minority authors?" What texts are taught at universities, what plays performed, and what films are screened in theaters? Students work as project groups in local sections, communicating with the instructor at Stanford and with students at distant sites through the Web. Group projects involve students at several locations and include comparisons of local literary institutions (e.g., the range of theater performance or the character of literary criticism in the different sites).

4 units, Win (Berman)

101. Seminar on Literature and the Institution of Literary Study— The impulse to the comparative study of literature and to the institutionalization of that impulse. Where are the origins of comparative literature as an academic discipline, and what does comparative literature mean today? To what degree has contemporary literary theory decentralized the comparatist, and what is lost if this position is no longer stable? Where are the limits of what we can compare? These questions are asked of selected shortish works of literature, and of some non-literary works (selected films, a memoir, essays in criticism), from writings on mimesis through psychoanalysis and cultural studies. (WIM)

5 units, Win (Middlebrook)

103. Egyptian East/Egyptian West—The texts and visual arts of ancient Egypt reveal a persistent and sophisticated engagement with problems of language, the body, and multiplicity. These problems are related to the later understanding of Egypt's position vis-a-vis subsequent civilizations in "the West." Focus is on the written and visual representational systems used in the ancient Nile Valley, on Egyptian mythology as it represents gender difference, and on the ways the Egyptians constructed their relations with the divine, the metaphysical, and the eternal. GER:3a (DR:7 or 8)

3 units, Spr (Hare)

113, Seminar: Voice and Literature in Russia and America 1776-1917—Introduction to the comparative study of literature through voice and text. In the modern era, prose and poetry have drawn from the productive tension between the vital but ephemeral spoken word and the objectification of language in writing. The shifting relationship between these modes of expression and the changing representations of voice in text have defined forms of social and cultural identity (gender, race, class, nation), and the notion of literature itself. Concepts from theoretical readings are explored in active dialogue with literary texts from several national traditions and genres. GER:3a (DR:7)

5 units (Greenleaf) not given 1999-2000

115Q. Stanford Introductory Seminar: Thinking in the Present—Discussions about 20th-Century European Philosophy—Preference to sophomores. More than the Anglo-American ("analytic") tradition which dominates in this country's philosophy departments, European ("continental") 20th-century philosophy has made the effort of thinking to/our own present with its existential, social, political consequences. The continental tradition has taken greater risks and probably accepted, in exchange, a lesser degree of rigor in its style of argumentation. Readings/discussion of several analyses of "present situations," written (in different moments and from different angles) by continental philosophers: Helene Cixous, Jacques Derrida, Martin Heidegger, Niklas Luhmann, Jean-Francois Lyotard, and Gianni Vattimo. Texts deal with questions regarding the continued viability (or non-viability) of concepts and patterns of thought in Western cultural and intellectual life (e.g., Subjectivity, Reason, Knowledge, History).

3 units, Win (Gumbrecht)

194. Independent Research

1-5 units, Aut, Win, Spr (Staff)

4 units, Aut (Greenleaf)

170E. Introduction to African Systems of Thought—(Same as French and Italian 170E.) Anthropology, ethnography, and the classical debates on ethnoscience. The problems involving intellectual histories, with emphasis on African cultures. What is Africa? Analysis of representative cosmologies and ethno-knowledges, a critical presentation of African practices of philosophy. GER:3a (DR:8)

3-5 units, Win (Mudimbe)

171. Comparative Narrations of Race, Ethnicity, and Nation—How can we get a better sense of issues of race and ethnicity by comparing the construction of these notions in the U.S. to their appearance (or invisibility) in another country? The historical and contemporary constructions of race and ethnicity in France and the U.S., the histories of colonization and decolonization, global labor and economies, immigration and redrawn borders, have all demanded different modes of incorporating diverse populations into variously reformulated notions of the Nation. Use of films; music; literary texts; with historical, anthropological, sociological materials.

3-5 units, Spr (Palumbo-Liu)

172. From Religion through Philosophy to Literature—Introduction to non-analytic philosophy. Discussion of attempts by philosophers (Plato, Kant, and Hegel) to replace religion with philosophy, of criticisms of such attempts by Nietzsche and Kierkegaard, and of Heidegger’s attempt to end philosophy and to substitute something more like poetry.

5 units, Win (Rorty)

190E. The Decameron and the 1001 Nights—(Same as French and Italian 190E.) Boccaccio’s Decameron and the 1001 Nights begin with a “frame-story” describing a catastrophe that threatens a city, then presents a series of scintillating tales to distract the audience from looming disaster. Beginning from the structural echoes, the two works are compared and contrasted, considering the role of women in the frame-story and in the tales; difference and exoticism; the salvific narrative; science, knowledge, and moral education in Christianity and Islam; and the modern retellings of the two works in film and fiction.

GER:3a (DR:7)

4-5 units, Aut (Malette)

212. The History of Rhetoric—(Same as English 212.) The history of the discipline of rhetoric from Classical Greek and Latin traditions, through medieval, Renaissance, modern, and contemporary treatments. Schemes and tropes (Cicero and Quintillian); grammatic education and the schools (Geoffrey Vinsauf, John of Garland); Renaissance handbooks (Wilson, Puttenham); 18th- and 19th-century oratory; current appropriations (e.g., Paul de Man, deconstruction). Texts are read for their deployments of rhetorical devices and their thematic attentions to verbal organization (e.g., selections from the Aeneid, medieval lyrics, Chaucer’s Canterbury Tales, Shakespeare’s Hamlet, Augustan and Romantic poetry, 19th-century prose fiction). Modern English translations; some emphasis to original-language texts of earlier periods.

4-5 units, Win (Lerer)

218. Latinity and Vernacularity—How did Latin literature respond to the challenge posed by the new vernacular traditions of the high Middle Ages? Readings of Latin texts and modern cultural and gender theory explore Latinity and linguistic difference. Topics: bi-literal writers (Boccaccio, Petrarch); Latinity and orality (the Carmina burana, sermons); works written by or for women (Hildegard of Bingen, Abelard and Heloise); translation (Ramon Llull). Prerequisite: basic knowledge of Latin.

5 units, Win (Mallette)

220. Versions of the Self—Studies of the genre of autobiography in cross-cultural perspective, concentrating on the topics of “the self, the subject, and the other” in myth, religion, history, and literature in the 20th century. How have the “extreme” situations of 20th-century life (atomic warfare, population displacement, concentration camps, changes in the conditions of work, plagues, and ecodisasters) led to the dismantling of traditional (religious and humanistic) notions of selfhood and the effort to redefine the nature of human subjectivity? Readings of Western, Asian, Latin American, and Middle Eastern autobiography.

5 units (White) not given 1999-2000

233E. Dante’s Divine Comedy—(Same as French and Italian 233E.) A reading of Dante’s poem, with reference to his other works (especially the Vita Nuova) and the European literary traditions of his age. Topics: Dante’s afterword in relation to Christian and Islamic visionary writings; his response to the Provencal and Sicilian poetry of courtly love; the idea of history, both personal and political, in the Comedy; Dante’s manipulation of Latin literary history; the Comedy and the autobiographical tradition.

GER:3a (DR:7)

3-5 units, Spr (Mallette)

236J. Weimar Republic—(Same as German Studies 236J.) The relationship between literature and democracy during the 1920s. The impact of military defeat and revolution on the restructuring of the institutions and on cultural life. Problems of nationhood and popularity; the tension between engagement and tradition; literature and film; representations of war.

3-5 units, Aut (Berman)

251E. Theories of Difference—Introduction to a reflection on differences and a methodological analysis of a history of histories of differences.

3-5 units (Mudimbe) not given 1999-2000

252E. Languages, Structures, and Societies: An Introduction to Structuralism—Analysis of the background and the basic concepts of structuralism. Readings: Ferdinand de Saussure, Course in General Linguistics; Roland Barthes, Elements of Semiology; Lévi Strauss, Mythologies; and from George Dumézil, Luc de Heush, and Edmund Leach.

3-5 units (Mudimbe) not given 1999-2000

156/256. Inside Picture Books—(Same as Art and Art History 156/256.)

4 units, Spr (Spitz)

258E. Jean-Paul Sartre: The Intellectual as Writer—Critical introduction to the chief positions and controversies of French existentialism. Is existentialism an amoral subjectivism? Can we describe the human in the same way we define an article of manufacture? How and why should we take atheism seriously? Human’s finitude and his/her relation to nothingness. In which sense should philosophy seek and define the human?

3-5 units (Mudimbe) not given 1999-2000

259E. Michel Foucault and the Archaeology of Knowledge—(Same as French and Italian 259E.) Introduction to, and explanation of, the basic tenets and methods of Michel Foucault’s theses and methods and their significance for the individualization and specification of each culture and individual. Close reading of Foucault’s major works.

3-5 units, Aut (Mudimbe)

264E. Seminar: Petrarch and Petrarchism—Examination of the Latin and vernacular writings of Francesco Petrarca, and their influence and impact on European cultural history in literature and the arts. Readings from Petrarch’s fundamental works (Trionfi, Canzoniere, Affrica, Secretum, Epistulae, etc.), and authors such as Garcilaso, Gongora, Sydney, Spenser, and Ronsard. Readings available in English translation.

5 units (Schnapp) not given 1999-2000

268. Introduction to Dream of the Red Chamber—A study of the great Chinese novel Hong lou meng (ca. 1750) by Cao Xueqin and Gao E.
together with its major commentaries. Methods of Euro-American criticism are tested against this seductive and challenging work. 

4 units (Saussay) not given 1999-2000


5 units, Spr (Middlebrook)


5 units (Palumbo-Liu) not given 1999-2000

300. The Theory of the Text—Introduction to theoretical issues in discourse, textualism, hermeneutics, poststructuralism.

5 units (White) not given 1999-2000

300B. Colloquium: The Bible and Literature—(Same as English 300B.) Combines intensive readings from Genesis to Revelation, with selections from a wide range of literary texts (from Dante and medieval drama, through Shakespeare, Spenser, Renaissance lyric, and Milton to 19th- and 20th-century poetry and novels from British, American, African-American, African, and other writings). Related topics: the relation between biblical eschatology and literary structures, Song of Songs and the history of lyric, the influence on prototypes of race/gender difference, citations in radical and hegemonic political contexts.

4-5 units, Spr (Parker)

301C. Nations and Cosmopolitanisms—The origins of modern comparative literary study may be traced to an engagement with the idea of distinct nations and national cultures, and the modern articulation of cosmopolitan culture. The various facets and formations of this engagement, including historical studies which point to the construction of “literature” as a modern object, and recent work on nations and national identity (cultural wars, patriotism, postethnicity) and new cosmopolitanisms (“rooted cosmopolitanism,” cultural studies in different national and institutional sites, etc.) in which “literature” variously appears and disappears, removed from or reinstated in its role as “culture.”

5 units, Spr (Palumbo-Liu)

308. Seminar: Introduction to Literary Criticism and Theory—Introduction to literary theory and criticism from New Criticism through Structuralism, post-Structuralism, archetypal, and psychoanalytical criticism to post-Modernist textualism.

5 units, Win (White)


5 units, Win (White)

314. Seminar: Epic and Empire—(Same as English 314.) Focusing on Virgil’s Aeneid and its influence, traces the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

5 units, Win (Parker)

320E. The Avant-Gardes of the Middle Ages—(Same as French and Italian 320E) The medieval courtly love movements parallel many of the social and aesthetic tensions of the modernist avant-gardes. Readings of Provencal, Arabic, and Italian poetry highlight similarities to the avant-garde and issues peculiar to the Middle Ages: the revolution in poetic language and form; the antagonistic relation with literary tradition; the role of the court in the evolution of new literatures; orality and the lyric text; gender and courtly love; vernacular literatures and the construction of cultural identity. Readings available in translation.

4-5 units, Win (Mallette)

331E. What Intellectually Mattered between 1958 and 1968 in Paris and the Rest of Europe—(Same as French and Italian 331E.) In relation to the present-day agenda in the Humanities (if there is a “shared agenda”), the years 1958-68 are both extremely remote and close. Remote because the “quietism” of the post-WW II period and the “student revolution” of 1968, as a reaction to it, appear as episodes long left behind. Those years seem close because some of those intellectual protagonists (mostly “French theorists”), who are still agenda-setting for us, published their first (or most important) books between 1958 and 1968: Roland Barthes, Jacques Derrida, Michel Foucault, Jacques Lacan, Jürgen Habermas, Carlo Ginzburg, Raymond Williams, etc. Seminar analyzes the texts that have become foundational of our present-day intellectual situation in their specific historical contexts (and in their often-complicated interrelations).

3-5 units, Win (Gumbrecht)

358E. The Practice of Sociology and the Humanities: An Analysis of Pierre Bourdieu’s Work—(Same as French and Italian 358E.) Specialized study of the work of Pierre Bourdieu, focusing on themes such as the function of the school, the practice of social sciences, and the politics of knowledge. Emphasis is on the philosophical presuppositions of Bourdieu’s work in the logic of his investigation.

4 units, Aut (Mudimbe)

369E. The Disciplines of Literature—(Same as French and Italian 369E) Open to all entering graduate students in the Division of Litera-
399. Dissertation
1-15 units, any quarter (Staff)

RELATED OFFERINGS
Courses primarily of a comparative nature are listed below and require enrollment in the departments they are listed under.

ART AND ART HISTORY
140/240. Introduction to Film Study
4 units, Aut (Bukatman)

143/243. The Hollywood Musical
4 units, Win (Bukatman)

146/246. Cyborgs and Synthetic Humans
4 units, Aut (Bukatman)

347. Phenomenology of Film
4 units, Win (Bukatman)

ENGLISH
150. Poetry and Poetics
5 units, Aut (Fields)
Win (Felstiner)
Spr (Boland)

184. Seminar: The Gothic Novel
5 units, Aut (Bender)

293. Seminar in Literary Translation
4-5 units, Win (Felstiner)

FRENCH AND ITALIAN
304H. Seminar: Early 20th-century Avant-Garde
4-5 units, Aut (Perloff)

108N. Stanford Introductory Seminar: Female Saints—The Rhetoric of Religious Perfection
4 units, Aut (Cazelles)

191E. The Cinema as a Space of the Sacred
3-5 units, Spr (Campani)

225E. Pirandello, Sartre, and Beckett: Self and World in Modern Literature
3-5 units, Win (Harrison)

389E. Common Roots: A Perspective on the History of Linguistics and Linguistic Ideas
3-5 units, Aut (Gambarara)

GERMAN STUDIES
191. Mentoring Comparative Institutions
2 units, Win (Berman)

241A-243A. Open to graduate students, advanced undergraduates, and sophomores with consent of instructor.

241A. Deutsche Geistesgeschichte I: 18th-Century German Thought
3-5 units, Aut (Strum)

242A. Deutsche Geistesgeschichte II: 19th-Century German Thought
3-5 units, Win (Mueller-Vollmer)

243A. Deutsche Geistesgeschichte III: 20th-Century German Thought
3-5 units, Spr (Staff)

292A. Concord and Jena: The Coming of Romanticism to America
3-5 units, Spr (Mueller-Vollmer)
HISTORY

274A/374A. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in Late 20th-Century America
4-5 units, Win (Lenoir, Taylor)

INTERDISCIPLINARY STUDIES IN HUMANITIES

193N. Ecology in Philosophy and Literature
4 units, Spr (Nightingale)

INTRODUCTION TO THE HUMANITIES

30A,B. Transculturations
5 units, Win, Spr (Batchelor, Saussy)

LANGUAGE CENTER

125A,C,D. Topics in Arabic Literature and Culture—May be taken independently. Readings/discussion in English.
125A. The Contemporary Arabic World and Culture through Literature
4 units, Aut (Barhoum)
125C. Contemporary Arab Women Writers and Issues
4 units, Win (Barhoum)
125D. Arab World through Travel Literature
4 units, Spr (Barhoum)

MODERN THOUGHT AND LITERATURE

361. Graduate Colloquium: The Modern Tradition—Globalization and Modernity
5 units, Aut (Palumbo-Liu, Gupta)

SLAVIC LANGUAGES AND LITERATURES

145/245. The Age of Experiment (1820-1850)
3-4 units, Aut (Fleishman)
146/246. The Age of Transgression: Russian Literature from Turgenev to Tolstoy
3-4 units, Win (Safran)
147/247. The Age of Revolution: Russian Literature and Culture since 1917
3-4 units, Spr (Fleishman)

151. Dostoevsky
4 units, Win (Frank)

166/266. Russia on the Silver Screen: U.S., Western European, and Émigré Cinema
4 units, Spr (Bulgakowa)

168/268. Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present
4 units, Aut (Bulgakowa)

220A. Verse Translation: From Intuition to Artistry
4 units, Spr (Hofstadter)

221. Modernism and the Jewish Voice in Europe—(Same as German Studies 221A.)
3-4 units, Aut (Safran, Eshel)

SPANISH AND PORTUGUESE

190. Fiction and Political Imagination
3-5 units, Spr (Pratt)

308E. Scholarly Research and Writing: Workshop and Tutorial
3-5 units, Win (Pratt)

357. Latin American Fiction of the 1990s
5 units, Aut (Pratt)

OVERSEAS STUDIES

These courses are approved for the Comparative Literature major and taught overseas at the campus indicated. Students should discuss with their major advisers which courses would best meet individual needs. Descriptions are in the “Overseas Studies” section of this bulletin, or at the Overseas Studies Office, 126 Sweet Hall.

MULTI-SITE COURSE

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.)
4 units, Win (Berman)

BERLIN

274A. Bodyworks
5 units, Win (Bender)

PARIS

130P. Paris: 1200-2000
4 units, Win (Bender)

KYOTO

121K. The Asian Others of Western Culture
3-5 units, Spr (Gumbrecht)
122K. Western Permutations in Thinking Technology
3-5 units, Spr (Gumbrecht)

COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE)

Director: Albert Camarillo
Steering Committee: Albert Camarillo (History), David Palumbo-Liu (Comparative Literature), George Fredrickson (History), Gail Ladidus (Institute for International Studies), Hazel Markus (Psychology), John Rickford (Linguistics), C. Matthew Snipp (Sociology), Dorothy Steele (Research Institute of Comparative Studies in Race and Ethnicity), Claude Steele (Psychology), Guadalupe Valdés (Education), Steven Zipperstein (History)

Affiliated Faculty: David Abernethy (Political Science), Anthony Antoni (Education), Rick Banks (Law), Lucius Barker (Political Science), John Baugh (Linguistics), Joel Beinin (History), Rudy Busto (Religious Studies), Albert Camarillo (History), Martin Carnoy (Education), Clayborne Carson (History), Gordon Chang (History), George Collier (Cultural and Social Anthropology), Nadinne Cruz (Haas Center), Larry Cuban (Education), Jennifer Bhard (Psychology), Paul Ebron (Cultural and Social Anthropology), Arnold Eisen (Religious Studies), Harry Elam (Drama), Roberto Fernandez (Business), Claire Fox (Spanish and Portuguese), Luis Fraga (Political Science), George Fredrickson (History), Estelle Freedman (History), Sonya Grier (Business), Akhil Gupta (Cultural and Social Anthropology), Kenji Hakuta (Education), Janet Halley (Law), Shirley Heath (English), Sharon Holland (English), Terry Karl (Political Science), Roy King (Psychiatry), Michael Kirst (Education), Barbara Koenig (Biomedical Ethics), Jan Krawitz (Communication), Teresa LaFromboise (Education), Sam LeBaron (Family and Community Medicine), Gail Lapidus, (Institute for International Studies), Laura Leets (Communication), Yonne Maldonado (Pediatrics), Purnima Mankekar (Cultural and Social Anthropology), Hazel Markus (Psychology), Raymond McDermott (Education), Paula Moya (English), Norman Naimark (History), Daniel Okimoto (Political Science), Susan Olzak (Sociology), Amado Padilla (Education), David Palumbo-Liu (Comparative Literature), Mary L. Pratt (Spanish and Portuguese), John Rickford (Linguistics), Cecilia Ridgeway (Sociology), Richard Roberts (History), Aron Rodrigue (History), Renato Rosaldo (Cultural and Social Anthropology), Ramón Saldívar (English),
Stephen Sano (Music), Debra Satz (Philosophy), Anna D. Smith (Drama), C. Matthew Snipp (Sociology), Paul Sniderman (Political Science), Tim Stanton (Haas Center), Claude Steele (Psychology), Michael Thompson (History), Robert Trujillo (Green Library), David Tyack (Education), Guadalupe Valdés (Education), Robert Warrior (English), Richard White (History), Carolyn Wong (Political Science), Sylvia Yanagisako (Cultural and Social Anthropology), Yvonne Yarbro-Bejarano (Spanish and Portuguese), Bob Zajonc (Psychology), Steven Zipperstein (History)

Affiliated Lecturers: Diann McCants (Psychology), Sandra Soo-Jin Lee (Cultural and Social Anthropology)

Teaching Fellows: Stephanie Fryberg, Martha Mabie Gardner, Sara Johnson

UNDERGRADUATE PROGRAMS

MAJORS

CORE CURRICULUM

The Interdisciplinary Program in Comparative Studies in Race and Ethnicity (CSRE) provides students the opportunity to structure a major or minor in comparative ethnic studies or to focus their course work in a single ethnic studies area. Four new majors and minors (Asian American Studies, Comparative Studies, Chicana/o Studies, and Native American Studies) are offered as part of CSRE. All courses taken for the major must be taken for a letter grade. In addition, the existing Program in African and Afro-American Studies and the Program in Jewish Studies are affiliated with the new majors.

Students who declare any of the four new majors participate in a common curriculum of the CSRE consisting of at least two introductory "core" courses and a senior seminar. Students who declared the major in African and Afro-American Studies beginning Autumn Quarter 1997 enroll in this core curriculum. Individually designed majors in Jewish Studies may also enroll in the CSRE core curriculum.

MINORS

Students who wish to minor in the new study areas must complete six courses (a minimum of 30 units) from the approved CSRE course list, two of which must be introductory "core" courses. Proposals for the minor must be approved by the chair or curriculum of each study area.

DIRECTED READING AND RESEARCH

Directed reading and research allows students to focus on a special topic of interest. In organizing this plan, the student consults with the program director and one or more faculty members specializing in the area or discipline.

SENIOR SEMINAR

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. The seminar format consists of presentations by students through the process of research (conceptualization, development of prospectus, development of theses, research, analysis, and writing). This course meets the writing in the major requirement. (WIM)

HONORS

Majors in each of the study areas who meet academic qualifications (at least a grade point average of 'B+' in CSRE-related courses) may apply for admission. Majors may participate in summer programs to facilitate their honors thesis research. Prizes for the best undergraduate honors theses are awarded annually by the Faculty Steering Committee of CCSRE.

AFRICAN AND AFRO-AMERICAN STUDIES (AAAS)

Chair: John Rickford

As of 1997-98, AAAS is a CSRE-related major. For major and minor descriptions and requirements, see the "African and Afro-American Studies" section of this bulletin.

ASIAN AMERICAN STUDIES

Chair: David Palumbo-Liu

Asian American Studies (AAS) provides an interdisciplinary approach to understanding the historical and current experiences of persons of Asian ancestry in the United States. In using the term "Asian American," the AAS faculty recognizes that the term seeks to name a rapidly developing, complex, and heterogeneous population and that there is neither a single Asian American identity nor one "community" that comprises all Asian Americans. Asian Americans include those with ancestral ties to countries or regions in East Asia, South Asia, Southeast Asia, or the Philippines, among others.

AAS brings together courses that address the artistic, historical, humanistic, political, and social dimensions of Asian Americans and is an appropriate course of study for students interested in a variety of concerns related to Asian Americans, including: artistic and cultural contributions, current social significance, historical experiences, immigration, intellectual, policy issues, relationships with other social groups, and the construction of "Asian American" as it addresses important theoretical and practical issues.

REQUIREMENTS

AAS offers undergraduates opportunities for either a major or a minor. In addition to the 15 units in the CSRE core curriculum, 45 units are distributed as follows: 5 units in a course with an international dimension; 30 units in Asian American focus courses selected from among historical studies, social sciences, and humanities; and 10 units in courses offering comparative perspectives. In certain instances, students are able to apply credit from the study of an Asian language to help meet requirements and receive a special citation for relevant language study. For students already fluent in an Asian language, the citation may also be earned by using the language in a substantial way in the research for their senior papers. An honors option is available. Minors take 30 units in a program of study similar in form to that of majors.

Students interested in the major or minor in AAS work with a faculty adviser to develop a specific program of study. The proposal must be approved by the chair of AAS. Policies and programming for the new major and minor are guided by the Asian American Studies Curriculum Committee.

CHICANA/O STUDIES

Chair: Guadalupe Valdés

Chicana/o Studies is an interdisciplinary major focusing on the Mexican-origin population of the U.S., the second largest ethnic group in the nation. Students who major or minor in Chicana/o Studies have an opportunity to select from a wide variety of courses in the humanities and social sciences as well as selected courses offered by affiliated faculty in the School of Education. In addition to the CSRE introductory "core" courses, students who major and minor in Chicana/o Studies are required to enroll in the Introduction to Chicana/o History and Culture survey course.

REQUIREMENTS

Together with their faculty mentors, majors design a thematic concentration consisting of eight courses (40 units). The substantial number of courses available across the disciplines permit majors to develop unique and innovative thematic concentrations. Students also have opportunities to participate in public service-learning internships related to their academic course of study. The Chicana/o Studies Curriculum Committee approves applications for majors and minors and reviews proposals for the honors program.

A "Spanish Language Proficiency Option" is offered to majors interested in using Spanish in their course work or for their research. This option, modeled on programs of foreign language study across the curriculum at other institutions, is aimed at students who have a strong interest in using the Spanish language proficiency they have acquired in meaningful contexts outside of foreign language courses. There are several ways to complete the Spanish Language Proficiency Option. Consult with the chair of Chicana/o Studies for details about these options.
Students who wish to minor in Chicana/o Studies must enroll in two CSRE introductory "core" courses and the Introduction to Chicana/o History and Culture course. The remaining three courses must be designed around a general theme or topic.

COMPARATIVE STUDIES IN RACE AND ETHNICITY

Chair: Albert Camarillo

The new major and minor in Comparative Studies in Race and Ethnicity (CSRE) offers students one of the first, and most unique, opportunities in higher education to study the topics of race and ethnicity from comparative national and international perspectives. How to manage and understand ethnic differences and conflicts has long been a central issue in international affairs, especially since the end of the Cold War, and an intense debate has developed in the United States on how to achieve justice and equality in an ethnically diverse, multicultural society. The themes of both interethnic cooperation and conflict are critical for comprehending the history and current social reality of racial and ethnic minorities worldwide. Students have an opportunity to structure a major or minor through CSRE that encourages the study of these and other important issues facing the U.S. and other societies.

REQUIREMENTS

Students who major in CSRE enroll in the core curriculum, and in consultation with the chair of the program and a faculty mentor, develop a thematic course of study focusing on the comparative dimensions of race and ethnicity. Though majors and minors in CSRE must complete the CSRE core introductory courses before they focus their work on the thematic concentration, students have great flexibility to structure and design their comparative curriculum. For example, students may opt to develop a concentration comparing two or more groups within the U.S. or they may choose to study groups in the U.S. in comparison to ethnic groups elsewhere in the world. Or, they may opt to study the diaspora of a single group or the sovereignty of indigenous peoples within and across different national contexts. In different examples of thematic concentrations for the CSRE major, students may prefer to study issues of international migration or how social constructions of racial identities are influenced by gender or class.

The thematic course of study developed by CSRE majors must be approved by the CSRE chair and by the CCSRE Faculty Steering Committee. Proposals for the minor and admission to the CSRE honors program must be approved by the chair. The policies and programs for the major and minor are guided by the Subcommittee on the Curriculum of the CCSRE Faculty Steering Committee.

PROGRAM IN JEWISH STUDIES

Chair: Steven Zipperstein

Jewish Studies is an affiliated program of CCSRE. For program and course descriptions see the "Jewish Studies" section of this bulletin.

NATIVE AMERICAN STUDIES

Chair: C. Matthew Snipp

Native American Studies provides an intensive approach to understanding the historical and contemporary experiences of Native American people. Attention is paid not only to the special relationship between tribes and the Federal government, but issues across national boundaries, including tribal nations within Canada, and North, Central, and South America. In using the term "Native American," the NAS faculty recognize the heterogeneous nature of this population. Native Americans include the Alaska Native population, which comprises Aleuts, Eskimos, and other Native American people residing in Alaska.

The purpose of the Native American Studies major and minor is to introduce students to a broad range of approaches in the academic study of Native American people, history, and culture. Students who major in Native American Studies have the opportunity of doing advanced work in a number of related fields, including literature, sociology, education, and law. In addition to specialized course work on Native American issues, students also are expected to concentrate in a traditional discipline such as anthropology, history, or psychology to ensure they have a well rounded educational experience. The area of concentration and related course work should be selected in consultation with an faculty adviser in Native American Studies. All courses in the program in some way promote the ongoing discussion of how academic knowledge about Native Americans relates to the historical and contemporary experiences of Native American people and communities.

REQUIREMENTS

NAS offers undergraduates opportunities for either a major or minor. The major requires 60 units of course work. In addition to the 15 units of CSRE core courses, 45 units are distributed as follows: 30 units in Native-American focus courses selected from among humanities and social sciences; 5 units in a course devoted to the methodologies, theories, or field research in a particular area of study; and 10 units in courses offering comparative perspectives. Students may acquire credit from a service-learning internship option. Minors take 30 units in a program of study similar in form to that of majors.

COURSES

CORE

COMPARATIVE STUDIES IN RACE AND ETHNICITY

200XYZ. Senior Seminar—(WIM)
units by arrangement, Aut, Win, Spr (Staff)

CULTURAL AND SOCIAL ANTHROPOLOGY

88. Theories of Race and Ethnicity: A Comparative Perspective
5 units (Yanagisako) not given 1999-2000

EDUCATION

156X. Understanding Racial and Ethnic Identity
5 units (LaFromboise) not given 1999-2000

HISTORY

64. Introduction to Race and Ethnicity in the American Experience
5 units, Win (Castillo)

65. Introduction to Comparative Studies in Race and Ethnicity
5 units, Spr (Camarillo, Fredrickson)

257. Undergraduate Colloquium: Immigrants and Racial Minorities in American Cities—Comparative Perspectives
5 units (Castillo) not given 1999-2000

PHILOSOPHY

177. Philosophical Issues in Race and Racism
4 units, Spr (Satz)

THEMATIC

AFRICAN AND AFRO-AMERICAN STUDIES

103A,B,C. African and Afro-American Lecture Series

103A. 1-3 units, Aut (Rickford)
103B. 1-4 units, Win (Rickford)
103C. 1-3 units, Spr (Rickford)

104. African and Afro-American Learning Expedition
1 unit, Spr (Rickford)

105. Introduction to African and Afro-American Studies
5 units, Spr (McCants)

COMMUNICATION

122B. Documentary Film
5 units (Krawitz) alternate years, given 2000-01

155. Interethnic Communication
3 units (Leets) not given 1999-2000
141. Race, Class, and Gender
5 units, Win (Andersen)

200R. Directed Research
1-5 units, Aut, Win, Spr (Staff)

200W. Directed Reading
1-5 units, Aut, Win, Spr (Staff)

COMPARATIVE LITERATURE
24Q. Stanford Introductory Seminar: Ethnicity and Literature
3-5 units, Aut (Palumbo-Liu)

85C. Aspects of Asian American Culture
2 units, Aut (Palumbo-Liu, Staff)

86C. Asian Pacific Islander American Men: Contemporary Issues
2 units, Win (Palumbo-Liu, Staff)

87C. Asian Pacific Islander American Women: Contemporary Issues
2 units, Spr (Palumbo-Liu, Staff)

168. Introduction to Asian American Culture
5 units, Win (Palumbo-Liu)

171. Comparative Narrations of Race, Ethnicity, and Nation
5 units, Spr (Palumbo-Liu)

301C. Nations and Cosmopolitanisms
5 units, Spr (Palumbo-Liu)

CULTURAL AND SOCIAL ANTHROPOLOGY
13. Critical Perspectives on Popular Culture
5 units, Spr (Mankekar)

15. Africa and the Diaspora
5 units (Ebron) not given 1999-2000

33. Inventing the Savage
5 units, Aut (Ramirez)

72. Dance and Culture in Latin America—(Same as Drama 168.)
3-4 units, Spr (Cashion)

77. Japanese Society and Culture
5 units, Win (Inoue)

79. Anthropological Perspectives on the Middle East
5 units, Win (Razieli)

83. Gender in South Asian Communities at Home and Abroad
5 units (Mankekar) not given 1999-2000

89B. Comparative Race and Inequality
5 units, Win (Turnstall)

104. Race and Language in the U.S.
5 units, Win (Gordon)

129A. Gender in East Asia
5 units, Spr (Lee)

130B. Asian American Immigration and Health
5 units, Win (Lee)

143. Anthropology of Death and Dying
5 units, Spr (Koenig)

147. Comparative Feminism
5 units (Mankekar) not given 1999-2000

157C. Cultural Studies of Youth
5 units, Spr (Bakrania)

251. Cultural Studies
4-5 units, Aut (Rosaldo)

251A. Latino Studies
5 units, Spr (Rosaldo)

255. Cultural Citizenship
5 units (Rosaldo) not given 1999-2000

EDUCATION
105. American Education and Public Policy—(Same as History 105B)
4 units (Kirst, Tyack) not given 1999-2000

141. Race, Education and Media
5 units, Spr (Carnoy, Steyer)

149. Theory and Issues in the Study of Bilingualism
3-4 units (Valdés) not given 1999-2000

175. African-American English in Educational Context—(Same as 275.)

177X. Education of Immigrants in Cities
4 units (Padilla) not given 1999-2000

188B. Bilingual Education
3 units, Win (Hakuta)

193B. Peer Counseling: Chicano Community
2 units, Aut (Martinez)

193C. Peer Counseling: The African-American Community
2 units, Aut (Edwards, Reede-Hoskins)

193F. Peer Counseling: The Asian American Community
2 units, Win (Brown)

193N. Peer Counseling in the Native American Community
2 units, Win (Martinez, Simms)
201. History of Education in the United States—(Same as History 158B.)
3 units, Aut (Tyack, Williamson)

202. Introduction to Comparative and International Education
4-5 units, Aut (Carnoy)

203X. Education and Equality in American Culture: Discussion
2-3 units, Aut (McDermott)

203Y. Discussion: Education and Inequality in American Culture
2 units, Aut (McDermott)

283. Attitudes towards Languages and Language Study
3 units (Padilla) not given 1999-2000

306A. Education and Economic Development
5 units, Win (Carnoy)

306C. Technologies of the Mind
4 units, Spr (McDermott)

335X. Language Policy and Planning: National and International Perspectives
3 units, Spr (Valdés)

340X. Psychology and American Indian Health
3 units (LaFromboise) not given 1999-2000

381. Multicultural Issues in Higher Education
4 units, Spr (Antonio)

ENGLISH

123D. The Multicultural Moment: American Literature from the Civil War to World I
5 units, Spr (Jones)

159. 19th- and 20th-Century African-American Poets
not given 1999-2000

162G. Writing by 20th-Century Women of Color
5 units, Aut (Moya)

162L. Caribbean Literatures in English
5 units, Spr (Aldama)

164B. Imagining the Holocaust
not given 1999-2000

168. American Indian Mythology, Legend, and Lore
not given 1999-2000

168B. Introduction to Afro-American Literature
5 units, Spr (Rampersad)

168C. Introduction to Chicana/o Literature
not given 1999-2000

187R. Seminar: Literature of Colonialism and Postcolonialism
5 units, Aut (Drake)

187Y. African American Autobiography
5 units, Win (Rampersad)

238. The Third World Novel in English
4-5 units, Aut (Drake)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Term</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>256</td>
<td>Undergraduate Colloquium: Topics in Mexican American History</td>
<td>5</td>
<td>Win</td>
<td>Camarilla</td>
</tr>
<tr>
<td>259</td>
<td>Undergraduate Colloquium: Race and Ethnicity in the United States and South Africa</td>
<td>5</td>
<td>(Fredrickson)</td>
<td>not given 1999-2000</td>
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<tr>
<td>283A</td>
<td>Undergraduate Colloquium: Slavery and Race Relations in the Americas</td>
<td>5</td>
<td>Klein</td>
<td>not given 1999-2000</td>
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<tr>
<td>141</td>
<td>Race, Poverty, and the Environment</td>
<td>5</td>
<td>Win</td>
<td>Rosencranz</td>
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<tr>
<td>73</td>
<td>African American Vernacular English</td>
<td>3-5</td>
<td>Win</td>
<td>Rickford</td>
</tr>
<tr>
<td>150</td>
<td>Language in Society</td>
<td>4-5</td>
<td>Win</td>
<td>Rickford</td>
</tr>
<tr>
<td>111K</td>
<td>Perspectives in North American Taiko</td>
<td>4</td>
<td>Spr</td>
<td>Sano, Uyechi</td>
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<tr>
<td>25</td>
<td>Colonialism and Nationalism in the Third World</td>
<td>5</td>
<td>Win</td>
<td>Abernethy</td>
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<tr>
<td>104</td>
<td>Seminar: Urban Policy</td>
<td>5</td>
<td>Win</td>
<td>Fraga</td>
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<tr>
<td>117K</td>
<td>The Global Politics of Human Rights</td>
<td>5</td>
<td>Win</td>
<td>Karl</td>
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<tr>
<td>118B</td>
<td>The Politics of Race and Class in Southern Africa</td>
<td>5</td>
<td>Abernethy</td>
<td>given 2000-01</td>
</tr>
<tr>
<td>125</td>
<td>The Rise of Industrial Asia</td>
<td>5</td>
<td>Spr</td>
<td>Oi, Oksenberg, Rohlen, Rowen, Staff</td>
</tr>
<tr>
<td>159R</td>
<td>Issues in Public Service</td>
<td>5</td>
<td>Win</td>
<td>Reich</td>
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<td>171</td>
<td>Judicial Politics and Constitutional Law: Civil Liberties</td>
<td>5</td>
<td>Spr</td>
<td>Buchman</td>
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<tr>
<td>180</td>
<td>Courts, Color, and the Constitution</td>
<td>5</td>
<td>Barker</td>
<td>not given 1999-2000</td>
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<tr>
<td>181</td>
<td>African Americans and the Political System</td>
<td>5</td>
<td>(Staff)</td>
<td>not given 1999-2000</td>
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<tr>
<td>184W</td>
<td>Issues of Representation in American Politics</td>
<td>5</td>
<td>Win</td>
<td>Wong</td>
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<tr>
<td>185</td>
<td>Seminar: Asian Americans in Politics</td>
<td>5</td>
<td>Spr</td>
<td>Wong</td>
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<tr>
<td>186</td>
<td>Urban Politics</td>
<td>5</td>
<td>Win</td>
<td>Fraga</td>
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<tr>
<td>192F</td>
<td>Seminar: Politics of Race and Ethnicity in the United States</td>
<td>5</td>
<td>Spr</td>
<td>Fraga</td>
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<tr>
<td>196</td>
<td>Issues of Race in American Politics</td>
<td>5</td>
<td>Aut</td>
<td>Sniderman</td>
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<tr>
<td>197P</td>
<td>Seminar: Political Beliefs and Values of Black Americans</td>
<td>5</td>
<td>Win</td>
<td>Sniderman</td>
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<tr>
<td>218L</td>
<td>Seminar: Ethnicity and Nationalism in Soviet and Post-Soviet Politics</td>
<td>5</td>
<td>Win</td>
<td>Lapidus</td>
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<tr>
<td>291F</td>
<td>Seminar: Urban Politics and Policy</td>
<td>5</td>
<td>Spr</td>
<td>Fraga</td>
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<tr>
<td>294</td>
<td>Graduate Seminar: Politics of Social Policy and Race</td>
<td>5</td>
<td>Spr</td>
<td>Wong</td>
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<tr>
<td>296</td>
<td>Seminar: Racial and Ethnic Politics in the U.S.</td>
<td>5</td>
<td>Win</td>
<td>Fraga</td>
</tr>
<tr>
<td>160</td>
<td>Culture and Self</td>
<td>3</td>
<td>Win</td>
<td>Markus (alternate years, not given 2000-01)</td>
</tr>
<tr>
<td>161</td>
<td>Cultural Psychology</td>
<td>5</td>
<td>Win</td>
<td>Markus (not given 1999-2000)</td>
</tr>
<tr>
<td>174</td>
<td>African American Psychology</td>
<td>3</td>
<td>Aut</td>
<td>McCants</td>
</tr>
<tr>
<td>175</td>
<td>Seminar on Topics in Identity Development</td>
<td>3</td>
<td>McCants</td>
<td>given 1999-2000</td>
</tr>
<tr>
<td>180</td>
<td>Social Psychological Perspectives on Stereotyping and Prejudice</td>
<td>4</td>
<td>Eberhardt (alternate years, given 2000-01)</td>
<td></td>
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<tr>
<td>215</td>
<td>Mind, Culture, and Society</td>
<td>3</td>
<td>Win</td>
<td>Markus, Steele</td>
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<tr>
<td>8</td>
<td>Religion in America</td>
<td>4</td>
<td>Busto</td>
<td>not given 1999-2000</td>
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<tr>
<td>23</td>
<td>Introduction to Judaism</td>
<td>4</td>
<td>Win</td>
<td>Fishman</td>
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<tr>
<td>53</td>
<td>Jews and Judaism in America</td>
<td>4</td>
<td>Eisen</td>
<td>not given 1999-2000</td>
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<tr>
<td>143</td>
<td>Chicano/a Religious Traditions</td>
<td>4</td>
<td>Busto</td>
<td>not given 1999-2000</td>
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<tr>
<td>155</td>
<td>Asian/Pacific American Religious Traditions</td>
<td>4</td>
<td>Busto</td>
<td>not given 1999-2000</td>
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<td>163</td>
<td>Religion and Ethnicity</td>
<td>5</td>
<td>Busto</td>
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The Stanford University Bulletin includes a course catalog that details offerings in various departments. This extract from the catalog focuses on the Department of Cultural and Social Anthropology. It lists course titles, credit units, instructors, and relevant departmental information. The courses are categorized under different topics such as American Indians, Asian Americans, Caribbean, and Mexican studies. Each course entry includes essential details like credit units, instructors, and additional information like course descriptions or specific notes on course content. The bulletin also highlights the departmental faculty, with listings that include professors, associate professors, assistant professors, consulting professors, lecturers, and courtesy professors. The overall goal is to provide students with a comprehensive overview of the course offerings and to guide them in their academic decision-making process.
with the Cultural and Social Anthropology Student Program Coordinator.

UNDERGRADUATE PROGRAMS
BACHELOR OF ARTS

The Department of Cultural and Social Anthropology (CASA) offers an A.B. degree in Cultural and Social Anthropology and an honors program. The major provides students with expertise for understanding social and cultural transformations from an international and cross-cultural perspective. In addition to gaining an excellent foundation for graduate study and research, students majoring in Cultural and Social Anthropology can pursue careers in government, international business, international development agencies, international education, law, mass media, non-profit organizations, and public policy.

Within the major, students may include course offerings in other departments such as Anthropological Sciences, Classics, Economics, English, History, Political Science, Psychology, and Sociology, as well as course offerings in programs such as African Studies, American Studies, Comparative Studies in Race and Ethnicity, East Asian Studies, Feminist Studies, Latin American Studies, Public Policy, and Urban Studies.

All undergraduate majors in Cultural and Social Anthropology must fulfill the following requirements:

1. A program of 65 units, with at least 40 in Cultural and Social Anthropology. The remaining 25 units may be taken from courses in related departments, including Anthropological Sciences. The 65 units must form a coherent program of study and be approved by the student’s academic adviser and the Undergraduate Committee as part of the application for the major.

2. The units in anthropology must include at least one course in four of the following topical categories:
   a) Linguistic and Symbolic Anthropology (CASA 4, or related, courses in linguistics in other departments such as Anthropological Sciences 4, 111, 119; or Linguistics 146, 150, Cultural and Social Anthropology 152, 153C, 154)
   b) Race and Ethnicity (8N, 53, 73, 84, 88, 89B, 104, 130B, 148)
   c) Feminist Anthropology (11C, 12, 13, 83, 129A, 142, 145, 154, 160, 166)
   d) Globalization and Transnationalism (13, 15, 73, 79, 83, 84, 86, 133A, B, C)
   e) Science, Technology or Medicine (130B, 138, 143)
   f) Material Culture (92, 136)

   For courses listed in two topical areas, the student may use the course to meet the requirement in either area, but not in both.

3. Students must choose an area of concentration, taking at least 15 units or three courses in that field. Possible areas of concentration include cultural studies, economic development, kinship, mass media, material culture, migration and immigration, political economy, popular culture, race and ethnicity, religion, urban cultures, or a particular culture area, i.e., Japan, Europe. Students must have their areas of concentration approved by their advisers.

4. To facilitate studying social and cultural issues in an international and cross-cultural framework, majors must take at least two courses in area studies (30-130B).

5. A minimum of 15 units must be in Cultural and Social Anthropology seminars above the 100 level.

6. A grade of ‘B’ or better in CASA 90 (letter grade only for students entering Stanford Autumn 1996 or later). This course is required of all cultural and social anthropology majors and should be taken within a year of declaring the major or before the end of the junior year. It introduces students to anthropological theory and prepares them for upper-division courses in the department.

7. Competence in a foreign language beyond the first-year level. Such competence is usually demonstrated by completing a course at the second-year level with a grade of ‘B’ or better. The requirement may be met by special examination administered through the Language Center.

Up to 10 units of the Anthropology or Cultural and Social Anthropology Area 1 track may be counted toward the major. Students whose programs require additional language study as part of a geographical or linguistic focus may petition the Undergraduate Committee to count up to 10 units of language courses toward the degree if such courses are at the second-year level or are in a second language. No more than 10 units may be in Directed Individual Study. All required units for undergraduate programs must be passed with a grade of ‘C’ or better, and not more than 8 (5 units in Cultural and Social Anthropology and 3 units in related subjects) of the required 65 units may be taken for a satisfactory/no credit grade.

Majors are strongly encouraged to develop field research projects. Research course work includes 93, Prefield Research Seminar; 94, Postfield Research Seminar; and 96, Directed Individual Study. The department has summer field research grants available to support individually designed research projects.

To declare the major in Cultural and Social Anthropology, a student first must contact the student program coordinator who explains the degree requirements and also gives general guidance. It may be helpful for students to meet with the chair of the Undergraduate Committee for initial academic advising and assistance in choosing an appropriate faculty adviser in the department. In consultation with their faculty adviser, students must develop a coherent program of study to be submitted to the Undergraduate Committee as an application for the major. Application forms may be obtained from the student program coordinator. Students must submit the application form along with their proposal for the major to the student program coordinator no later than the beginning of the Winter Quarter of the junior year.

Majors are required to meet with their advisers at least once every quarter. Each student’s progress towards fulfilling the major requirement is recorded in a file kept in the student program coordinator’s office. It is the student’s responsibility to see that this file is kept up to date.

MINORS

Prospective Cultural and Social Anthropology minors should request a Minor Planning Form and Checklist from the student program coordinator. Requirements for the minor are:

1. Have an adviser in Cultural and Social Anthropology approve the program of study for the minor.

2. Complete 30 units of Anthropology with a GPA of ‘C’ or better. No more than 10 of the required 30 units may be taken for an instructor-elected satisfactory/no credit grade. No student-elected satisfactory/no credit units are allowable. Of the 30 units:
   a) Not more than 10 units may be in entry-level courses, normally Cultural and Social Anthropology 1-20, including no more than 5 units of the Cultural and Social Anthropology Area 1 track.
   b) At least 15 units must be numbered Cultural and Social Anthropology 70 or above.
   c) Five units must be in an area course.
   d) Fifteen units must be in an area of concentration, approved by the minor adviser.
   e) Only 5 units of independent research can be used toward the minor.

Deadline for Declaring the Minor—Students must complete the declaration process (including the adviser’s signature) no later than the last day of the quarter, two quarters prior to degree conferral (Autumn Quarter if Spring Graduation is planned).

HONORS

The Honors Program in Cultural and Social Anthropology is open to all majors in the department. Candidates of sophomore or junior standing should submit an application to the student program coordinator no later than the end of the fourth week of the Spring Quarter. It must include a brief statement of the project, a transcript, a short paper, and a letter of recommendation from the professor who is to supervise the honors thesis. The Undergraduate Committee reviews applications and notifies accepted students.
Candidates whose application to the honors program has been approved by the Undergraduate Committee must complete all of the requirements for their major and submit an honors thesis no later than four weeks prior to the end of the quarter in which graduation is anticipated. The thesis is read by the candidate’s adviser and a second reader appointed by the Undergraduate Committee. Honors candidates enroll in 95A, Research in Cultural and Social Anthropology, for as many as 10 units, and 95B, Honors, for as many as 10 units. Most honors projects involve a total of 10 to 20 units of course work in 95A and 95B. No more than 5 of those units can count toward the 65-unit degree requirement.

GRADUATE PROGRAMS

University requirements for the degrees of Master of Arts and Doctor of Philosophy are described in the “Graduate Degrees” section of this bulletin.

Masters of Arts

The Department of Cultural and Social Anthropology offers the A.M. degree to four groups of students: (1) Stanford undergraduates who enroll in the coterminal program; (2) Stanford graduate students taking advanced degrees in other departments or schools at Stanford; (3) Ph.D. students in Cultural and Social Anthropology who fulfill the A.M. requirements in the course of their work toward the Ph.D. degree; and (4) students who apply from outside of Stanford for entry into the terminal A.M. program.

Stanford students interested in the coterminal program and graduate students in other departments or schools at Stanford should review the “Graduate Degrees” section of this bulletin and consult with the student program coordinator in the department. Other prospective students should request application materials from Graduate Admissions, the Registrar’s Office. Successful applicants for the A.M. program usually enter Autumn Quarter. Applications from Stanford students are reviewed in Winter Quarter if received by January 1 and in Spring Quarter if received by April 15. Outside applicants must file their scores on the Graduate Record Examination.

Applicants whose ultimate goal is the Ph.D. degree should apply directly to the Ph.D. program. Students accepted for the terminal A.M. degree program cannot transfer to the Ph.D. program; they must reapply on the same basis as other Ph.D. applicants and in competition with other Ph.D. applicants. Ph.D. students who decide to take the A.M. on the way to the Ph.D. are governed by separate requirements described in the department’s Guide to the Ph.D. Program.

Graduate enrollment at Stanford for at least three quarters of full tuition is required of all candidates for the master’s degree, including coterminal students. A.M. students in Cultural and Social Anthropology must take a minimum of 45 quarter units in sociocultural anthropology beyond the undergraduate degree with a grade point average (GPA) of 'B' or better. Thirty-six of those units, which constitute the University minimum for the A.M. degree, must be at or above the 100-level, and 18 of the 36 must be in courses designated primarily for graduate students (typically at least at the 200 level). The department further requires at least 15 additional units of sociocultural anthropology at Stanford or elsewhere, constituting a minimum total of 60 units in anthropology. At the discretion of the department, the 15 additional units may have been taken in fulfillment of the undergraduate degree. Within the 45 units taken at Stanford, students must take Cultural and Social Anthropology 211, plus two additional graduate-level seminars in the department. The remaining units may be made up of courses selected in consultation with the faculty adviser to meet the needs and interests of the student.

The A.M. program usually requires more than one year of study. However, full-time students entering the program with appropriate background can complete the A.M. program in one calendar year. To provide a meaningful A.M. program within a one-year period, advance planning of course work with an adviser is required.

A field or library research paper read and approved by at least two departmental faculty members must be presented. Ph.D. students in the department may submit the first-year paper in fulfillment of this requirement. Other A.M. students must submit a project proposal for the master’s paper for approval. Coterminal students must obtain approval either by the end of the second quarter of the fifth year of study, or if earlier, by the end of the quarter preceding the quarter in which the degree is completed. All other A.M. students must do so not later than the end of the second quarter of graduate study.

Doctor of Philosophy

Prospective graduate students should request application materials from Graduate Admissions, the Registrar’s Office. Applicants must file a report of their scores on the Graduate Record Examination and submit a writing sample in English that demonstrates the ability to produce original analytical work at the graduate level. Successful applicants for the Ph.D. program may enter only in Autumn Quarter. The deadline for applications is January 4.

The Ph.D. program includes a number of required courses and examinations. It also allows the student to develop a flexible program reflecting special interests, under the supervision of a faculty committee chosen by the student. Students are encouraged to plan for completion of all work for the Ph.D. in five years.

The Ph.D. requirements for students who matriculated beginning 1999 are as follows (those matriculating earlier should consult the department’s Guide through the Ph.D. Program for their cohort).

1. Pass within the first year, with a grade of "B" or better:
   a) At least three of the graduate-level courses in department designated by the faculty as theory/evaluation courses, including Cultural and Social Anthropology 210 and 211
   b) Cultural and Social Anthropology 212, Anthropological Research Methods
   c) At least 40 units of completed course work overall

2. In Spring Quarter of the first year, enroll and participate in the teaching apprenticeship practicum (CASA 298C).

3. Submit an acceptable, substantial research paper in the Spring Quarter of the first year.

4. During the second year, pass at a satisfactory level:
   a) Additional graduate-level theory/evaluation courses in the department to make a total of six such courses over the first two-years of the program
   b) The Proposal Writing Seminar (CASA 294)
   c) At least 27 units of completed course work overall

5. Serve as a teaching assistant during the second year for three courses (or two courses if not on University financial aid). An approved internship may be substituted for one course of the teaching assistantship requirement.

6. By the end of Winter Quarter in the second year, recruit the special examination committee, and by the end of Spring Quarter in the second year, schedule examinations (see item 9, below).

7. For those whose native language is English, pass, by the end of Spring Quarter of the second year, a reading examination in a language other than English in which there is a substantial body of general theoretical literature relevant to anthropology. For those whose native language is not English, demonstrate satisfactory command of English, as evidenced by successful completion of the first two years of graduate study.

8. Upon completion of the above requirements, and upon recommendation of the Cultural and Social Anthropology faculty, petition for candidacy at the end of Spring Quarter of the second year or Autumn Quarter of the third year.

9. Pass a special examination (written and oral), before or during Winter Quarter (but in no case later than the fourth week of Spring Quarter) of the third year, covering the candidate’s major topic of specialization and one major ethnological area of the world. The oral part of this examination is normally taken as the University oral.

10. Serve as a teaching assistant for one course in the third year if on financial aid (waived for those who complete all requirements above no later than Winter Quarter of the third year).

11. Prepare a dissertation proposal to be approved by the student’s dissertation committee, and obtain needed research clearances before the end of Spring Quarter of the third year and before undertaking doctoral research.
12. Present an approved dissertation based on independent research.

Ph.D. MINOR

Prospective Ph.D. minors in Cultural and Social Anthropology should request an application from the Department of Cultural and Social Anthropology student program coordinator. The requirements for a minor in Cultural and Social Anthropology consist of the following:

1. Complete 30 units of courses in the Department of Cultural and Social Anthropology at Stanford with a grade point average (GPA) of 'B' or better. Course work for a minor can not also be used to meet requirements for a master's degree.

2. Enlist a faculty member within the Department of Cultural and Social Anthropology at Stanford who will provide written consent to serve as the adviser for the minor (see the student program coordinator for a listing of faculty and office hours).

3. In conjunction with the adviser, determine a coherent course of study related to the Ph.D. program, including Cultural and Social Anthropology 211, two courses in theory, and one course in a geographical area (for a list of current theory/methods courses, see the student program coordinator).

4. File the necessary paperwork with the student program coordinator, Department of Cultural and Social Anthropology requirements listed above are more extensive than the University requirements.

FINANCIAL SUPPORT

The department endeavors to provide needed financial support (through fellowships, teaching and research assistantships, and tuition grants) to all students admitted to the Ph.D. program who maintain a satisfactory course of study. Applicants for the Ph.D. program must file a request for financial aid when applying to the program if they wish to be considered for support. First-year students in the Ph.D. program who have not entered with outside funding are required to apply for such funding during their first quarter. No financial support is available to students enrolled for the A.M. degree.

TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, consult the "School of Education" section of this bulletin or address the inquiry to the Credential Administrator, School of Education.

COURSES

(WIM) indicates that the course meets the writing in the major requirements.

UNDERGRADUATE

GENERAL

Open to all students, these courses are introductory in the sense that prior knowledge is not assumed. The numbers are only labels; they say nothing about the level of the course. Students who want a general introduction to human behavior and culture are advised to take CASA 1; those who are interested in introductory courses focused on specific areas of anthropological inquiry should choose from among the courses numbered 2 through 18.

1. Cultural and Social Anthropology—(Upper-division students, register for 101.) Cross-cultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual and related topics. Lectures, films, and readings present case studies illustrating basic principles of the cultural process. GER:3b,4a (DR:2 or 9)

5 units, Win (Mankekar)

4. Language and Culture—Language in its relationship to culture and society. Focus is on the roles of language and language use in constructing worldviews, cultural values, social relationships, institutional orders, and identities. The ways language is employed in differing social and cultural contexts. Drawing on existing empirical studies of language-culture interaction, student projects involve data-collection, transcription, analysis, and consideration of theoretical implications and linkages to the existing literature. GER:3b (DR:9)

5 units, Aut (Inoue)

7N. Stanford Introductory Seminar: Investigating Culture—Preference to freshmen. Students compare and contrast their experience of entering the University with that of anthropologists entering another culture. The culturally specific ways that people situate themselves (as they are situated) in space and time, by means of language, the structures of everyday life and the global economy, in terms of the body, and symbols and frameworks provided by public myth and ritual. Classic anthropological readings, supplemented by weekly ethnographic exercises, enable students to become more deeply aware of culture as a constructed phenomenon that is open to investigation of its implicit premises and explicit forms.

4-5 units (Delaney) not given 1999-2000

8N. Stanford Introductory Seminar: Narratives of Self and Society—Preference to freshmen. How people portray their lives, the facts that made them become who they are, the nature and impact of encounters with different worlds, and the ways they find meaning in their lives. How external factors, such as globalization, class, race, and migration shape people's life stories. GER:3b (DR:9)

5 units, Win (Rosaldo)

9,10. Encounters and Identities—(Enroll in Introduction to the Humanities 27A, 27B.)

9. From the Age of Exploration to the Present: South Asia—GER:1 (DR:1) (two-quarter sequence)

5 units, Win (Gupta)

10. From the Age of Exploration to the Present: Europe and the U.S.—GER:1 (DR:1) (two-quarter sequence)

5 units, Spr (Yanagisako)

11C. Gender in Cross-Cultural Perspective—Anthropological theories of gender constructions. Recent questions posed to anthropologists about representation, power, and the interpretive authority of ethnographers, drawing on a range of resources (ethnography, film, fiction, and life stories). How gender is a lens through which other forms of social organization can be illuminated and how given theoretical tools act as framing devices for the kind of cross-cultural interpretation one makes.

5 units (Ebron) not given 1999-2000

12. Introduction to Feminist Study—Understanding the creation and perpetuation of gender inequality. Topics: sexuality, reproduction, work, family, welfare, violence, language, and religion. Examples from non-western societies illuminate the cultural and historical construction of gender in western society.

5 units (Delaney) not given 1999-2000

13. Critical Perspectives on Popular Culture—Introduces critical perspectives on popular culture, including Hollywood and Indian films, Latin American and U.S. soap operas, popular music, and video. Emphasis is on the historical, sociological, anthropological, and cultural perspectives on popular culture and mass media in cross-cultural contexts. Issues: the relationship between film and nationhood, television sitcoms and racial identity, soap operas and gender, and video and ethnicity. GER:3b (DR:9)

5 units, Spr (Mankekar)

15. Africa and the Diaspora—Lecture/discussion. Surveys the debate surrounding Africa and the diasporic communities. The cultural history offers insight into contemporary discussions about the culture and politics of these mapped cultural spaces. Methodological approaches to the context, providing basic analytic tools for research projects. GER:4b (DR:2)

5 units (Ebron) not given 1999-2000
THEORY AND RESEARCH

90. Theory in Cultural and Social Anthropology—Anthropological interpretations of other societies contain assumptions about ourselves and about “Western” societies. Seminar highlights that interpret and consider how underlying assumptions and implicit categories have influenced the presentation of data in a major anthropological monographs. Emphasis on Karl Marx, Emile Durkheim, Max Weber, and anthropological analyses of nonwestern societies. (WIM)
5 units, Win (Ebron)

92. Introduction to Approaches in Archaeology—Over recent decades, archaeology has seen a vigorous debate about approaches to interpretation of the past. Why these approaches matter in the contemporary world: objective scientific universals about cultural development vs. individuals use of the past to create identities for themselves in the present. Their application to specific sites and problems: the explosion of symbolism in the Upper Palaeolithic, the adoption of Catalhoyuk in Turkey, the adoption of farming in the New World, the experience of prehistoric monuments in Europe and N. America, the archaeology of indigenous peoples, gender archaeology, internet archaeology. GER:3b (DR:9)
5 units, Win (Hodder)

93. Prefield Research Seminar—Prepares students for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies of successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Prerequisite: introductory course in anthropology or consent of instructor. GER:3b (DR:9)
5 units, Spr (Rosaldo)

94. Postfield Research Seminar—Undergraduates analyze and write about material gathered during summer fieldwork, emphasizing writing and revising as key steps in analysis and composition. Students critique classmates’ work and revise their own writing in light of other’s comments. Reading/discussion on ethical issues in fieldwork and ethnographic writing, setting research write-up concerns within broader contexts. Objective: produce an excellent ethnographic report based on original field research. GER:3b (DR:9)
5 units, Aut (Delaney)

95A. Research in Cultural and Social Anthropology—Independent research conducted under faculty supervision, normally taken junior or senior year in pursuit of an honors project. May be taken more than one quarter for credit. Prerequisite: approved application to the honors program.
1-10 units, any quarter (Staff)

95B. Honors—Taken in the final quarter of the student’s work for graduation with honors. Independent study and honors thesis work for students admitted to the program. Prerequisites: acceptance to the honors program and a draft of the honors thesis.
1-10 units, any quarter (Staff)

96. Directed Individual Study—For undergraduate students with special needs, and showing the capacity to do independent work. Prerequisite: 1 or consent of instructor.
1-10 units, any quarter (Staff)

96A/B/C/199A/B/C. Honors/Masters Writing Workshop—(Graduate students register for 199.) For students in the process of writing their honors or master’s papers. Techniques of interpreting data, organizing bibliographic materials, writing, editing, and revising. Preparation of papers for conferences and publications in anthropology.
2-6 units, Aut, Win, Spr (Roth Gordon)

UNDERGRADUATE AND GRADUATE AREA STUDIES

33. Inventing the Savage—Examines colonialism as the root cause of cultural trauma in Native American communities, including domestic violence, criminality, and post-traumatic stress disorder. How Native American scholars have theorized cultural trauma and how Native American writers have fashioned strategies to heal the negative effects of colonialism.
5 units, Aut (Ramirez)

72. Dance and Culture in Latin America—(Same as Drama 168.) 3-4 units, Spr (Cushion)

73. Introduction to Chicano Life and Culture—Chicano culture in historical perspective, including indigenous and African heritages and comparisons with Mexico and other U.S. Latino groups. Emphasis is on the contemporary period and popular culture.
5 units (Rosaldo) not given 1999-2000

5 units, Aut (Gupta, Mancall)

76. Political Economy of India—The changing nature of relations of power in the Indian economy since British colonial rule. Conflicting interpretations of Indian economic history, the success of post-Independence development efforts, the relationships between agriculture and industry in contemporary India, and the position of the subcontinent in the world systems. Prerequisite: 120 or History 186.
5 units (Gupta) not given 1999-2000

77. Japanese Society and Culture—Using anthropological literature as a baseline, discusses the problem of knowing and representing Japanese people, history, and culture. Beginning with a basic problematizing of any unreflective idea of “Japanese society and culture,” students are introduced to diverse lives and historically situated experiences to make them aware of the problems entailed in representation. Student views of Japanese people, ethnographic reports. GER:3b,4a (DR:2 or 9)
5 units, Win (Inoue)

79. Anthropological Perspectives on the Middle East—Who lives in the Middle East? What forces shape peoples lives in this region? Why does this part of the world appear to be so rife with conflict? The diversity of life in the region known commonly as the Middle East. Peoples living in rural, urban, and nomadic settings. Through a close reading of ethnographies and other cultural texts, analyzes how constructions of race, religion, ethnicity, nationalism, and gender shape everyday life.
5 units, Win (Razieli)

83. Gender in South Asian Communities at Home and Abroad—The relationship between men and women in S. Asian communities. Material from scholarship on gender relations in India, Pakistan, Bangladesh, Sri Lanka, Nepal, and overseas S. Asian communities (e.g., those in N. America, Africa, and the U.K.). Focus is on the relationship between the practices and ideologies of gender, and other social institutions (e.g., religion, family, state, mass media, and ideologies of communalism and nationalism). Prerequisite: 12 or consent of instructor.
5 units (Manekkar) not given 1999-2000

84. The Multicultural City in Europe—European cities have become a kaleidoscope of peoples and cultures. How does multiculturalism mean in the European setting? How have different governments dealt
with the issues, and with what results? The theoretical issues of migration, citizenship, and international labor as they affect people's lives. How does culture affect how different groups utilize space and time, health, and educational resources? How do different notions of gender, family, work, religion, and food and clothing operate as symbols of identity? What are the politics of language? In what way does the city foster or mitigate difference?

5 units (Delaney) not given 1999-2000

87. Social Change in Contemporary China: Modernity and the Middle Kingdom—Seminar introduces cultural issues of contemporary China through an examination of various types of social change. How People's Republic of China residents of different backgrounds experience the state's post-Mao policies of economic liberalization and openness. Areas of social change shaping China today, including changes in ancestor worship, ritual practices, religion, shifts in marriage markets, interpersonal relations, child bearing, rises in urbanization, migration, unemployment, and shifts in minority-Han relations. Enrollment limited to 25. GER:3b,4a (DR:2 or 9)

5 units, Aut (Kohrmann)

104. Race and Language in the U.S.—The role of language in the social construction of race, racism, and racial identity in the U.S. context. Emphasis is on African-American Vernacular English (AAVE), Spanish-English bilingualism, and other language groups. Combines theory and research from anthropology and linguistics on identity and ideology. Language issues in education, law, and politics.

5 units, Spr (Roth Gordon)

110. The Middle East through Ethnography—For advanced undergraduates and graduate students. Exploration of the Middle East and anthropological theory through a close reading of ethnographies. Emphasis is on issues associated with the region (honor and shame, public and private, sexual segregation, religion, and orientalism).

5 units (Delaney) not given 1999-2000

129A. Gender in East Asia—Focus is on gender relations in contemporary societies in East Asia with respect to nationalism, global capitalism, and the politics of sexuality. How do notions of the private and public, tradition and modernity, non-Western and Western inform gender ideologies? The role of patriarchal authority in the family and the nation-state, the meaning of agency and resistance in everyday life; and the relevance of feminism on local histories. Ethnographic work from Japan, Korea, China, Taiwan, and Hong Kong. Topics: gendering of transnational labor, "choice" and reproductive technology, prostitution and the military, and images of masculinity and femininity in popular culture.

5 units, Spr (Lee)

130B. Asian American Immigration and Health—Employing a critical medical anthropological approach, focus is on the experience and meanings of illness for Asian immigrants newly arrived in the U.S. Beginning with a study of immigrants as a feared source of disease and contagion, issues of power, race, and nationhood in the ideology and practice of biomedicine. The immigrant's navigation of the U.S. health care system and the attribution of culture in the construction of the sick. Topics: post-traumatic stress disorder, AIDS, culture bound syndrome, risk assessment and preventative health.

5 units, Win (Lee)

TOPIC COURSES AND SEMINARS

86. Environmental Politics and Development—How do global environmental problems affect developing countries? What is the relationship between environmental degradation, poverty, and population? Why the perspective of developing countries of the South differs from the industrial nations of the North, and what can be done to reconcile environmental concerns with the amelioration of poverty.

5 units (Gupta) not given 1999-2000

88. Theories of Race and Ethnicity: A Comparative Perspective—Introduces the concepts and theories of race and ethnicity in the social sciences and cultural studies. U.S.-based definitions, ideas, and problems of race and ethnicity are compared to those that have emerged in other areas of the world.

5 units (Yanagisako) not given 1999-2000

89B. Comparative Race and Inequality—Analyzes the persistence of inequality in racially and culturally hybrid societies in Africa, Latin America, the Caribbean, and the U.S. What is the relationship between race and cultural, economic, and political inequality? What are the boundaries of racial "purity" and whom do they keep in or out? Given the diversity of large groups such as blacks and mestizos, what becomes the basis of group solidarity.

5 units, Win (Tunstall)

133A,B,C. Ethics of Development in a Global Environment (EDGE)—(Same as Engineering 297A,B,C) Wednesday evening seminars on world affairs, mostly on issues affecting poor nations. Autumn Quarter treats war and peace: the background of current wars and peace negotiations, the UN peacekeeping efforts, war and religion, arms trade. Winter Quarter treats international resources and commerce: the debt crisis, environmental protection, resource depletion, Japan in the world economy, aid and monetary institutions. Spring Quarter treats poverty and prejudice: development models, comparative national health, AIDS, control of wealth, India-China-Africa-S. America today. Speakers from Stanford and other institutions are experts who directly deal with world policy makers through research and advisory activities. One unit credit for attendance of the speaker series; 5 units additional credit for optional workshops treating selected issues in more depth. (Sequential registration not required.)

1-4 units, Aut, Win, Spr (Lusignan, Gupta)

136. The Anthropology of Consumption—Ethnographic historical approach to the study of consumption and its related topic, production. The social life of things are traced through interrelated processes addressing questions about the organization of labor that help produce an object; contingencies of value and the making of consumer distinctions; and the role of advertising. GER:3b (DR:9)

5 units, Spr (Ebron)

138. Anthropology of Medicine: Illness, Suffering, and Health Policy—Introduction to basic issues in medical anthropology through detailed discussions of the ways health care professionals and local residents in Euroamerican and non-Euroamerican contexts have understood, experienced, and responded to modes of bodily distress during the last century. How, in places like Haiti, India, Brazil, and China, people have come to use multiple medical approaches for understanding and dealing with illness, death, and other forms of distress. GER:3b,4a (DR:2 or 9)

5 units, Spr (Kohrmann)

142. Person, Gender, and Family in Welfare Policy—Explicit, implicit notions of the individual person, gender, and family embodied in U.S. welfare policy. Historical roots of welfare, its institutionalization, actual practices, and effects on recipients. Who has responsibility for children? Do theorists and policy makers have different assumptions about person, gender, and family when thinking about the poor? What assumptions are implied about marriage, the individual, independence? What are the assumptions of personhood, gender, and family among those who shape policy?

5 units (Delaney) not given 1999-2000

143. The Anthropology of Death and Dying—Examines fundamental topics in medical anthropology, focusing on the medical and social practices of caring for the ill or aging body throughout the process of dying and following death. How are the boundaries between life and death constructed and negotiated? What is considered a timely, or "good" death? What is the role of the healer as a person that dies? How is the body viewed (or used) after death and what is the appropriate ritual response
to loss of close kin? The cultural responses focus on contemporary biomedical practices: the declaration of brain death, physician-assisted suicide, and the commodification of human body parts.

3 units, Spr (Koenig)

145. Comparative Feminism—Preference to juniors and seniors majoring in Feminist Studies and anthropology. Interdisciplinary seminar for upper-level undergraduates. Women’s struggles for empowerment, situating them in the specific cultural and historical contexts in which they have emerged in different parts of the world. Focus: broaden an understanding of women’s struggles in the world, and develop analytical models that enable study of these struggles in their complexities and specificities by calling into question dominant assumptions about feminism. GER:4c (DR: 15)

5 units (Manekar) not given 1999-2000

148. Latino Cultural Citizenship—Cultural citizenship refers to the right to be different and to belong in a participatory democratic sense. Readings are drawn from the historical experiences of Chicanos, Puerto Ricans, and Dominicans in the U.S. and from different disciplines including imaginative literature.

5 units (Rosaldo) not given 1999-2000

152. Symbolic Anthropology—For undergraduates. Symbolic anthropology is an approach to the study of human society developed along with the concept of culture as a system of symbols and meanings, a system presumed to be embedded in and expressed by institutions, values, attitudes, structures of everyday life, and social action. The intellectual roots, exemplary texts, and opportunities to do symbolic analysis.

5 units (Delaney) not given 1999-2000

153C/253C. Millennial Fever—(Graduate students register for 253C.) Seminar opportunity for students to observe and analyze the social responses and events leading up to the turn of the millennium. The rituals of celebration being planned, apocalyptic movements and anxieties including the Y2K problem, the notion of time as an organizing principle. Comparisons of contemporary responses with those at the turn of the first millennium, and with other millennial movements. The Christian basis for the millennium focuses the issue of religious and political domination and the role of religion in creating identity and difference. GER:3b (DR: 9)

5 units, Aut (Delaney)

154. Creation/Procreation: A Comparative Study—An alternative to the study of religion and reproduction as distinct categories and separate domains. The gendered aspects of cosmological or religious systems and the cosmological significance of gender in terms of their symbolic interrelationships. Anthropological and other literatures examine these relationships in several cultures, including our own. Emphasis is on the ways these beliefs are embedded in practices and structures of social life and on Western categories and meanings, and their implications for theorizing.

5 units (Delaney) not given 1999-2000

157C. Cultural Studies of Youth—Introduction to anthropological and cultural studies of educational institutions, capitalism, popular culture, workplaces, and the nation as they shape youth identities, “sub-cultures,” and resistance. Emphasis is on theories of social reproduction and inequality, and on the cultural practices that produce gender, race, ethnic, and class-specific youth identities.

5 units, Spr (Bakrania)

158. Culture and Learning—(Same as Education 287.) Learning in various institutional settings in U.S. and around the globe. Learning in families, in schools, on the job, and on the streets. Emphasis is on the cultural organization of success and failure in American schools. Tentative consideration of opportunities for making less inequality.

3-4 units, Win (McDermott)

166. Sexuality and Culture—The history of sexuality in Western and non-Western traditions and how sexuality is affected by capitalism, globalization, and consumerism at the end of the 20th century. The major theoretical and methodological approaches to the study of sexuality (heterosexualities, homosexualities, bisexualities, and transgendered sexualities). Focus is on the rise of gay and lesbian sexualities in postcolonial societies.

5 units, Aut (Boellstorff)

170S. Space, Place, and Culture—(Same as Modern Thought and Literature 193S.) The ways cultures are embedded in spaces and places, how geography effects identity, how communities make and negotiate places, and the connections between space, power, and knowledge. The ways “space” has been theorized by cultural geographers and used as a trope in cultural theory. Interdisciplinary readings in cultural geography, anthropology, political economy, critical theory, and literature. Feminist geography, cartography and imperialism, race and space, and the politics of landscape.

5 units, Spr (Stein)

GRADUATE AND ADVANCED UNDERGRADUATE

210. Reading Theory through Ethnography—Restricted to first-year doctoral students. Graduate seminar focusing on contemporary ethnography and related cultural and social theories generated by texts. Topics: agency, resistance, identity formation, discourse analysis, etc. Enrollment limited to 10.

5 units, Aut (Ebron)

211. History of Anthropological Theory—The history of cultural and social anthropology is studied in relation to historical and national contexts and to key theoretical and methodological issues as these continue to inform contemporary theory and practices of the discipline. Enrollment limited to 15. Prerequisite: consent of instructor.

5 units, Win (Delaney)

212. Anthropological Research Methods—Open to all graduate students; Anthropology Ph.D. candidates have first priority. Introduces a range of research methods and modes of evidence building in ethnographic research. Enrollment limited to 10.

5 units, Spr (Gupta)


5 units (Inoue) not given 1999-2000

227. Linguistic Anthropology—For graduate students. Intensive reading, focusing on the relationship between language and political economy, and from a range of theories of language: Saussure, Jakobson, Hymes, Marx, Foucault, Butler, and Derrida. Goal: explore the diverse theorization of language in its linkages to power, social relations, and history. Prerequisites: either linguistics or anthropology course work.

5 units, Aut (Inoue)

235. Mass Media and Subjectivities—Graduate seminar on critical approaches to mass media and popular culture. Object is to collaborate in developing methodologies and critiques and to interrogate prevailing theoretical perspectives. Emphasis is on feminist perspectives, national and transnational circulation and reception of popular texts, questions of narrativity, identity, agency, and cross cultural conceptions of subjectivity.

5 units (Manekar) not given 1999-2000

243. Culture as Commodity—Graduate seminar focusing on theories of commodification, interests in tourism, national cultures as marketable objects, how identities are constituted through production and consumption. Formation of global style and taste.

5 units (Ebron) not given 1999-2000
244. Naturalizing Power: Kinship/Gender/Race/Sexuality—Graduate seminar examines discursive and material practices through which social relations of inequality are naturalized. Ideologies of family, kinship, gender, race, and sexuality are compared to consider the parallel processes of naturalization and mutual affirmation. The role of anthropological theory in these naturalizations. Enrollment limited to 20. Prerequisite: graduate student or advanced undergraduate major in anthropology, or consent of instructor.
5 units (Yanagisako) not given 1999-2000

245. Advanced Feminist Theory—Interdisciplinary graduate seminar examines cultural differences and recent feminist theory within dialogues of contemporary social theory. Enrollment limited to 20. Prerequisite: graduate student or advanced undergraduate major in anthropology, or consent of instructor.
5 units (Ebron) not given 1999-2000

247. Feminist Methodologies—Interdisciplinary graduate seminar for students with a thorough working knowledge of feminist theories. Focus is on feminist epistemologies and methodologies, drawing on questions from feminists working at the intersection of feminist anthropology and cultural studies, and in political theory, film theory, history, and literary theory. Feminist negotiations of poststructuralism and postmodernism and interrogations of concepts such as difference, experience, fieldwork, location, and voice. Students think through readings by doing specific research, pedagogical, and community projects.
5 units (Mankekar) not given 1999-2000

249. Seminar on Studying Up—Graduate seminar on issues in cultural theory and methodology through research on people who have greater material and cultural resources than those usually studied by anthropologists. How ideas about ideology, hegemony, identity, power, and practice are altered when we study those we consider to be agents of power rather than the subaltern. Topics: global capitalism, masculinity, white racial subjectivity. Enrollment limited to 20.
5 units, Win (Yanagisako)

250. Nationalism and Gender—The co-implication of discourses of nationalism and gender, focusing on nationalist movements and ideologies in newly-independent countries and “Third World” contexts. Themes: discourses and practices of nationalism with institutions such as the state, mass media, the family; masculinity, femininity, and militarization; and questions of representation, historiography, location, and strategy.
5 units, Spr (Mankekar)

251. Cultural Studies—Focus is on the politics of identity and community. Broader topics: questions on nationalism, displaced nationalism, and ethnicity. Interdisciplinary readings in cultural studies provide a theoretical context.
5 units, Aut (Rosaldo)

251A. Latino Studies—Graduate seminar on issues concerning Latino and indigenous groups in the Americas, including racial formations, migration, nationalisms, and settler colonialism. Readings primarily from ethnography, social history, and personal testimony.
5 units, Spr (Rosaldo)

252. Advanced Symbolic Anthropology—See 152.
5 units (Delaney) not given 1999-2000

253. Religion and Society—Covers theoretical and ethnographic material, sensitizing students to the complexity of the issues involved in the study of religion. In what ways is it useful, or not useful, to talk of religion as a human universal? What is the nature of religion, how is it practiced and by whom, what counts as religious phenomena and what accounts for the persistence of religion and the power of religious movements? What is the relationship between religion and state and what are some issues blurring that distinction? What is the relation between religion, power, and gender? Prerequisite: consent of instructor.
5 units (Delaney) not given 1999-2000

253A. “Fundamentalism” in the Modern World—Social scientists and others assumed religion would become a minor element in the modern world. In the evolutionary schema, myth was replaced by religion and religion by science. Yet in the U.S., the most modern and advanced society on earth, religion is still flourishing. Why are fundamentalist forms becoming popular around the world? Is “fundamentalism” a reaction against or an integral aspect of modernity? What does it portend for the future? Students debate definitions of religion, and become more aware of the interrelations between gender, religion, society, and law.
5 units, Win (Delaney)

254. Narrative, History, and Memory—Interdisciplinary graduate seminar on the debates surrounding theories of narrative and their relevance to ideas of history and memory. The importance of methodological implications of these approaches and their applicability to the analysis of social research, particularly anthropology and history.
5 units (Ebron) not given 1999-2000

255. Cultural Citizenship—The right to be different and to be equal, and the political and the cultural issues at stake in this formulation. Readings on the U.S. and the politics of difference.
5 units, Rosaldo not given 1999-2000

257. Medical Anthropology—Graduate seminar examining the history and theories of medical anthropology. Focus is on medical anthropology’s transformations in the 20th century: how medical anthropology has emerged as a field of inquiry, grown in dialogue with other areas of scholarship, and come to offer a unique array of theoretical positions and modes of ethnographic engagement. Emphasis is on debates within interpretive and critical medical anthropology, and how an understanding of these debates may be used to assess contemporary works within the field.
5 units, Win (Kohrman)

261. Graduate Colloquium: The Modern Tradition—Globalization and Modernity—(Same as Modern Thought and Literature 361.) Rather than assume one modern tradition, the colloquium encourages the analysis of the (uneven) appearance of a number of possible “modernities” in various geopolitical spaces, their cultural and historical formations, and their inter-relations. Can modernity be seen as a uniquely “western” achievement? By examining such diverse topics as trade and finance, colonialism, ecological transformations, immigration and forced migration, nationalism, and postcolonialism, the complicated history of modernity is understood as a global phenomenon. Prerequisite: consent of instructor.
5 units, Aut (Gupta, Palumbo-Liu)

262. Topics in Political Economy—Introduction to selected themes in political economy, emphasizing Marxist approaches. Topics: the development and articulation of capitalism, imperialism, colonialism, dependency, and world systems; 20th-century capitalism, post-Fordism, and postmodernism; the political economy of race, gender, and ethnicity; class relations and productive inequalities in the Third World; the discourse of development; and the cultural mediation of political economic transformation. The ethnographic material that employs these theories is used to examine specific socio-historical contexts.
5 units (Gupta) not given 1999-2000

263. Political Economy and Poststructuralist Theories of the State—Advanced graduate seminar on classic and contemporary Marxist, structuralist, and poststructuralist approaches to the state. Readings initiate dialogue between institutional analysis and those emphasizing process...
of representation and the cultural construction of the state. Prerequisite: 262 or consent of instructor.
5 units (Gupta) not given 1999-2000

272. Objectification: The Study of Material Culture—Theories of material culture and how the object world participates in social processes. The Hegelian and Marxist background and recent attempts to develop material culture studies between archaeology, anthropology, sociology, and psychology. Why are objects important to us? The relationships between conscious thought and daily material practice. The role of objects in thought and subjective experience. Objects in human evolutionary development and in child development. The nature of commodification. Objects in relations to power, authority, resistance; and in relation to the construction of self. The dependence of human subjectivity on the object world.
5 unit, Spr (Hodder)

275. Archaeology and Globalism—The emergence of archaeology as a discipline in the context of the rise of the nation state. The emergence of global economies and other global issues has created a new context for archaeology. How are archaeology and heritage responding to this new situation? The idea of "world heritage." The impact of postcolonialism. The commodification of the past: the past as theme park, as travel tourism or nostalgia, as exotic and other. Conflict between uses of the past for identity and as theme park; between heritage and resource or play. The impact of the Goddess, New Age, and other movements. Archaeology and human rights issues (including forensic archaeology).
5 units, Win (Hodder)

280. Ethnographic Approaches to Cultural Diversity in Schooling—(Same as Education 280.) How to learn about culture and to analyze education-relevant situations such as the culturally diverse classroom. The cultural process is approached by acquiring techniques of observation, interview, and interpretation of behavior in context, and soliciting and recording the "native" explanations of their own behavior; developing an internally consistent conceptual structure that orients observation and elicitation productively; and being sensitized to one's own culture and how it influences perception and interpretation of behavior. Techniques of ethnographic research applicable to the study of schooling are demonstrated and applied in modest field research projects. Writing of one research report or proposal for research.
4 units, Spr (Spindler)

4 units, Spr (Spindler)

292. Dissertation Seminar—For graduate students in the process of writing dissertations and preparing for professional employment.
0-3 units, Aut, Win, Spr (Mankekar)

293. Internship
1-15 units, any quarter (Staff)

294. Proposal Writing Seminar—Required of Ph.D. students in anthropology in their second year. Treats conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus of the sort suitable for dissertation proposals and research grant applications. Limited enrollment. Prerequisite: 289 or consent of instructor.
5 units, Spr (Yanagisako)

295. First-Year Paper—Required of first-year students.
2-5 units, Win, Spr (Inoue)

296. Research Assistantship—Supervised work with an individual faculty member on a research project. May be taken for more than one quarter.
5 units (Staff)

297. Directed Individual Study—Opportunities for advanced students to explore special areas of interest.
any quarter (Staff)

298. Teaching Assistantship—Supervised experience as assistant in one undergraduate course.
5 units, any quarter (Staff)

298C. Teaching Apprenticeship Practicum—Required of Ph.D. students in Cultural and Social Anthropology in their first year of study. Orientation and training in the skills and practices of effective undergraduate teaching. Limited enrollment, consent of instructor.
2 units, Spr (Staff)

299. A.M. Project—Research in connection with the master's paper.
any quarter (Staff)

AFFILIATED DEPARTMENTAL OFFERINGS

AFRICAN AND AFRO-AMERICAN STUDIES

105. Introduction to African and Afro-American Studies
5 units, Spr (McCants)

ANTHROPOLOGICAL SCIENCES

213. Topics in Linguistic Anthropology
5 units (Fox) not given 1999-2000

CLASSICS

33. Landscape: From Fine Art to Archaeology
4-5 units, Win (Shanks)

302. Classical Archaeology: Experiences of the Discipline
4-5 units, Aut (Shanks)

ENGLISH

398A. Writing for Academic Publication
5 units, Win (Heath)

LINGUISTICS

146. Language and Gender
4 units, Aut (Eckert)

247. Ethnography of Communication
4-5 units, Spr (Heath)

PSYCHOLOGY

160. Culture and Self
3 units, Win (Markus) alternate years, not given 2000-01

161. Cultural Psychology
5 units (Markus) not given 1999-2000

DRAMA

Emeriti: (Professors) Wendell Cole, Martin Essin, Helen W. Schrader, H. Donald Winbigler; (Associate Professor) Miriam B. Lidster; (Adjunct Professors) Evelyn M. Draper, Inga Weiss
Chair: Michael F. Ramsaur

Drama Division

Professors: Jean-Marie Apostolidis (French and Italian, Drama), Carl Weber
Associate Professors: William S. Eddelman, Harry J. Elam, Jr., Alice Rayner, Rush Rehm (Drama, Classics), Anna Deaver Smith
**Drama Division**

The Department of Drama bases its undergraduate and graduate programs on the integration of theory and performance. The faculty commit themselves to the need for artists to be able to analyze their aesthetic work and for scholars to be able to understand specialization to prepare students for continued work at the graduate level, either in professional or in conservatory programs that aim to educate artists for careers in the theater. As well, the Drama major offers a generalist theater education. The Ph.D. program, which demands that its candidates work as both theorists and theater artists, offers a chance to develop the skills for further work in the professional and university theaters.

**UNDERGRADUATE PROGRAMS**

**Bachelor of Arts**

The requirements for the A.B. degree in Drama are planned to integrate the critical and historical study of drama with the study and experience of performance. The major provides aesthetic and critical opportunities for students to develop special aptitudes. For example, a student may elect an emphasis in acting, directing, design, or critical theory or may combine areas of emphasis. Examples of how students can structure course work to take advantage of such an emphasis are available from the major adviser. Students are encouraged to declare a major in their sophomore year.

The core program of Drama courses required of all majors is:

1. Performance/Literature: 161, 162, and 163
2. Stage Management Project: 134
3. A practical production class in technical theater or performance: one of 29, 39A, 39B, or 39C.
4. Senior Project: every Drama major must complete an approved Senior Project in the area of their specialization: a minimum of 2 units in 200.

Two years of a college-level foreign language are strongly recommended.

All majors, in addition to completing the core described above, are required to complete one of the following five specializations:

1. **Acting:**
   a) Drama 120A, B (Fundamentals of Acting)
   b) The student must have completed at least 4 units of Drama 29 and acted in at least two department productions.
   c) Drama 28 (Make-Up for the Stage)

   d) Drama 47 (Period Movement and Dance)
   e) Four additional acting classes
   f) One course in dramatic literature
   g) Eight units of approved electives

2. **Directing:**
   a) Drama 170A (Introduction to Directing), 170B (Advanced Directing), and 171 (Undergraduate Theater Workshop)
   b) Drama 166 (Performance, Space, and Technology)
   c) Drama 159 (Shakespeare)
   d) Drama 30 (Introduction to Theatrical Design)
   e) Drama 31 (Introduction to Lighting and Sound)
   f) One course in acting
   g) One course in dramatic literature
   h) Eight units of approved electives

3. **Playwriting/Dramaturgy:**
   a) Drama 177 (Playwriting)
   b) Drama 170A (Introduction to Directing) and 170B (Advanced Directing)
   c) Drama 176 (Undergraduate Dramaturgy Project)
   d) Drama 166 (Performance, Space, and Technology)
   e) Drama 159 (Shakespeare)
   f) Two courses in acting
   g) One course in dramatic literature
   h) Four units of approved electives

4. **Design/Stagecraft:**
   a) Drama 30 (Introduction to Theatrical Design)
   b) Drama 31 (Introduction to Lighting and sound)
   c) Drama 131 (Lighting Design)
   d) Drama 132 (Costume Design)
   e) Drama 133 (Stage Scenery Design)
   f) Drama 39A, 39B, 39C (Performance: Crew)
   g) Drama 166 (Performance, Space, Technology)
   h) Two courses in design
   i) Eight units of approved electives

5. **Performance Theory and Cultural Studies:**
   a) Drama 156 (Contemporary Ethnic Drama)
   b) Drama 159 (Shakespeare)
   c) Drama 166 (Performance, Space, and Technology)
   d) Twenty-four units of course work in dramatic literature, criticism, theater history, history, art history, and so on, to be determined in consultation with the undergraduate adviser.

**SENIOR PROJECT**

Work for this project normally begins in Spring Quarter of the junior year and is completed by the end of the senior year. The student must do a senior project in his or her area of specialization: Acting, Directing, Playwriting/Dramaturgy, Design/Stagecraft, Performance Theory and Cultural Studies. The project can be a creative or research project, or a combination of both. The student has the option of writing an essay associated with the project. Students receive credit for senior projects through Drama 200, Senior Project.

Students pursuing senior projects should consult with both the Department of Drama undergraduate adviser and a faculty adviser in the project's specialty area. These consultations should take place early in the junior year. Students must petition approval of senior projects through the Department of Drama undergraduate adviser. Projects are typically approved by the department faculty at the end of Spring Quarter of the junior year or the end of Autumn Quarter of the senior year.

The student proposal should include an outline of the courses the student has taken and grades received in the area requirements, and should describe the courses in which they plan to enroll as part of the project. It should describe in detail the purpose and methods involved in the project; a bibliography, if appropriate; and a one-to-two page abstract of the associated essay if an essay is part of the project.

**MINORS**

For students wishing to minor in Drama, the following core requirements must be met:
1. The three-quarter sequence in Performance/Literature: Drama 161, 162, 163.
2. Stage Management Project: Drama 134.
3. A practical production class in technical theater or performance: one of Drama 29, 39A, 39B, or 39C.
4. Elective courses totaling a minimum of 15 units from the specified courses in any one of the five specializations listed above would constitute a minor concentration in: Acting, Directing, Playwriting/Dramaturgy, Design/Stagecraft, or Performance Theory and Cultural Studies.

HONORS PROGRAMS

Drama
For a limited number of students, the department confers the degree of Bachelor of Arts with departmental honors in Drama. To be considered for departmental honors, students must meet the following requirements:
1. The student must have fulfilled the requirements for the Drama major.
2. The student must be a Drama major in good standing with a grade point average (GPA) of 'B+' including all the student's work in Drama.
3. The student must have completed prerequisite courses in the area of specialization with a GPA of 'A-' or better.
4. The student must have completed a senior project that the Department of Drama considers outstanding.
5. Honors are awarded on the basis of both the senior project and the student's entire work in the Department of Drama.

HUMANITIES
An honors program in Humanities is available for Drama majors who wish to supplement their major with related and carefully guided studies. See the "Interdisciplinary Studies in Humanities" (ISH) section of this bulletin for a description of the honors program. Students who enroll in this program may offer ISH 160 and two seminars from 190-198 in fulfillment of the departmental elective requirement.

GRADUATE PROGRAMS

Doctor of Philosophy
University requirements for the Ph.D. are described in the "Graduate Degrees" section of the bulletin.
All graduate study in the Department of Drama leads to the Ph.D. degree. The doctoral program in Drama aims to integrate practical theater work with the critical and historical study of dramatic literature and theory. All candidates are expected to function both as scholars and as theater directors. The curriculum offers a two-year practical concentration in directing along with the study of critical and performance theory, aesthetics, history, and literature. The goal of the program is to give students a thorough knowledge of the field that leads to original and significant scholarly work grounded in practice.
The following department requirements are in addition to the University's basic requirements for the doctorate.

UNITS AND COURSE REQUIREMENTS
1. A minimum of 72 units of graduate courses and seminars in support of the degree. These units are in addition to units for the doctoral dissertation.
2. The sequence in Performance and Critical Theory (Drama 300, 301).
3. Six (6) additional graduate seminars within the Department of Drama. These must include at least one seminar in each of the following fields: (a) intersections of theory and performance (designated by suffix A in course number); (b) theater history (designated by suffix B in course number); and (c) dramatic literature (designated by suffix C in course number).
4. The five workshops in directing: Drama 370, 371, 372, 373, 374. In the first year, students will take 370 (Concepts of Directing), 372 (Projects in Directing), 371 (Visual Aesthetics for the Director), and 373 (Directing and Dramaturgy). The Projects class consists of the conceptual development, design, and production of a short play in a multi-form space. In the second year, students take Drama 374 (Graduate Directors' Performance Project) to stage a more fully developed production chosen in consultation with the faculty.

LANGUAGE REQUIREMENT
The candidate must demonstrate reading knowledge of one foreign language in which there is a major body of dramatic literature. The language requirement may be fulfilled in any of the following ways:
1. Achievement of a sufficiently high score (70th percentile) on the foreign language examination prepared by the Educational Testing Service (ETS). Latin and Greek are not tested by ETS.
2. A reading examination given each quarter by the various language departments, except for Latin and Greek.
3. Passage with a grade of 'B' or higher a course in literature numbered 100 or higher in a foreign language department at Stanford.
The language requirement must be met before the student can be advanced to candidacy.

TEACHING REQUIREMENT
Five quarters of supervised teaching at half time are a required part of the Ph.D. program. The requirement is normally met by teaching three courses during the second year and two courses during the third year.

EXAMINATIONS
Candidates must complete three examinations, one comprehensive and two qualifying examinations, by the end of the first three years of study at Stanford.
The comprehensive examination is taken as a four-hour sit-down in the Spring Quarter of the first year. The first part of the comprehensive exam is based on a range of texts given to the student by the department at the beginning of the first year. The second part of that exam is based on a list of texts from a given period determined by the student and faculty adviser. It may focus on texts or critical approaches of special interest to the student. Students who do not enter with significant background in dramatic literature may opt to take this exam in the week prior to the start of classes in the second year.
The first qualifying exam, which must be completed before advancement to candidacy at the end of the second year, consists of three 15-20 page essays written in consultation with a faculty adviser, covering a specific period of dramatic literature and theater history. These essays should not duplicate any written work from seminars. After approval by the adviser, the Graduate Studies Committee reads and evaluates these essays.
The second qualifying examination is a departmental oral with three faculty members, at least two of whom should be from the Department of Drama. This oral covers a second period of dramatic literature and theater history. The format of this exam approximates that of the University oral.
For the two qualifying examinations, the essays and the oral, each student will work out a program of study with a faculty adviser drawing from the following periods of Western drama, but may include non-Western texts:

CLASSICAL
Medieval and Renaissance
17th, 18th, and early 19th century
Modern: 1870-1980
Contemporary: 1980 to the present

Satisfactory Progress
Graduate students in Drama are expected to make consistent progress toward the completion of the Ph.D. degree. At the end of the first year, the departmental Graduate Studies Committee evaluates the work of each student in classes, seminars, examinations, and in performance work. Continuation in the program depends upon the recommendation of this faculty group. At the end of the second year, the committee reviews the student's work in consideration of advancement to candidacy. At the end...
of the third year, students are expected to have developed an approved dissertation prospectus in preparation for the University oral.

APPLICATION FOR CANDIDACY

By the end of the second year of residence, the following requirements or appropriate equivalents must be completed:
1. Performance and Critical Theory sequence (Drama 300, 301) and four seminars
2. The directing workshop series (Drama 370-374), including the successful production of two works in public performance
3. A foreign language
4. At least two examinations

Based on its evaluation of the student’s progress, the Graduate Studies Committee certifies the student’s qualifications for candidacy. Upon favorable action, the student files formal application for candidacy, as prescribed by the University, by the end of Summer Quarter of the second year.

DISSERTATION PROSPECTUS

The dissertation prospectus must be approved by the candidate’s adviser and by the departmental Graduate Studies Committee by the end of Spring Quarter of the third year.

UNIVERSITY ORAL EXAMINATION

The University oral examination, to be taken during the fourth year, is to demonstrate the candidate’s ability to conduct significant research in the general area of the dissertation. The examining committee consists of four faculty members, at least two of whom must be from the Department of Drama, as well as one faculty chair from outside the department. The University oral covers the area of the dissertation and is based on the prospectus and bibliography of the candidate.

DISSERTATION

Normally, the Ph.D. program is completed in four years. The first year should be devoted to full-time graduate study, the second and third years to graduate study and teaching, the fourth year to writing the dissertation. Following formal admission to candidacy (typically at the end of the second year), the dissertation must be completed and approved within five years from the quarter in which candidacy is granted. A candidate taking more than five years is required to restate candidacy by repassing the written examinations on dramatic literature.

APPLICATION AND FELLOWSHIPS

Applicants for the Ph.D. program may write directly to the Department of Drama for information and to Graduate Admissions, Registrar’s Office, Old Union, Stanford, CA 94305-3005, for an application. In addition to the required statement of purpose, all applicants must submit a statement detailing their practical theater experience and a sample of their written critical work. An interview, while not required, is recommended. Interviews are best scheduled after January 10 and before February 4. Graduate students in the Department of Drama begin study in the Autumn Quarter of each academic year; there are no mid-year admissions.

APPLICATION FOR CANDIDACY

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All graduate students must be degree candidates. All admissions materials must be submitted to the Department of Drama, Memorial Auditorium m144, 551 Serra Mall, Stanford, CA 94305-5010 by December 17, 1999. The Department of Drama awards a number of fellowships to students in the Ph.D. program.

FOR MORE INFORMATION

Write to the Department of Drama, Memorial Auditorium, m144, 551 Serra Mall, Stanford, CA 94305-5010 or telephone (650) 723-2576. The FAX number is (650) 723-0843. Email is et.jlf@forsythe.stanford.edu and the website is: http://www.stanford.edu/dept/drama/.

JOINT PH.D. IN DRAMA AND HUMANITIES

The Department of Drama participates in the Graduate Program in Humanities (GPH) leading to a joint Ph.D. degree in Drama and Humanities. For a description of that program, see the “Interdisciplinary Studies in Humanities” section of this bulletin.

BLACK PERFORMING ARTS DIVISION

The Committee on Black Performing Arts (CBPA) is an interdisciplinary program supporting the presence of Black art forms at Stanford. Started as a student project in 1968, the committee became an official University program in 1972. In 1997, the CBPA joined the Department of Drama as a division.

The CBPA functions as: (1) a liaison with departments in hiring faculty and devising courses in Black performing arts; (2) a presenter of professional performances in dance, drama and music, and film and symposia, framed by related academic study in anthropology, dance, drama, history, philosophy, and sociology; (3) a producer of student productions; and, (4) as a resource for student organizations promoting artistic expression in the Black cultural tradition. Through the cooperation of the departments, students are able to take relevant courses in dance, drama, literature, and music. While the offerings do not, at this time, constitute an academic minor, students are able to concentrate studies in Black performing arts as part of the A.B. major in African and African American Studies or Drama.

The CBPA publishes a journal, the Black Arts Quarterly (BAQ), three times a year. The BAQ is a forum for reflective explorations of Black performativity. It showcases original student work from campuses across the country and addresses the material impact of Black representation in the arts, in media, and popular culture.

The CBPA has developed a strong relationship with the city of East Palo Alto through the holding artist residencies in the community and via “Dreams of a City: The East Palo Alto Project.” The project incorporates commissioning plays, co-producing a video documentary and creating an archive about the community. The CBPA intends to continue its relationship with East Palo Alto in its future programming.

DANCE DIVISION

The Dance Division aims to develop a trained body, an aesthetic imagination, and an active engagement through the experience of movement. In this way, the program supplements the University’s emphasis on stimulating the whole range of “intelligences” outside the strictly verbal, including the bodily kinesthetic, spatial, musical, and personal.

Since its inception in 1920, dance at Stanford University has positioned itself responsively to the needs of a changing university and society. By offering a range of studio and lecture courses aimed at enhancing understanding of dance as a way to create and communicate meaning, the program enables students to make connections between dance and other disciplines.

UNDERGRADUATE PROGRAMS

Students who wish to major in Drama with a specialization in Dance should see the undergraduate adviser, Susan Cashion, in the Dance Division.

MINORS

For students wishing to minor in Dance, the following core requirements must be met and a program of study arranged in consultation with the minor adviser in Dance.
1. Three of the following courses in Theory/Advanced Theory: Dance 160, Dance, Gender and History; 161, Dance and Live Art in the 20th Century; 168, Dance and Culture in Latin America; 170, World Dance and Cultures; 242, The Work of Art and the Creation of Mind.
2. Dance 134, Stage Management Project.
4. Additional choreographic experience: Dance 154, Dance Composition, or creating a work for Dance 100, Performance Workshop; Dance 106, Vintage Dance Ensemble, or another acceptable venue.
5. Studio courses totaling a minimum of 12 units. There must be a concentration of at least three classes chosen from a single dance form.
with the other classes chosen from at least three other dance forms, and at least one class of dance performance (Dance 23, 27, 100, 105, 106, 150). A member of the dance faculty must confirm that the student has attained an appropriate level of proficiency in their areas of emphasis. The studio dance classes are from the series in: Modern Dance (Dance 40, 45, 140, 141, 165); Latin American Dance (Dance 42, 43, 56, 75); Jazz (Dance 44, 143, 144, 145); Social Dance (Dance 46, 47, 146, 147); Ballet (Dance 38, 48, 148, 149); and Acting (any class).

GRADUATE PROGRAMS

The A.M. degree in Education/Dance Specialization addresses the fundamental issues of how to nurture effective educational leadership. One major emphasis of the program is to develop strategies for revitalizing and refocusing teaching skills in response to changing societal needs. Values and ethics in education are examined through course work that focuses on artistic considerations of human development, the patterning of dance education in a cross-cultural perspective, and teaching practices. To apply for admission to graduate study, successful completion of undergraduate courses in dance at Stanford, a bachelor’s degree in dance from an accepted university or college, or proof of equivalent professional experience is required. For further information about the Dance Division of the Department of Drama, contact Janice Ross.

DANCE DIVISION

Registration for most dance classes takes place at the first class meeting; further registration information is printed in the Time Schedule each quarter. Some class sizes are limited and require advanced registration in the Dance office in Roble Gym. Series classes (I, II, III) should be taken in order or with consent of instructor. Selected dance courses may fulfill General Education Requirements (GERs).

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

DRAMA DIVISION

Registration for most drama classes takes place at the first class meeting; further registration information is printed in the Time Schedule each quarter. Some class sizes are limited and require advanced registration in the Department of Drama, room 144, Memorial Auditorium. INTRODUCTORY

3. Production Processes—Workshop, introducing the production process and preparation for creating a show. The role of the producer, from the hiring of the staff to the scheduling of a production, and that of the technical director.

1-2 units, Aut, Spr (Duxbury)

12N. Stanford Introductory Seminar: Antigone—From Ancient Democracy to Contemporary Dissent—Preference to freshmen. Sophocles’ tragedy as evidence of the tensions inherent in the democracy of ancient Athens, the myth as a paradigm for modern philosophical and ethical approaches to social change, and a look at modern dramatic versions (Brecht, Anouilh, Fugard, von Trotta) and essays (Hegel, Marx, Kierkegaard, Heidegger) that show how Antigone may be relevant to contemporary issues (the status of women, the struggle to save the environment, and resistance to illegitimate political authority). GER:3a, 4c (DR:7† or 8†)

4 units, Win (Rehm)

14N. Stanford Introductory Seminar: Contemporary German Drama from Brecht to Heiner Mueller—Preference to freshmen. Traces the movement from the modernist playwright Bertolt Brecht and the Berliner Ensemble to the postmodern theater of Heiner Mueller. GER:3a (DR:7)

4 units, Win (Weber)

15N. Stanford Introductory Seminar: The Shakespearean Era—Preferre to freshmen. The visual forms (architecture, painting, sculpture, and costume) that expressed the cultural style of the Shakespeare era. Dramatic texts, slides, and video. GER:3a (DR:7)

4 units, Aut (Eddelman)

17N. Stanford Introductory Seminar: (Re)Viewing Valdez in the Year 2000—Preference to freshmen. Reading, dramatic writing, and performance, examining (from Chicana feminist, indigenous, and cultural nationalist perspectives) the actos, mitos, full-length plays, films and philosophical thought developed by Luis Valdez, Founding Director of El Teatro Campesino, over a thirty-year period (1968-1998). GER:3a (DR:7)

3 units, Win (Moraga)

19N. Stanford Introductory Seminar: The Arts and Civic Dialogue—Preference to freshmen. Issues surrounding the position of the artist in society. GER:3a (DR:7)

4 units, Aut (Smith)

20. Acting: An Introduction—Theater games and physical exercises in concentration, attention, playing an objective, voice, movement, stage terminology, characterization, performing a monologue, and rehearsal techniques. Provides an experiential overview of actor training and prepares actors for advanced courses. Enrollment limited.

2 units, Aut, Win, Spr (Staff)


2 units, Aut (Mederos)

22. Scene Work—For actors who complete substantial scene work with graduate directors in the graduate workshop.

1-2 units, any quarter (Staff)

28. Make-up for the Stage—The basic techniques of make-up application for the artist and/or actor, which include aging, prosthetics, stylization, characterization, animals, and fantasy make-up.

2 units, Aut (Strayer)

29. Acting in Performance—Students cast in department productions receive credit for their participation as actors; 1-2 units for Graduate Directing Workshop projects and 1-3 units for major productions (units determined by instructor). May be repeated. Prerequisite: consent of instructor.

1-3 units, any quarter (Staff)

30. Introduction to Theatrical Design—Lecture/lab introducing the basic skills of visual communication used in stage productions. Design and construction methods for stage scenery, costumes, and lighting.

4 units, Win (Guirguis, Strayer)

31. Introduction to Lighting and Production—The technical and aesthetic aspects of lighting and the production process.

3 units, Win (Ramsaur)

32. Textiles—Introduction to fabric techniques and processes for stage costumes.

3 units, Win (Strayer)
33. Drafting for the Theater—Lecture/lab, introducing the basic mechanical drawing techniques utilized by scenic and lighting designers. The basic pencil techniques through orthographic and isometric drawing, culminating with the technique of drop point perspective.
   2 units, Win (Guirguis)

34. Stage Management Techniques—Survey lecture introducing the production process and the duties and responsibilities of a stage manager. Provides the skills needed to stage manage a production.
   2-3 units, Aut, Spr (Duxbury)

35. Sound Design for the Theater—Lecture/lab introducing the practical handling of sound equipment, acoustics, and editing. The analysis, creation, and implementation of theatrical sound effects, live and recorded.
   3 units, Win (Duxbury)

36. Scene Shop Tutorial—Lecture/lab introducing the practical handling of shop equipment used in theatrical production.
   1 unit, Win (Duxbury)

37. Costume Construction—Lecture/lab, introducing the basic skills of constructing costumes for the stage.
   2 units (Strayer) alternate years, given 2000-01

38. Scene Painting—Lecture/lab, introducing the basic skills of scene painting for the stage.
   2 units, Spr (Guirguis)

39A, B, C. Theater Performance: Crew—Participation in the design and technical areas of department productions. Students commit to a specific show and receive credit for preparation and construction as a member of “running crew” in a specific area.
   1-3 units, any quarter (Staff)

39A. Scenery and/or Property
39B. Lighting and/or Sound
39C. Costumes and/or Make-up

53. Greek Tragedy—(Enroll in Classics/Greek 12.)
   3-5 units, given 2000-01

65. American Musical Theater: Broadway/Hollywood—As a unique and indigenous art form, American musical theater represents an important facet of American culture. Focusing primarily on Hollywood film musicals, explores technology, ethnicity, gender, concepts of romance, stardom, and developments in dance and musical forms as they change within the genre. Slides, recordings, and films. GER:3a (DR:7)
   4 units, Aut (Eddelman)

INTERMEDIATE

Primarily for the major but open to all undergraduates who have the necessary prerequisites.

103. Improvising—The improvisational theater techniques that teach spontaneity, cooperation, team-building, and rapid problem solving, emphasizing common sense, attention to reality, and helping your partner. Based on TheatreSports™ by Keith Johnstone. Required readings, written papers, and attendance at performances of improvisational theater. Enrollment limited.
   3 units, Aut, Spr (Ryan)

113. Group Communication—Focuses on the interpersonal processes of communication as they relate to intergroup experience.
   4 units, Win, Spr (Schrader)

120A, B. Acting: The Fundamentals—For students who intend to begin serious actor training. First quarter emphasizes the understanding and utilization of the basic vocabulary of objective and action. Theater games and improvisation develop the actor’s ability to act with focus, intention, and energy. Introduction to the basics of characterization and transformation. Second quarter: the actor’s spontaneity and imagination are used to reveal the life of a play (working with dramatic texts). Approaches the actor’s craft range from character biography to moment-to-moment truthful playing. Exercises from Strasberg, Meisner, Chaiken, Linklater, and others. Scene and monologue work are drawn from primarily naturalistic plays. Outside rehearsal time required. Must be taken in sequence.

   120A. 3 units, Aut (Freed)
   Win (Ryan)

   120B. Prerequisite: 120A or consent of instructor.
   3 units, Win (Freed)
   Spr (Ryan)

121C. Acting: The Craft of Comedy—The basics of comedy playing from its origins in the utterly truthful to its destination in the over-the-top characterization, mask, and exaggeration; classwork on non-verbal scenes. The actor’s understanding of the mechanics of comedy, timing, and clowns are developed through improvisation and in-class exercises designed to free the imagination. Texts may include scenes from Feydeau, Woody Allen, Moss Hart, and Ayckbourne.
   4 units, Spr (Freed)

121K. Acting: Commedia dell’Arte—Mask and character work in the traditional style of the original slapstick comedy.
   4 units, Spr (Kairschner)

121M. Playing the Monologue—Students preparing for graduate or professional training can benefit from this solo work. Acting alone provides a special challenge for the performer. Monologues may be found within a play or may be used as audition material. The particular conventions which apply to this art form.
   3 units (Ryan) alternate years, given 2000-01

121P. Acting: Period and Style—Provides the actor with an approach to Classical, Expressionist, and historically unfamiliar texts. Acting beyond the “Method” emphasizes work on voice, language, and movement. Material is from Classical texts that have a strong formal “style” and from plays that have special demands based on theatrical time-period or genre. Scenes and monologues from Shakespeare, the Restoration, Molière, Feydeau, Chekhov, and Shaw.
   4 units (Freed) alternate years, given 2000-01

121R. Acting American Realism—Provides the actor with skills appropriate to the work of major American playwrights from Williams and Miller to Mamet and beyond.
   4 units, Win (Freed)

121S. Acting Shakespeare Project—Intensive work on a shortened Shakespeare play (Macbeth) selected by the ensemble, and leading to a studio performance project. Develops skills in understanding and performing Shakespeare, conducted as a series of rehearsals, and culminating in group performance. The development of the voice, movement, and speaking skills necessary for demanding classical theater work. Prequisite: 120A,B or consent of instructor.
   4 units, Aut (Freed)

121V. One Person Shows—Exercises in the creation of work by a solo performer.
   4 units, Win (Reese)

121W. Actors Who Write/Writers Who Act—The development of dramatic scripts for solo performance and multi-character plays. Work happens “on its feet,” with regular writing deadlines and through an informal workshop environment in which students engage actively in the presenting scripts, with support and feedback in dramaturgy and help with performance and staging issues where appropriate.
   4 units, Spr (Freed)
129A. Arcadia Workshop—A series of exercises culminating in a classroom presentation of Tom Stoppard’s play.
   2-3 units, Aut (Zack)

131. Lighting Design—Lecture/lab dealing with all of the practical and aesthetic aspects of lighting: electricity, light sources, color instrumentation, control, drafting, plotting, and the aesthetic principles of lighting design, interpretation, and concept. Prerequisites: 30, 31, or consent of instructor.
   3 units, Spr (Ramsaur)

132. Costume Design—A visual analysis of historical styles of costume design, interpreted for the modern theater and developed by the student in various presentational media. Prerequisite: 30 or consent of instructor.
   3 units, Aut (Guirguis)

133. Stage Scenery Design—Creations of increasing complexity involving text analysis, historical and artistic style, visual research, spatial organization, drafting, sketching, model building, and director-designer collaboration. Prerequisite: 30, or consent of instructor.
   3 units, Aut (Guirguis)

134. Stage Management Project—For students stage managing a Department of Drama production.
   1-5 units, any quarter (Duxbury)

135. Project in Theatrical Production—Assistant directing: stage, costume, lighting, and sound design; technical production, stage managing, or other work in connection with Department of Drama productions. Prerequisite: consent of instructor.
   1-5 units, any quarter (Staff)

156. Contemporary Ethnic Drama—Contemporary and earlier plays by playwrights of color (Asian-American, African-American, Latino-American) are analyzed to identify the diversity of cultural experience in American theater.
   4 units (Elam) alternate years, given 2000-01

   4 units, Win (Apostolidès)

158K. Women Playwrights and Feminist Performance Theory—Investigation of a range of women playwrights, confronting the issues raised within the plays and by the fact of their female authorship, situating these works within the broader contexts of various feminism(s).
   4 units, Win (Kuzminki)

158M. The Art of the Performer: A Century of Acting in Europe and America—The diversity of the actor’s craft from a historical perspective. What do we mean when we say “theatrical truth,” and how does that “truth” change when we change era and country? How have the shifting demands of dramaturgy, scenic design, directing, and evolving notions of “natural” behavior shaped and changed our ideas of performance over a century? What can historical styles and techniques teach the contemporary performer? Through film, video, audio, and written records, examines theater practice in terms of the major European and American movements in actor training and performance.
   4 units, Spr (Mease)

159A,B,C. Shakespeare—(Enroll in English 173A,B,C.)
   159A. 5 units, Aut (Orgel)
   159B. 5 units, Win (Parker)
   159C. 5 units, Spr (Rebholtz)

   4 units, Win (Rayner)

162. Performance and the Actor—How an actor’s performance serves as a sign for class, race, and gender in various historical moments. Theories of acting (Diderot, Brecht, Artaud, Meyerhold, Stanislavski), play texts, and contemporary performances are used to examine the cultural mapping of the body on stage. Emphasis is on works that present culturally significant images of women. Readings from plays by Benmussa, Brecht, Shakespeare, Kleist, Hansberry, Genet, Pones, Strindberg, Chekhov, Churchill, Kushner, Wertenbaker. GER:3a (DR:7) (WIM)
   4 units, Win (Rayner)

163. Performance and America—Key dramas by women, men, Asian-Americans, Latino-Americans, and African-Americans are examined as to the role of dramatic performance within contemporary American society, and as an affective and effective arena for inducing social change. GER:3a,4b (DR:3 or 7) (WIM)
   4 units, Aut (Elam)

164. 17th-Century French Theater—(Enroll in French and Italian 221.)
   3-5 units, Win (Apostolidès)

166. Performance, Space, and Technology—Theater history is analyzed through dramatic texts, slides, and videos to discover the ways in which performing styles, spatial evolutions, and technological advances express the cultural and social changes that are embedded in the theatrical event.
   4 units, Aut (Kuzminki)

167. Sour Grapes: Writing in Resistance—(Enroll in Spanish and Portuguese 282.)
   4-5 units, Spr (Moraga)

170A. Introduction to Directing—Prerequisite: consent of instructor.
   4 units, Aut (Mease)

170B. Advanced Directing—Prerequisite: 170A or consent of instructor.
   4 units, Win (Mease)

171. Undergraduate Theater Workshop—Undergraduate directors present one-act plays in workshop performances. Credit is available for actors and directors. Prerequisite: 170A/170B or consent of instructor.
   1-4 units, Spr (Mease, Ramsaur)

176. Undergraduate Dramaturgy Project—Serve as a dramaturg on any department production. Research the production’s text source, the writing of program notes, the compilation and editing of the playbill, and possible adapting/editing of the performance text or translating text from a foreign language.
   2 units, any quarter (Staff)

177. Playwriting: Writing for Performance—The Fundamentals—The autobiographical monologic/ poetic possibilities in Performance Art are explored to learn the elements of playwriting.
   5 units, Win (Moraga)

178. Intensive Playwriting—Opportunity to develop new material for the stage or complete a play-in-progress. Focus is on the most essential elements of playwriting, with an emphasis on the process of revision, and culminating in public readings of highlights of plays-in-progress. Prerequisite: prior experience in playwriting or consent of instructor.
   5 units (Moraga) alternate years, given 2000-01

179B. Teatro America Workshop: The Theater of Native/Chicano America—Traces the contributions of indigenous Americans to Native American theater.
American, Chicano, and Latin American popular, radical, and grassroots theater. Prerequisite: consent of instructor.

5 units, Spr (Moragga)

189Q. Stanford Introductory Seminar: Noam Chomsky—The Drama of Resistance—Preference to sophomores. Focuses on the ideas and work of Noam Chomsky, who challenged the reigning political and economic paradigms governing the U.S. the last 30 years. Chomsky's model for linguistics, Chomsky's work in the U.S., S.E. Asia, the Middle East, Central America, E. Timor, the media, "terrorism," ideology and culture, student/popular movements, and the role of resistance.

3 units, Spr (Rehm)

182Q. Stanford Introductory Seminar: Improvisation—The Jazz of Theater—Preference to sophomores. The new paradigm of improvisation as a "method" and as a developing art form. Readings on the theory of improvisation, compared and reinforced by attendance at performances of improvised theater in the Bay Area. Prerequisite: consent of instructor.

3 units (Ryan) alternate years, given 2000-01

189Q. Stanford Introductory Seminar: Mapping and Wrapping the Body—Preference to sophomores. Investigation into the concepts behind gender boundaries and clothing systems. Prerequisite: consent of instructor.

3 units, Spr (Eddelman)

190. Special Research—Individual project on the work of a playwright, period, or genre. Prerequisite: consent of instructor.

1-5 units, any quarter (Staff)

191. Independent Research—Individual supervision of off-campus internship. Prerequisite: consent of instructor.

1-18 units, any quarter (Staff)

ADVANCED COURSES

Courses numbered 200 through 299 are designed for advanced undergraduates and graduates.

200. Senior Project—See "Undergraduate Programs" for description.

2-9 units, any quarter (Staff)

203. Advanced Improvisation—By audition only, become members of the Stanford improvisers (SIMPS) group. Prerequisite: 103.

3 units, Win (Ryan)

210A.B. The Actor in Performance—Preference to Drama majors and minors. Sequence provides a wide range of techniques and vocal training for the serious student who may be interested in further training in the performing arts. Guest-teachers from the professional theater contribute to the student's practical work on Shakespeare and text, movement, characterization, and comedy. Limited enrollment. Prerequisite: interview with instructor.

5 units (Freed) alternate years, given 2000-01

213. Stanford Improv Ensemble—By audition only, for members of the improvisation troupe. Special project work. Prerequisite: 103. (AU)

1-2 units, any quarter (Ryan)

231. Advanced Lighting Design—Individually structured class in lighting mechanics and design through experimentation, discussions, and written reports. Prerequisite: 131 or consent of instructor.

1-5 units, any quarter (Staff)

232. Advanced Costume Design—Individually structured tutorial for costume designers. Prerequisite: 132 or consent of instructor.

1-5 units, any quarter (Staff)

233. Advanced Scenery Design—Fast-paced, individually structured workshop. Prerequisite: 133 or consent of instructor.

1-5 units, any quarter (Staff)

235. Project in Theatrical Production—See 135.

1-5 units, any quarter (Staff)

242. The Work of Art and the Creation of Mind—(Enroll in Education 200.)

4 units, Win (Eisner, Chagoya, Rehm, Ross, Sano)


4 units, Spr (Rehm)

262. Performance and the Actor—See 162.

4 units, Win (Rayner)

263. Performance and America—See 163.

4 units, Aut (Elam)

264. 17th-Century French Theater—(Enroll in French and Italian 221.)

3-5 units, Win (Apostolides)

266. Performance, Space, and Technology—See 166.

4 units, Aut (Kuzminski)

273. Shakespeare: "The Voice of a Whole Epoch"—(Enroll in English 273.)

4-5 units, Aut (Brooks)

290. Special Research—Individual project on the work of a playwright, period, or genre.

1-5 units, any quarter (Staff)

GRADUATE

For graduates; open to advanced undergraduates with consent of instructor.

300. Performance Theory—Seminar addresses the relationship between aesthetic theory and practical criticism by examining selected works of recent scholarship in 20th-century Athenian tragedy, Shakespeare, and Beckett that display the relative impact of poststructuralism, cultural materialism, postmodernist theory, feminism(s), or psychoanalytic aesthetic theory.

3-5 units, Aut (Rayner)

301. From Theory to Criticism—Theater, performance, and performativity as theoretical concepts for interdisciplinary trends in critical studies. Performance theory as an arena in which to investigate the paradoxes of "interdisciplinarity" itself, focusing on how theories derived from the interdisciplinary arts, the social sciences, and literary and rhetorical studies. The contexts for engaged conversation or heated controversy, depending upon disciplinary heritage. Theater and performance in light of contemporary concerns in cultural studies, focusing on shared topics and methods, and on theatrical innovations in modes of scholarly representation.

3-5 units, Win (Jackson)

302A. Staging Analysis: The Psychoanalytic Scene—Readings of psychoanalytic case studies (Freud, Lacan, Montrelay, etc.) and dramatic texts to focus on how theatrical elements inform the analytic field related to actor/audience relations, material and signifying objects, memory and narrative, and the historical exclusions of gender and race.

3-5 units, Win (Rayner)

303A. Race, Gender, and Identity in Modernism—Readings from Ibsen to the Harlem Renaissance.

3-5 units, Spr (Elam)
304D. Classical Seminar—Performing the Ancient City—(Enroll in Interdisciplinary Studies in Humanities 311.)
3-5 units, Aut (Rehm)

308B. Seminar: Topics in Theater History—Classical Greece to the Beginning of the 19th Century—The stylistic evolution of theaters and staging from the classical period to the early development of Romanticism. Emphasis is on the ways theaters and staging reflect their own cultural and spatial environments.
3-5 units (Eddelman) alternate years, given 2000-01

309B. Seminar: Topics in Theater History—1800 to the 1980s—Staging from the classical period to the early development of Romanticism, behind early Realism, Naturalism, Appia, Craig, the "isms," and scenography created by artists.
3-5 units, Spr (Eddelman)

20. Basic Approaches to Teaching Acting—Workshop on the pedagogy of acting to prepare graduate student teachers for introductory classes in acting.
1-3 units, Aut (Staff)

359A, B. Seminar: Shakespeare—Text and Performance—(Enroll in English 373A, B.)
4-5 units, Aut, Win (Orgel)

370-374. Graduate Directing Workshop—The core curriculum for graduate students in directing. Prerequisite: consent of instructor.
370. Concepts of Directing—The basic directorial definitions of time, space, movement, and the performer/spectator relationship. Experimentation with texts chosen from literary and other sources, including works from the realistic tradition in drama, using a multi-form performance space.
5 units, Aut (Weber)

371. Visual Aesthetics for Directors—Introduction to the concepts of stage, costume, and light design. Creative procedures, e.g., designing groundplans and elevations, building a model, sketching and swatching costumes, and practical work in the lighting lab.
3 units, Win (Eddelman, Ramsaur)

5 units, Win (Weber)

373. Directing and Dramaturgy—Discussion/application of dramaturgy, directorial methods, and visual concepts in plays from the Elizabethan tradition to postmodernist texts. Work on the text is tested in the staging of scenes.
3-5 units, Aut, Spr (Weber)

374. Graduate Directors' Performance Project—Production of a full-length play, selected in consultation with faculty. Project is designed by graduate students, sometimes in collaboration with undergraduate design students, under the supervision of design faculty. Four to five weeks rehearsal. Public performance.
3-5 units, any quarter (Ramsaur, Weber)

376. Graduate Directors' Dramaturgy Project—Serve as a dramaturg on any department production. Work includes research on the production's text source, the writing of program notes, and the compilation and editing of the playbill. Possible adapting/editing of the performance text, and translating text from a foreign language.
2 units, any quarter (Staff)

377. Graduate Directors' Staged Reading Project—Presentation of a new or newly adapted work for the stage, in a mode employed in professional theater for the development of new plays. Two to four rehearsals. Public performance.
2 units, any quarter (Staff)

390. Tutorial
1-9 units, any quarter (Staff)

391. Tutorial for the First Exam (Sit-Down)
1-2 units, any quarter (Staff)

392. Tutorial for the Second Exam (Essays)
1-4 units, any quarter (Staff)

393. Tutorial for the Third Exam (Oral)
1-2 units, any quarter (Staff)

399. Dissertation Research
1-9 units, any quarter (Staff)

BLACK PERFORMING ARTS DIVISION
Students are advised to consult the Time Schedule each quarter to note changes. See the Drama and the Dance Division of this bulletin for additional course listings and descriptions.

AFRICAN AND AFRO-AMERICAN STUDIES

105. Introduction to African and Afro-American Studies
5 units (Staff)

BLACK PERFORMING ARTS

1-2 units, Aut (Elam)

DANCE DIVISION
Registration for most dance classes takes place at the first class meeting; further registration information is printed in the Time Schedule each quarter. Some class sizes are limited and require advanced registration in the Dance office in Roble Gym.
Series classes (I, II, III) should be taken in order or with consent of instructor. Selected dance courses may fulfill General Education Requirements (GERs).

INTRODUCTORY
Open to all students. No previous dance experience needed.

38. Ballet Barre—Barre work, as the foundation for future work in classical ballet, grounding the beginning student in aspects of poise, precision, and placement.
1 unit, Aut (Ryan)

40. Modern Dance I—The technical and creative principles of modern dance, designed to develop the body as an articulate instrument.
1 unit, Aut, Win, Spr (Cashion)

42. Dances of Latin America—Selected dances of Latin America, specifically Argentina, Brazil, Chile, Cuba, Mexico, Peru, and Puerto Rico. (AU)
1 unit, Aut (Cashion)

43. Afro-Brazilian and Afro-Peruvian Dance—Brazilian dance forms of the Northeast: Samba, Maracatu, Maculele, Bloco Afro. Peruvian
dance of the coastal region: Festejo and Zamacueca.
1 unit, Aut (Cashion)

44. Jazz Dance I—Introduction to the basic techniques, with emphasis on current jazz style. Historical jazz steps are studied to enhance an understanding of contemporary jazz forms.
1 unit, Aut, Win, Spr (Kramer)

45. Improvisation plus Contact—The development of improvisation skills as a creative performance practice and as a basis for choreography; techniques of contact improvisation.
1 unit, Aut, Win, Spr (Kramer)

46. Social Dances of North America I—Introduction to the partner dances found in American popular culture: waltz, swing, tango, foxtrot, two-step, blues. Fee. (AU)
1 unit, Aut, Win, Spr (Powers)

48. Ballet I—Emphasis is on the fundamentals of classical technique: alignment, basic barre exercises, and movement sequences in the center and across the floor. (AU)
1 unit, Aut, Win (Ryan)

56. Argentine Tango—Emphasis is on leading/following and techniques of tango dancing. Styling, musicality, and other aspects of partnering. (AU)
1 unit, Spr (Staff)

75. Mexican Dance and Folklore—For the novice dancer. Three forms of Mexican dance: regional/folklorico, popular/social, and religious. Taught for technical and cultural understanding.
2 units, Win (Cashion)

INTERMEDIATE

Open to all undergraduates who have previous dance experience.

140. Modern Dance II—Intermediate technique. Introduction of improvisation and composition in directed studies.
1 unit, Aut, Spr (Kramer)

143. Afro-American Roots of American Concert Dance—Traditional African and Caribbean dance forms and their influences on American concert dance performers of the 20th century. Reading materials and lectures support a dance historical approach.
2 units, Win (Moses)

144. Jazz Dance II—Intermediate level, emphasizing alignment, control, rhythmic coordination, and the learning of movement combinations.
1 unit, Aut, Spr (Moses)

146. Social Dances of North America II—Accelerated survey of the partner dances found in American popular culture: waltz, swing, tango, foxtrot, two-step. Prerequisites: 46 or equivalent experience; must know basic waltz and swing.
1 unit, Aut, Win (Powers)

147. Living Traditions of Swing—In-depth instruction in many forms of swing dancing, from the early Lindy of the 1920s to 6- and 8-count Lindy shag, street swing, and hustle. A foundation of partnering and improvisation is supplemented with advanced variations.
1 unit, Spr (Powers)

148. Ballet II—Intermediate level. Continuation of 48, repeating the fundamentals with increased complexity and introducing additional movement vocabulary.
1 unit, Aut, Spr (Elliott, Ryan)

154. Dance Composition: The Practice of Making Dances—Students investigate movement material, compositional tools, and traditional and non-traditional methods of dance composition, leading to choreography. Structured as a participatory lab, class informs performance and compositional skills through an enhanced understanding of how dances are made.
3 units, Win (Frank)

165. Dance Heritage: History and Styles—Workshop/seminar on the origins of movement forms that have influenced Western contemporary dance, e.g., Duncan, Graham, Horton, Limon, Ailey, Cunningham. Specific approaches and techniques utilize cross-cultural and historical perspectives; studio work is amplified by lectures, films, and readings.
2 units, Win (Ross)

ADVANCED

Open to all undergraduates who have previous dance experience.

1 unit, Aut, Spr (Frank)

145. Jazz Dance III—Advanced level of technical proficiency. Focus on advancing the performance skills of projection and movement quality. Prerequisite: consent of instructor.
1 unit, Aut, Win, Spr (Moses)

149. Ballet III—Advanced level of classical ballet training.
1 unit, Win, Spr (Elliott)

PERFORMANCE

23. Public Performance—For students participating in movement oriented performance. (AU)
1 unit, Aut, Win, Spr (Kramer)

27. Faculty Choreography—Rehearsal and performance of faculty choreography. Selection by audition.
1 unit, Aut, Win, Spr (Staff)

100. Performance Workshop—Explores and develops composition and performance skills. Required for participation in certain faculty and/or student-directed productions.
1 unit, Win, Spr (Kramer, Frank)

105. Grupo Folklorico Los Decanos—Dance material of Latin America (e.g., Folk, Carnival) is arranged for performance with a variety of performing experiences off and on the Stanford campus. Prerequisite: previous dance experience in Latin American forms, or consent of instructor.
1 unit, Win, Spr (Cashion)

106. Stanford Vintage Dance Ensemble—Training and mastery of period ballroom dances, from the 19th century to the 1930s. Advanced social dance is taught in a rehearsal format in a variety of performance experiences, including Viennese and Ragtime Balls.
1 unit, Aut, Win, Spr (Powers)

134. Stage Management Project—For students stage managing a Dance Division production.
1-5 units, any quarter (Kramer)

150A.B.C. Ballet Repertory—Designed for students with at least one year of ballet. Learn, rehearse, and perform choreography from the classical and contemporary repertoire. Participants must enroll in all three quarters of sequence. Corequisite: 148 or 149.
1 unit, Win, Spr (Elliott)

THEORY

Classroom or classroom/studio combination courses on topics in Dance and Performance.
158. The Body in Motion—Approaches and methods in body therapy: body maintenance and conditioning, the Laban movement system, body-mind centering
3 units (Staff) alternate years, not given 2000-01

160. Dance, Gender, and History—Historical lecture/survey of Western theatrical dance, examining changing notions of gender construction and the body in dance over the last 200 years. Ballet and modern dance are looked at in the context of social and political events as and artistic developments and ideologies. GER:4c (DR:‡)
3-4 units, Win (Ross)

3-4 units, Spr (Ross)

168. Dance and Culture in Latin America—(Same as Cultural and Social Anthropology 72.) Selected dance forms of Latin America are viewed as aspects of human behavior. Emphasis is on the cultural influences (European, African, and indigenous) which have shaped the ritual and social dance forms of Argentina, Brazil, Chile, Cuba, Mexico, and Puerto Rico.
3-4 units, Spr (Cashion)

169. Methodologies for Creation, Staging, and Reconstruction—Develops the skills and criteria for the choreographic process in dance. The work of invention, staging, and reconstruction in dance. Students are led through the creative process and practical considerations in making a dance work.
3 units, Aut (Kramer, Moses)

170. Dance and World Cultures—Dance as the embodiment of cultural identities. Emphasis is on issues of cultural representation, transmission, socialization, and education through dance in a variety of world cultures. Comparative cultural examination of identity formation in dance from ritual to theatrical forms, in historical to contemporary settings.
3 units, Aut (Cashion, Ross)

190. Special Research—In-depth study of topics related to the discipline of dance.
1-5 units, any quarter (Staff)

191. Independent Research—Individual supervision of off-campus internship. Prerequisite: consent of instructor.
1-18 units, any quarter (Staff)

197. Art and Community Learning through Service in Dance—Participatory seminar allows students to research the nexus of art and community, using the specific medium of dance to study how art affects self-perception and social development in female and male juvenile populations at risk. Students participate in service through the arts by developing a relationship to a specific population, by reading and reflecting on existing literature, and by hearing testimony from experts in the field.
4 units, Spr (Ross)

ADVANCED THEORY

Courses numbered 200 through 299 are designed for advanced undergraduates and graduates in the A.M. program.

241. Masters' Seminar: Issues in Dance Education—Required of first-year A.M. students in Dance Education. Introduction to the current issues and research concerning dance in education. Readings/discussions focus on the challenges to the field of dance in academic and artistic institutions.
1-2 units Aut (Ross)

242. The Work of Art and the Creation of Mind—(Enroll in Education 200.)
3-4 units, Win (Eisner, Chagoya, Rehm, Ross, Sano)

246. Dance Teaching Internship—The methodologies of teaching dance and using music resources within a variety of classroom situations. Instruction and guided practice in the preparation of lesson plans, developing sequence and progression in a class setting, and using accompaniment.
1-3 units, Win (Frank)

248. Graduate Design Project—Three part, individually designed creative project required for completion of the A.M. Degree in Dance Education.
5 units (Ross, Frank, Kramer)

290. Special Research—Individual project on the work of any choreographer, period, genre, or dance-related topic.
1-5 units, any quarter (Staff)

EAST ASIAN STUDIES

Director: Jean Oi

Affiliated Faculty:
Art and Art History: John D. La Plante (emeritus), Michael Sullivan (emeritus), Sarah Fraser, Melinda Takeuchi, Richard Vinograd (on leave 1999-2000)
Comparative Literature: David Palumbo-Liu
Cultural and Social Anthropology: Harumi Befu (emeritus), Miyako Inoue, Matthew Kohrman
Economics: Masahiko Aoki, John J. Gurley (emeritus), Lawrence Lau
Education: Thomas Rohlen
History: Gordon Chang, Peter Duus, Harold L. Kahn (emeritus), Jeffrey Mass, Ellen Neskar, Roger Thompson, Lyman P. Van Slyke (emeritus)
Law: Stanley Lubman (Consulting)
Linguistics: Peter Sells
Philosophy: David S. Nivison (emeritus)
Political Science: Jennifer Amyx, John W. Lewis (emeritus), Daniel Okimoto (on leave 1999-2000), Michel Oksenberg, Jean Oi, Kurt Scitler (emeritus), Robert E. Ward (emeritus)
Religious Studies: Carl Bielefeldt, Angelika Czodzich, Bernard Fuare, Lee H. Yearley
Sociology: Andrew Walder

In addition, a number of other Stanford faculty have some teaching or research interests related to East Asia: Takeshi Amemiya (Economics), Barton Bernstein (History), Henri-Claude de Bettignies (Business), Walter P. Falcon (Institute for International Studies), William B. Gould (Law), Tetsuya Kataoka (Hoover Institution), Thomas Metzger (Hoover Institution), David Montgomery (Business), Ramon Myers (Hoover Institution), Leonard Ortolano (Urban Studies), Mark Peattie (Hoover Institution) Sylvia Yanagisako (Cultural and Social Anthropology), Pan A. Yotopoulos (Food Research)

The Center for East Asian Studies (CEAS) coordinates all University instructional, research, and special activities related to China, Japan, and Korea. Faculty and students who share a common interest in the study
of East Asia are brought together by the center from a broad range of academic concerns covering nearly every discipline and historical period. In addition to supporting a wide variety of academic and extra-curricular activities on the Stanford campus, the center is also involved in programs that link the University’s resources on East Asia with civic groups, secondary schools, and local colleges in the San Francisco Bay area. As a National Resource Center designated by the Department of Education, Title VI, CEAS sponsors programs that provide opportunities for East Asian Studies faculty and students to meet and work with one another.

Further information may be obtained from the Center for East Asian Studies, Building 50, Stanford University, Stanford, California 94305-2034; telephone 650-723-3362, 723-3363.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The undergraduate major in East Asian Studies enables students to obtain a comprehensive understanding of East Asia broadly conceived, that is the vast area stretching from Japan through Korea and China to the contiguous areas of the Central Asian landmass. Majors in East Asian Studies begin or continue the mastery of Chinese, Japanese, or Korean. Within the humanities or social sciences, they focus on a particular subregion, for example, Japan, south China, Hong Kong and Taiwan; or western China and Central Asia, or a substantive issue involving the region as a whole, such as environment, public health, rural development, historiography, cultural expression, Buddhism’s impact on East Asian cultures, or traditional Japanese civilization. The major seeks to reduce the complexity of a region to intellectually manageable proportions and illuminate the interrelationships among the various facets of a society.

Potential majors must submit a Student Proposal for a Major in East Asian Studies not later than the end of the first quarter of the junior year for approval by the East Asian Studies Subcommittee on the Bachelor of Arts program.

Majors must complete at least 75 units of course work on China, Japan, and/or Korea. Courses to be credited toward major requirements must be completed with a grade of ‘C’ or better. Specific requirements are:

1. **Language**: proficiency in Chinese, Japanese, or Korean language at the second-year level or above, to be met either by course work or examination. Students who meet the requirement through examination are still expected to take an additional 15 units of language at a higher level or literature courses taught in the language, or first year in an additional Asian language.

2. A minimum of two of the three gateway courses, or one gateway course plus Asian Languages 91 (East Asian Civilization: China) or 92 (East Asian Civilization: Japan). The gateway courses are “The Roots of Modern East Asia” offered in Autumn Quarter, East Asia in the Age of Imperialism offered in Winter Quarter, and Contemporary East Asia, offered in Spring Quarter.

3. **History**: completion of at least two courses from one of the following course sequences:

   - History 192A, 192B, 192C (Chinese History)
   - History 194A, 194B, 194C, 194D (Japanese History)

4. **Substantive Concentration**: additional courses on East Asia, one of which must be a seminar.

5. **Capstone Essay**: completion of a paper of approximately 7,500 words, written either in a directed reading course or for one of the courses in item 4 above, which optimally would be built upon the student's thematic interest. A one-credit Spring Quarter course is required for all majors, in which they share their senior theses.

Majors are encouraged to distribute their course work among at least three disciplines and two subregions in Asia. (The subregions need not be traditionally defined. Examples include China, Japan, or Korea; or, in recognition of the new subregions which are emerging, South China, Hong Kong, and Vietnam; or Central Asia, Xinjiang, and Mongolia.) At least four courses must have a thematic coherence built around a topic such as:

Buddhism’s impact on East Asian cultures
Culture and society of modern Japan
Economic development in South China NETS (Natural Economic Territories)
Environmental issues of Asia
Fine arts and literature in late imperial China
Political economy of postwar Japan
Social transformation of modern China
Traditional Japanese civilization

An East Asian Studies course that satisfies the University Writing in the Major requirement (WIM) should be completed before beginning the senior essay. This year, Asian Languages 133 and 138 and Art and Art History 2 satisfy the WIM requirement, as do Department of History courses at the 100 and 200 level.

The courses for the major must add up to at least 75 units and all must be taken for a letter grade.

MINORS

The goal of the minor in East Asian Studies is to provide the student with a broad background in East Asian culture as a whole, while allowing the student to focus on a geographical or temporal aspect of East Asia. The minor may be designed from the following, for a total of six courses. All courses should be taken for a letter grade.

1. Two quarters of the gateway courses, The Roots of Modern East Asia, East Asia in the Age of Imperialism, and Contemporary East Asia. One of the following may substitute for one quarter of the gateway courses:
   - Asian Languages 91, Traditional East Asian Civilization: China
   - Asian Languages 92, Traditional East Asian Civilization: Japan
   - Political Science 125, The Rise of Industrial Asia

2. A course in the History sequences 192 (China) or 194 (Japan)

3. One undergraduate seminar and two other courses from among those listed each quarter as approved for East Asian Studies majors, including literature courses but excluding language courses.

Applications for the minor are due no later than the second quarter of the junior year.

HONORS PROGRAM

Majors with a grade point average (GPA) of 3.25 or better in all courses related to East Asia may apply for the honors program no later than the final quarter of the junior year. Application entails submitting an honors prospectus to the student’s adviser for approval. Admission is granted by the subcommittee on the A.B. program, acting on the adviser’s recommendation.

Honors requirements are satisfactory completion of: (1) an honors thesis of high quality of approximately 10,000 words to be submitted in lieu of the senior essay otherwise required for the major, (2) 5 to 10 units of directed individual study in connection with the thesis project, and (3) one advanced level colloquium or seminar dealing with China, Japan, or both.

COTERMINAL DEGREE

The center admits a limited number of Stanford undergraduates to work for a coterminal A.M. degree in East Asian Studies. While the coterminal degree program permits admission to a graduate program at early as the eighth quarter and no later than the end of the eleventh quarter of undergraduate study at Stanford, the center accepts A.M. applications only once a year. Therefore, applications must be submitted by January 1. Applicants are expected to meet the same general standards as those seeking admission to the A.M. program: they must submit a written statement of purpose; a Stanford transcript; three letters of recommendation, at least two of which should be from members of the department of concentration; and scores from the General Test of the Graduate Record Exam. In addition, applicants must provide a list of courses they intend to take to fulfill degree requirements. The decision on admission rests with the A.M. Admissions Committee of the Center for East Asian Studies. Students must meet all requirements for both A.B. and
A.M. degrees. They must complete a total of 15 full-time quarters (or the equivalent), or three full quarters after completing 180 units for a total of 217 units.

**EAST ASIAN STUDIES (PAYSON J. TREAT) THEME HOUSE**

EAST House, on campus at Governor's Corner, is an undergraduate residence that houses 60 students and offers them a wide variety of opportunities to expand their knowledge, understanding, and appreciation of Asia. A member of the East Asian Studies faculty serves as resident fellow of EAST House. Assignment is made through the regular undergraduate housing draw.

**KYOTO CENTER FOR JAPANESE STUDIES**

Students interested in the study of Japanese language, history, culture, and social organization can apply to the Kyoto Center for Japanese Studies, a September-to-April program managed by Stanford that includes students from eight other American universities. Every Spring Quarter, the Stanford Center in Technology and Innovation, also at the Kyoto Center, offers an academic quarter focused on Japanese organizations and the political economy of research, development, and production of high technology and advanced industries. An internship in a Japanese firm, laboratory, or agency follows the training program. For information about Kyoto, contact the Overseas Studies office at Sweet Hall, telephone 650-723-3358.

**GRADUATE PROGRAMS**

**MASTER OF ARTS**

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The A.M. program in East Asian Studies is designed both for students who plan to complete a Ph.D., but who have not yet decided on the particular discipline in which they prefer to work, and for students who wish to gain a strong background in East Asian Studies in connection with a career in nonacademic fields such as business, law, education, journalism, or government service. However, career-oriented students should realize that a master's degree in East Asian Studies alone may often provide insufficient preparation for work in many professions, and they are advised to plan for additional professional training.

The master's degree program allows a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. The director of the center assigns faculty advisers to all students. Members of the staff and faculty are available for academic and career planning. The A.M. program is normally completed in two academic years, but students can shorten this time by receiving credit for prior language work or by attending summer sessions. Students are urged to complete the degree requirements within one year if their background makes it possible.

Applicants must submit scores for the General Test of the Graduate Record Examination. Foreign applicants are also required to take the Test of English as a Foreign Language. Applications for admission and financial aid may be obtained by writing to Graduate Admissions, Old Union, Stanford University, Stanford, California 94305-3005. The deadline for completed applications for admission and financial aid is January 1.

The basic requirements for the A.M. degree in East Asian Studies are as follows:

**Language Requirement**—Students must complete the equivalent of Stanford's first three years of language training in either Chinese, Japanese, or Korean. Students entering the program without any language preparation should complete first- and second-year Chinese, Japanese, or Korean within the first year of residence at Stanford. This will necessitate completing a summer language program. Language courses taken at Stanford must be for letter grades.

The language requirement may be satisfied in part or in full by placing into an appropriate Stanford language class through the language proficiency exam given by the Department of Asian Languages. Students who fulfill this minimum three-year language requirement before completing other requirements are encouraged to continue language study, or take courses in which Chinese or Japanese are used, for as long as they are in the program. Language courses beyond the third-year level may be applied to the Area Studies requirement discussed below.

Students in the A.M. program are eligible to apply for the Inter-University Language programs in Taipei, Beijing, and Yokohama. For further information, see the "Institute for International Studies" section of this bulletin. Work completed in one of these programs may be counted toward the A.M. degree's language requirement. Students may petition to have advanced work counted for a maximum of three out of the nine area studies courses required for the degree.

**Area Studies Requirement**—Students must complete the 1-unit core course, East Asian Studies 330, and an additional nine courses numbered 100 or above related to East Asia. A total of 37 units beyond the courses used to fulfill the third-year level language requirement is required for the degree. (Chinese and Japanese language courses numbered 100-199 are considered to be at the third-year level and do not count toward the courses required for the degree.) The nine courses must be 3 or more units and be taken for a letter grade. At least 18 units must be designated primarily for graduate students (typically at the 200 level).

An integral part of the program is training in research and a demonstration of research ability in a discipline. Three courses, one of which must be a seminar, colloquium, or advanced course in which a research paper on China or Japan is written, must be within a single department. A master's paper, representing a substantial piece of research, should be filed with the center's program office as part of the graduation requirements. With the adviser's approval, the master's paper requirement may be satisfied by using a research paper written for an advanced course. The six additional area courses may be taken in departments of the student's choosing. Some theory-oriented or methodological courses may be used to meet part of these requirements provided they are demonstrably useful for understanding East Asian problems. Except in unusual circumstances, credit toward the Area Studies requirement is not given for courses taken before entering the A.M. program. Students in this program may, however, take courses for exchange credit at the University of California, Berkeley with the approval of their adviser and the Office of the Registrar. In any case, Stanford University requires the payment of three full quarters of tuition for a University degree to be granted.

**DUAL DEGREE PROGRAMS**

**EAST ASIAN STUDIES AND LAW**

This joint program grants an A.M. degree in East Asian Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to East Asian legal affairs. Students must apply separately to the East Asian Studies A.M. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in Chinese or Japanese.

**EAST ASIAN STUDIES AND EDUCATION**

This joint program grants an A.M. degree in East Asian Studies and a secondary school teaching credential in social studies. To be eligible for this program, students should apply to the A.M. program in East Asian Studies and then apply to the Stanford Teacher Education Program during the first year at Stanford. Completing the joint program requires at least two years, including one summer session when beginning the education component of the program.

**EAST ASIAN STUDIES AND BUSINESS**

This joint program grants an A.M. degree in East Asian Studies and a Master of Business Administration. Students must apply separately to the East Asian Studies A.M. program and the Graduate School of Business and be accepted by both. Completing this combined course of study requires approximately three academic years (perhaps including summer sessions), depending on the student's background and level of training in Chinese or Japanese language.
EAST ASIAN STUDIES AND HEALTH SERVICES RESEARCH

The M.S. degree in Health Services Research (HSR) is an interdisciplinary program training students in research and analytic skills for careers in the growing health industry as innovative health planners, system analysts, and policy-makers. Students concluding the first year of graduate study at Stanford are eligible to apply for the degree, which is granted by the Department of Health Research and Policy in the School of Medicine. The degree may be pursued concurrently with the second and subsequent years of graduate study and is awarded on completion of 45 units of course work. This work is to be split approximately equally between research workshops and formal courses relevant to the health sector. Each student’s program is planned to meet individual interests in health services in addition to fulfilling HSR core requirements. For more information, apply to the Program Administrator, Division of Health Services Research, Health Research and Policy Building, Stanford, CA 94305.

DOCTORAL PROGRAMS

Stanford does not offer a Ph.D. in East Asian Studies. However, there are more than 100 doctoral students with a specialization on China or Japan within various departments and schools of the University. The departments that offer an East Asian concentration are: Anthropological Sciences, Art and Art History, Asian Languages, Comparative Literature, Cultural and Social Anthropology, Economics, History, Linguistics, Philosophy, Political Science, Religious Studies, and Sociology. It is also possible to specialize in East Asia within some of the doctoral programs of the professional schools of Business, Education, and Law. Inquiries should be directed to the individual department or school concerned.

FINANCIAL AID

Students in A.M. or Ph.D. programs who plan to do work in Chinese or Japanese language, or language-related area courses, may be eligible for Foreign Language and Area Studies (FLAS) fellowships and are encouraged to apply for them at the time of application to Stanford. Recipients of FLAS fellowships must be American citizens or permanent residents. For further information, contact FLAS Grant Administrator, Building 50, Stanford, California 94305-2034.

COURSES

The courses listed below deal primarily with China, Japan, and/or Korea. Many other theoretical and methodological courses within the various departments at Stanford are taught by faculty who are East Asian specialists; these courses often have a substantial East Asian component and may be found under the department listings in this bulletin.

GATEWAY COURSES FOR UNDERGRADUATES

92A. The Roots of Modern East Asia—China, Korea, and Japan in Early Modern Times—(Enroll in History 92A.)
5 units, Aut (Kahn)

92B. East Asia in the Age of Imperialism—(Enroll in Political Science 28, History 92B.)
5 units, Win (Okseberg, Duus)

92C. Contemporary East Asia—(Enroll in Political Science 29.)
5 units, Spr (Okseberg)

ADVANCED COURSES

198. Senior Colloquium in East Asian Studies
1 unit, Spr (Oi)

330. Graduate Core Seminar: Issues and Approaches in East Asian Studies
1 unit, Aut (Staff)

AFFILIATED DEPARTMENT OFFERINGS

ANTHROPOLOGICAL SCIENCES

7. Marriage and Kinship
5 units (Wolf) not given 1999-2000

24N. Stanford Introductory Seminar: Chinese Women and Girls
3 units (Gates) not given 1999-2000

125B. Late Imperial China
5 units, Aut (Chau)

220. China for Social Analysts
5 units (Gates) not given 1999-2000

ART AND ART HISTORY

2. Ideas and Forms in Asian Art—(WIM)
5 units, Win (Takeuchi)

12. Theme and Style in Japanese Art
4 units (Takeuchi) not given 1999-2000

13. Introduction to Chinese Art
4 units (Vinograd) not given 1999-2000

126A/226A. Introduction to the Study of Chinese Painting
4 units (Vinograd) not given 1999-2000

126B/226B. Early Chinese Pictorial Art
4 units (Vinograd) not given 1999-2000

126C/226C. Artists and Systems in Later Chinese Painting
4 units (Vinograd) not given 1999-2000

126E/226E. Across Cultures: Encounters of Eastern and Western Art
4 units (Vinograd) not given 1999-2000

129/229. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868
4 units (Takeuchi) not given 1999-2000

129A/229A. Painting in Late Medieval and Early Modern Japan, 1500-1868
4 units (Takeuchi) not given 1999-2000

228A. Seminar: Pictorial Art and Cultural Spaces in Late Ming China
4 units (Vinograd) not given 1999-2000

229C. Seminar: Nostalgia in Japanese Art—Revivals, Reformations, Representations
4 units (Takeuchi) not given 1999-2000

229D. Seminar: Japanese Discourse on Painting and Its Chinese Antecedents
4 units, Spr (Takeuchi)

229E. Colloquium: “Pictures of the Floating World”—Images from Japanese Popular Culture
4 units (Takeuchi) not given 1999-2000

229G. Colloquium: The Arts of Zen Buddhism
4 units, Aut (Takeuchi)

ASIAN LANGUAGES

51/151. Japanese Business Culture
3 units (Staff) not given 1999-2000
11N. Stanford Introductory Seminar: Language and Gender in Japan—Myths and Reality
3 units, Spr (Matsumoto)

73/173. Chinese Language, Culture, and Society
4 units, Win (Sun)

74. Women and Children in the May Fourth Literary Imagination
5 units, Spr (Abraham)

75/175. Contemporary Japanese Cinema
4 units, Spr (Suttmeier)

81N. Writing and Writing Systems
3 units, Spr (Hare)

91. Traditional East Asian Civilization: China
5 units, Aut (Egan)

92. Traditional East Asian Civilization: Japan
5 units, Win (Hare)

95. The Japanese Language in Culture and Society
4 units (Matsumoto) not given 1999-2000

114. Haiku
3 units (Staff) not given 1999-2000

121/221. The Chinese Cultural Revolution: History, Ideology, and Texts
4 units, Win (Shao)

131/231. Chinese Poetry in Translation
4 units, Aut (Egan)

132/232. Chinese Fiction and Drama in Translation
4 units, Win (J. Wang)

133/233. Modern and Contemporary Chinese Literature in Translation—(WIM)
4 units, Spr (Lyell)

133A/233A. Introduction to Modern Chinese Literature
4 units, Spr (Sang)

135. Classic Japanese Drama
4 units (Hare) not given 1999-2000

137/237. Classical Japanese Fiction in Translation
4 units, Aut (Wallace)

138/238. Modern Japanese Literature in Translation
4 units, Win (A. Ueda)

141. Chinese Mythology and Lyrical Imagination
4 units (Liu) not given 1999-2000

181. Japanese Women Writers
4 units (Staff) not given 1999-2000

187/287. Romance, Desire, and Sexuality in Modern Japanese Literature
4 units (Reichert) not given 1999-2000

CHINESE

Students registering for the first time in a first- or second-year course
must take a placement test if they have had any training in Chinese
before entering Stanford. Sign up for a section in the department office
before the quarter begins.
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</tr>
<tr>
<td>286</td>
<td>Women Writers of Transnational China</td>
<td>4</td>
<td>Spr (Sang)</td>
</tr>
<tr>
<td>334</td>
<td>Seminar in Modern Chinese Literature</td>
<td>5</td>
<td>Lyell (not given 1999-2000)</td>
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<tr>
<td>368</td>
<td>Dream of the Red Chamber: The Novel and its Readers</td>
<td>4</td>
<td>Saussy (not given 1999-2000)</td>
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<tr>
<td>373</td>
<td>Seminar on the Tso-Chuan</td>
<td>5</td>
<td>Spr (J. Wang)</td>
</tr>
<tr>
<td>400</td>
<td>Advanced Language Training</td>
<td>1-15</td>
<td>units per quarter (Staff)</td>
</tr>
</tbody>
</table>

**First-Year Japanese**

Students registering for the first time in a first- or second-year course must take a placement test if they have had any training in Japanese before entering Stanford. Sign up for section in department office before the quarter begins.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,3</td>
<td>First-Year Modern Japanese</td>
<td>5</td>
<td>Aut, Win, Spr (Busbin)</td>
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<tr>
<td>5</td>
<td>Intensive First-Year Modern Japanese</td>
<td>12</td>
<td>Sum (Staff)</td>
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<tr>
<td>7B/107B, 8B/108B, 9B/109B</td>
<td>First-Year Japanese Language, Culture, and Communication B</td>
<td>5</td>
<td>Aut, Win, Spr (Okano)</td>
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**Second-Year Japanese**

<table>
<thead>
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<tbody>
<tr>
<td>17B/117B, 18B/118B, 19B/119B</td>
<td>Second-Year Japanese Language, Culture, and Communication B</td>
<td>5</td>
<td>Aut, Win, Spr (Kubo)</td>
</tr>
<tr>
<td>21,22,23</td>
<td>Second-Year Modern Japanese</td>
<td>5</td>
<td>Aut, Win, Spr (Arao, Nebrig)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Win, Spr (Arao)</td>
</tr>
<tr>
<td>25</td>
<td>Intensive Second-Year Modern Japanese</td>
<td>12</td>
<td>Sum (Staff)</td>
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<tr>
<td>27,28,29</td>
<td>Intermediate Japanese Conversation</td>
<td>2</td>
<td>Aut (Gibeau)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Win, Spr (Kikunaga)</td>
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**Third Year/Advanced Japanese**

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<tbody>
<tr>
<td>101,102,103</td>
<td>Third-Year Modern Japanese</td>
<td>5</td>
<td>Aut, Win, Spr (Arao)</td>
</tr>
<tr>
<td>111,112,113</td>
<td>Business Japanese</td>
<td>3</td>
<td>Aut, Win, Spr (Fukuma)</td>
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<tr>
<td>114</td>
<td>Japanese for Business</td>
<td>3</td>
<td>Sum (Staff)</td>
</tr>
<tr>
<td>121,122,123</td>
<td>Advanced Japanese Conversation</td>
<td>2</td>
<td>Aut, Win, Spr (Kubo)</td>
</tr>
<tr>
<td>127B,128B,129B</td>
<td>Third-Year Japanese Language, Culture, and Communication B</td>
<td>5</td>
<td>Aut, Win, Spr (Okano)</td>
</tr>
<tr>
<td>177/277</td>
<td>The Structure of Japanese</td>
<td>4</td>
<td>Matsumoto (not given 1999-2000)</td>
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<tr>
<td></td>
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<td>JAPANESE/GRADUATE</td>
</tr>
<tr>
<td>200</td>
<td>Directed Reading in Japanese</td>
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<td>units by arrangement, Aut, Win, Spr (Staff)</td>
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</table>
201. Proseminar  
5 units, Win (Wallace)

208. Teaching Asian Languages  
2 units, Win (Matsumoto)

211,212,213. Advanced Modern Japanese  
211. 3-5 units, Aut (Matsumoto)  
212. 3-5 units, Win (Kubo)  
213. 3-5 units, Spr (Kubo)

246. Introduction to Classical Japanese  
5 units, Aut (Wallace)

247,248. Readings in Classical Japanese  
247. 5 units, Win (Wallace)  
248. 5 units, Spr (A. Ueda)

258. Japanese Buddhist Texts—(Same as Religious Studies 258.)  
5 units, Spr (Bielefeldt)

260. Japanese Poetry and Poetics  
4 units (Hare) not given 1999-2000

280. Medieval Japanese Narrative  
4 units (Staff) not given 1999-2000

281. Japanese Pragmatics  
4 units, Win (Matsumoto)

296. Readings in Modern Japanese Literature  
4 units, Spr (A. Ueda)

298. Translation Workshop  
4 units (Matisoff) not given 1999-2000

330. Seminar in Heian Fiction  
5 units (Hare) not given 1999-2000

333. Seminar in Japanese Classical Drama  
5 units, Win (Hare)

335. Seminar: Writing in Early Japan  
5 units (Hare) not given 1999-2000

396. Seminar in Modern Japanese Literature  
5 units, Aut (A. Ueda)

400. Advanced Language Training  
1-15 units per quarter (Staff)

KOREAN  
1,2,3. First-Year Modern Korean  
5 units, Aut, Win, Spr (Cho)

21,22,23. Second-Year Modern Korean  
5 units, Aut, Win, Spr (Cho)

101,102,103. Third-Year Modern Korean  
1-3 units, Aut, Win, Spr (Cho)

171/271. The Structure of Korean  
4 units, Spr (Cho)

200. Directed Reading in Korean  
units by arrangement, Aut, Win, Spr (Cho)

208. Teaching Asian Languages  
2 units, Win (Cho)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>192A</td>
<td>Chinese History to the 14th Century</td>
<td>Win</td>
<td>5</td>
<td>Neskar</td>
</tr>
<tr>
<td>192B</td>
<td>Chinese History from the Mongols to Early Modern Times</td>
<td>Kahn</td>
<td>5</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td>192C</td>
<td>Modern and Contemporary Chinese History</td>
<td>Spr</td>
<td>5</td>
<td>(R. Thompson)</td>
</tr>
<tr>
<td>194A</td>
<td>Japan from Earliest Times to 1560</td>
<td>Mass</td>
<td>5</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td>194B</td>
<td>Late Medieval and Early Modern Japan</td>
<td>Staff</td>
<td>5</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td>194C</td>
<td>19th-Century Japan</td>
<td>Staff</td>
<td>5</td>
<td>not given 1999-2000</td>
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<tr>
<td>194D</td>
<td>The Rise of Modern Japan</td>
<td>Duus</td>
<td>5</td>
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</tr>
<tr>
<td>290A</td>
<td>Undergraduate Colloquium: History of Chinese Overseas</td>
<td>Hsu</td>
<td>5</td>
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</tr>
<tr>
<td>294B</td>
<td>Undergraduate Colloquium: Late Medieval and Early Modern Japan</td>
<td>Duus</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>295B</td>
<td>Creating Modern China: From Empire to Nation in the Age of Imperialism</td>
<td>Mass</td>
<td>5</td>
<td>(R. Thompson)</td>
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<tr>
<td>296</td>
<td>Undergraduate Colloquium: Ordinary Lives—The Social History of Early Modern China</td>
<td>Kahn</td>
<td>5</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td>298/299</td>
<td>Undergraduate/Graduate Colloquium: Imperialism, Colonialism, and National Identity in Modern Japan</td>
<td>Duus</td>
<td>4-5</td>
<td>not given 1999-2000</td>
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<tr>
<td>299/399</td>
<td>Colloquium: Japan in the Age of Courtiers and Warriors, 1180-1333</td>
<td>Mass</td>
<td>4-5</td>
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<tr>
<td>306B</td>
<td>Design and Methodology for International Field Research</td>
<td>Kollmann</td>
<td>1</td>
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<tr>
<td>390A</td>
<td>Graduate Colloquium: Topics in Middle-Period Chinese History</td>
<td>Neskar</td>
<td>4-5</td>
<td>not given 1999-2000</td>
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<tr>
<td>390B</td>
<td>Graduate Colloquium: Topics in Late Traditional Chinese History</td>
<td>Kahn</td>
<td>4-5</td>
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<tr>
<td>390C</td>
<td>Graduate Colloquium: Topics in Modern Chinese History</td>
<td>Spr</td>
<td>4-5</td>
<td>(R. Thompson)</td>
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<tr>
<td>395A</td>
<td>Graduate Colloquium: Early and Medieval Japan</td>
<td>Mass</td>
<td>4-5</td>
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<tr>
<td>395B</td>
<td>Graduate Colloquium: Late Medieval and Early Modern Japan, 1560-1800</td>
<td>Staff</td>
<td>4-5</td>
<td>not given 1999-2000</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>295C</td>
<td>Graduate Colloquium: Modern Japan</td>
<td>Duus</td>
<td>4-5</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Graduate Seminar: Late Imperial China</td>
<td>Spr</td>
<td>4-5</td>
<td>Neskar</td>
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<tr>
<td>498</td>
<td>Graduate Seminar: Japanese Historical Texts</td>
<td>Win</td>
<td>4-5</td>
<td>Mass</td>
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**INDUSTRIAL ENGINEERING**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>279</td>
<td>Technology, Policy, and Management in Newly-Industrializing Countries</td>
<td></td>
<td>2-4</td>
<td>(Forbes)</td>
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**OVERSEAS STUDIES**

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<thead>
<tr>
<th>Course Code</th>
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<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>17R</td>
<td>Religion and Japanese Culture</td>
<td>Staff</td>
<td>4-5</td>
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**POLITICAL SCIENCE**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Credits</th>
<th>Instructor(s)</th>
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</thead>
<tbody>
<tr>
<td>28</td>
<td>East Asia in the Age of Imperialism</td>
<td></td>
<td>5</td>
<td>Duus, Oksenberg</td>
</tr>
<tr>
<td>395A</td>
<td>Chinese Politics: The Revolution and the Mao Years</td>
<td>Oi</td>
<td>5</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td>395B</td>
<td>Chinese Politics: The Transformation and the Era of Reform</td>
<td>Oi</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>395C</td>
<td>Seminar: Topics in Chinese Politics—Political Change in China</td>
<td>Oi</td>
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**21. Research Project**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>110K</td>
<td>Introduction to Team-Based Product Design Development                                        1</td>
<td></td>
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<td>(MacDougall)</td>
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**121K. The Asian Others of Western Culture**

<table>
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<tbody>
<tr>
<td>215X</td>
<td>The Political Economy of Japan</td>
<td>Kume</td>
<td>4-5</td>
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**POLITICAL SCIENCE**

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<th>Instructor(s)</th>
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<tbody>
<tr>
<td>115/215</td>
<td>Chinese Politics</td>
<td>Oi</td>
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<td>not given 1999-2000</td>
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<tr>
<td>115B/215B</td>
<td>Chinese Politics: The Transformation and the Era of Reform</td>
<td>Oi</td>
<td>5</td>
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<th>Instructor(s)</th>
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<tbody>
<tr>
<td>115C</td>
<td>Seminar: Topics in Chinese Politics—Political Change in China</td>
<td>Oi</td>
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**125/225. The Rise of Industrial Asia**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
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<tbody>
<tr>
<td>140M/240M</td>
<td>Chinese Foreign Policy</td>
<td>Oksenberg,Rohlen,Rowen,Staff</td>
<td>5</td>
<td>(Oksenberg)</td>
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<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>215E</td>
<td>Graduate Seminar: Political Economy of Reform in China</td>
<td>Oi</td>
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**216M. Seminar: Environmental Politics in the Asia/Pacific Region**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>217M</td>
<td>Graduate Seminar: Evolution of the Chinese State</td>
<td>Oksenberg,Miller</td>
<td>5</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>115C</td>
<td>Seminar: Topics in Chinese Politics—Political Change in China</td>
<td>Oi</td>
<td>5</td>
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</table>

**125/225. The Rise of Industrial Asia**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>140M/240M</td>
<td>Chinese Foreign Policy</td>
<td>Oksenberg,Rowen,Staff</td>
<td>5</td>
<td>(Oksenberg)</td>
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</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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</thead>
<tbody>
<tr>
<td>215E</td>
<td>Graduate Seminar: Political Economy of Reform in China</td>
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</table>

**216M. Seminar: Environmental Politics in the Asia/Pacific Region**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Credits</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>217M</td>
<td>Graduate Seminar: Evolution of the Chinese State</td>
<td>Oksenberg,Miller</td>
<td>5</td>
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</tbody>
</table>
223. Seminar: Japanese Politics  
5 units, Spr (Staff)

315F. Graduate Seminar: Topics in Chinese Politics  
5 units, Spr (Oi)

RELIGIOUS STUDIES

5N. Stanford Introductory Seminar: The Trickster in East Asia  
3 units, Aut (Faure)

6N. Stanford Introductory Seminar: Readings in Asian Religions  
3 units, Win (Bielefeldt)

11. Religious Classics of Asia  
4 units, not given 1999-2000

14. Introduction to Buddhism  
4 units, Win (Faure)

18. Zen Buddhism  
4 units, Spr (Bielefeldt)

20. Chinese Religious Thought and Practice  
4 units (Faure) not given 1999-2000

55. Introduction to Chinese Religions  
4 units, Win (Cedzich)

113. Introduction to the Daoist Religion  
4 units, Aut (Cedzich)

116. Japanese Buddhism  
5 units, not given 1999-2000

117. Syncretism and Sectarianism in Chinese Buddhism  
5 units (Faure) not given 1999-2000

118. Ritual in East Asian Buddhism  
4 units (Faure) not given 1999-2000

124. Religion in Japan  
5 units, not given 1999-2000

136. Buddhist Yoga  
4 units (Bielefeldt) not given 1999-2000

150. Mahayana Buddhism  
5 units, Aut (Bielefeldt)

206. Popular Chinese Religion  
4 units, Aut (Cedzich)

210. Speech and Writing in the Buddhist Traditions  
4 units (Faure) not given 1999-2000

212. Interpreting Confucian Texts  
5 units, not given 1999-2000

221. Ch'an/Zen and Local Religion  
5 units (Faure) not given 1999-2000

230A. Zen Buddhism Seminar  
5 units (Bielefeldt) not given 1999-2000

256. Japanese Buddhism Seminar  
4 units (Bielefeldt) not given 1999-2000

257. East Asian Buddhist Texts  
4 units, Win (Faure)

258. Japanese Buddhist Texts  
5 units, Spr (Bielefeldt)

286. Character and the Good Life  
5 units (Yearley) not given 1999-2000

306. Early Daoist Ritual  
4 units, Spr (Cedzich)

310. Buddhist Studies Proseminar  
5 units (Bielefeldt) not given 1999-2000

311A, B. Buddhist Studies Seminar  
5 units, Win, Spr (Faure)

319. East Asian Religions  
(Bielefeldt, Faure, Yearley)

345. Comparative Religious Ethics  
5 units, Win (Yearley)

SOCIOLOGY

117A/217A. Social Impact of the Chinese Revolution  
5 units, Win (Walder)

217. China's Social Transformation  
5 units (Walder) given 2000-01

217B. Seminar: Chinese Communist Revolution  
5 units (Walder) given 2000-01

318. Sociological Perspectives on Transitional Societies  
5 units, Aut (Tuma, Walder)

URBAN STUDIES

135. Cities and Urban Systems in East Asia  
5 units, Spr (Douglas)

184. Managing the Urban Environment in East Asia  
4 units, Win (Webster)

ECONOMICS


Chair: John Pencavel

Teaching Coordinator: B. Douglas Bernheim


Associate Professors: Lawrence H. Golub, Ilya Segal


Courtesy Professors: David Baron, John Ferejohn, Alan Garber, Kenichi Imai, David Kreps, Ralph Landau, A. Mitchell Polinsky, Peter C. Reiss, D. John Roberts, James F. Strnad, Barry Weingast, Robert Wilson, Mark Wolfson

Courtesy Assistant Professor: Laurence Baker

Senior Lecturer: Geoffrey Rothwell
The department’s purposes are to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them the ability to exercise judgment in evaluating public policy. There is training for the general student as well as for those who plan careers as economists in public service, private enterprise, teaching, or research.

The undergraduate program provides an excellent background for those going on to graduate work in the professional schools (for example, business and law) and may also be structured to prepare students for a Ph.D. program in economics. The department’s curriculum is an integral part of Stanford’s programs in International Relations, Public Policy, and Urban Studies.

The primary objective of the graduate program is to educate students as research economists. In the process, students also acquire the background and skills necessary for careers as university teachers and as practitioners of economics. The curriculum includes a comprehensive treatment of modern theory and empirical techniques. Currently, 25 to 30 students are admitted each year.

The faculty represent a wide spectrum of interests and conduct research on a broad range of topics. Most fields of economics are covered, including comparative institutional analysis, econometrics, economic development, economic history, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, and public finance.

UNDERGRADUATE PROGRAMS
BACHELOR OF ARTS

The department established a new curriculum for the undergraduate program, on September 1, 1998, to strengthen students’ quantitative skills and their knowledge of the analytical core of economics.

The total number of units required for the major has increased from 60 to 75. Economics 102 is now required for all majors. The required number of field courses has increased from two to four. There is now greater flexibility in the choice of electives, including upper-division math and statistics.

Of the 75 units required for the major, at least 50 of which must be taken at Stanford, California. Students cannot declare Economics as their major until they have completed Economics 1 with a grade of ‘C+’ or better.

Students who declared Economics as their major prior to September 1, 1998 may opt to complete their Economics major under the old requirements (see the 1997-98 Stanford Bulletin) or under the new requirements listed below.

REQUIREMENTS FOR THE MAJOR (75 units)

Basic Economics Courses (30-32 units)

1. Economics 1 (5 units).
2. Economics 50 (5 units). It is recommended that students satisfy this requirement before proceeding with the rest of the program. Prerequisite: Mathematics 41 or equivalent.
3. Economics 50 (5 units). Prerequisite: 1, Mathematics 41, or equivalent.
4. Economics 51 and 52 (10 units). Requirement ‘3’ must be completed before taking 51 or 52.
5. Economics 102 (5 units). Prerequisites: Economics 50, 51, 80.

Field Courses (must be taken at Stanford, CA) (20 units)—Four courses must be chosen from among Economics 111, 118, 140, 141, 145, 149, 150, 154, 155, 156, 157, 160, 165 (5 units each).

Policy Writing Course (5 units)—Economics 101 (5 units). This course may be taken only after completing Economics 51, 52, 102 and at least two field courses.

Electives (20 units)—Choose from Economics courses numbered up to 189, excluding 90 (190) and 91 (191). Up to 10 units of this requirement may be fulfilled by additional math and statistics beyond that required in the basic economics courses. For example, the Mathematics 50 series; Mathematics 103, 104, 113, 114, 115; or Statistics 116, 200 are eligible.

OTHER REQUIREMENTS

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit.

A grade point average (GPA) of ‘C’ or better must be received for all units applied toward the preceding requirements.

To use transfer credit in partial satisfaction of the requirements, the student must obtain written consent from the department’s Associate Director of Undergraduate Study, who establishes the amount of credit to be granted toward the department requirements (see the Information Book for Economics Majors). The time limit for satisfactory completion of a course is one year from the date an “incomplete” is given. Students are responsible for seeing that all grades of incomplete are cleared within the time limit.

SAMPLE PROGRAMS

Sample listings of upper-division economics electives may be examined in the department’s Information Book for Economics Majors, available in the Economics Building, room 136. Sample programs are provided for the following areas of emphasis: (1) liberal arts, (2) pre-business, (3) quantitative, (4) international, (5) political economy and regulation, and (6) preparation for graduate school in economics.

MINORS

Note—The curriculum for the minor in Economics was revised effective September 1, 1998 and the total number of units has increased from 30 to 35.

The minor in Economics has two main goals. The first is to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors. The second is to allow students to build basic competence in the application of this theory to two fields of economics of their choosing, and the opportunity to specialize further in any one of these fields by taking one additional advanced course in the Department of Economics.

COURSE WORK

1. Economics 1 (5 units).
2. Economics 50 (5 units). Prerequisites: Economics 1, Mathematics 41 or equivalent (Mathematics 51 may be substituted).
3. Economics 51 (5 units). Prerequisite: Economics 50 or Mathematics 51.
4. Economics 52 (5 units). Prerequisite: Economics 51.
5. Two field courses may be chosen from the following list: Economics 102, 111, 118, 140, 141, 145, 149, 150, 154, 155, 156, 157, 160, 165.
6. One elective from Economics courses numbered up to 198, excluding 90 (190) and 91 (191).

OTHER REQUIREMENTS

If the candidate’s major requires basic Economics courses (1-4 above), then half the units that count toward this minor must be made up by taking additional Economics courses towards the minor under items 5 and 6 above.

At least 20 out of the 35 units for the minor must be taken at Stanford in California.

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit. A grade point average (GPA) of ‘C’ or better must be received for all units applied toward the minor.

Two quarters before degree conferral, students must complete their declaration of the minor no later than the last day of the preceding quarter.
HONORS PROGRAM

The honors program offers an outstanding opportunity for independent research, creativity, and achievement. It is designed to encourage a more intensive study of economics than is required for the normal major, with coursework and the introduction of exceptional quality. Honors students are eligible to participate in an Honors Research Symposium during Spring Quarter, with those nominated for prizes making oral presentations. The honors program requires:

1. Completing all requirements for the major, including Economics 103 or 104 as electives.
2. Achieving a grade point average (GPA) of at least 3.5 for the 75 units required of the Economics major. See details in the Information Book for Economics Majors.
3. Demonstrating completion of those lecture courses (at least two beyond Economics 102, 103, or 104) most relevant for the proposed topic of the honors thesis. (These can be included in the basic 75 units.)
4. Candidates must write an honors thesis in their senior year for up to 10 units of credit (199D). The thesis must be of very high quality and written under the direction of a member of the department or its affiliated faculty. Units of 199D do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors. However, the requirement for Economics 101 may be replaced or substituted as early as possible during the second year.

Juniors interested in the honors program are urged to attend an informal presentation by the honors program director each Winter Quarter. At this meeting, students receive information on organizing an honors project and are given details on the Honor’s College. Prospective candidates for the honors program must submit an application to the department no later than the end of the second full week of the third quarter before graduation (typically Autumn Quarter of the senior year). Also required, later in the same quarter, is a three-page prospectus that must be approved by the thesis adviser.

GRADUATE PROGRAMS

Graduate programs in economics are designed to ensure that students receive a thorough grounding in the methodology of theoretical and empirical economics, while at the same time providing specialized training in a wide variety of subfields and a broad understanding of associated institutional structures. Toward these ends, the program is arranged so that the student has little choice in the curriculum at the outset but considerable latitude later on.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate calculus, a course in linear algebra, and a rigorous course in probability and statistics.

MASTER OF ARTS

University requirements for the master’s degree are described in the “Graduate Degrees” section of this bulletin.

The department does not admit students who plan to terminate their study with the A.M. degree. Students may (but need not) elect this degree in preparation for the Ph.D. degree. A master’s option is also available to Ph.D. candidates from other departments.

Admission—Prospective students must have completed the Stanford requirements for an A.B. in Economics or an equivalent training. Since students are required to take some of the same courses as Ph.D. candidates, similar preparation in mathematics and statistics generally is expected. Prospective applicants should submit their credentials together with a plan of study to the Director of Graduate Study for approval.

Requirements—A master’s program must satisfy the following criteria:

1. Completing, at Stanford, at least 45 units of credit beyond those required for the bachelor’s degree, of which at least 40 units must be in the Department of Economics. Economics courses must include 202, 210, and at least two other 200-level courses. Undergraduate courses must be numbered 105 or higher. No seminar courses numbered 300 or above can be counted.

2. Demonstrating competence in empirical methodology at the level of Economics 270. Normally, this is done by including that course in the program of study.

3. Submitting two term papers (or a thesis of sufficient quality). At least one of these papers must be deemed to represent graduate-level work. Normally, this means that it is written in connection with a 200-level course. A maximum of 10 units of credit can be earned for a thesis toward the 45-unit degree requirement.

4. A grade point average (GPA) of ‘B’ must be maintained for all master’s level work. In addition, a grade of ‘B-’ or better must be earned in each of the two graduate theory courses. All courses must be taken for a letter grade.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

Admission to Candidacy for Ph.D.—A student may apply for admission to candidacy when the following minimal requirements are met:

1. Successful results on comprehensive examinations in “core economics” (the examinations based on material from Economics 202, 203, 204, and Economics 210, 211, 212), and “Econometrics,” (the examination based on material from Economics 270, 271, 272).

2. Completing the requirements in two additional fields from the list below or one such field together with a substantial amount of work toward a minor in a related department approved by the Director of Graduate Study. Advanced fields include comparative institutional analysis, econometrics, economic development, economic history, industrial organization, international economics, labor economics, mathematical economics, monetary theory and advanced macroeconomics, and public finance.

Each field listed above can be satisfied by completing two courses, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. All courses (or comprehensive exams, when offered) must be passed with a grade of ‘B’ or better.

3. Completing a “candidacy paper,” normally written in conjunction with one of the special fields selected above.

It is expected that the student will meet, and indeed exceed, the above standard by the beginning of the third year of residency. When this is not possible for any reason, the Director of Graduate Study should be consulted as early as possible during the second year. Once it is deemed that the above standards have been met, the student should complete the Application for Candidacy for Degree of Doctor of Philosophy. After approval, candidacy remains valid for five years (although it can be terminated earlier by the department if progress is deficient); it can be renewed or extended beyond this period only under unusual circumstances.
Further Requirements for the Ph.D. Degree—

1. Additional Course Work: four other graduate-level courses must be completed. One of these must be from the area of economic history unless that field has already been selected above and, in any event, these courses must be “distributed” in such a way that at least two fields not selected above are represented. In addition, if the special fields consist of econometrics together with mathematical economics, the distribution courses must include at least two from outside these areas. With the approval of the Director of Graduate Study, some of the distribution courses may be drawn from a minor subject, for those choosing that option.

2. Teaching Experience: each student must serve as a teaching assistant for at least one quarter. It is strongly recommended that this requirement be satisfied before the final year of residence.

3. Seminar Participation: each student is expected to participate in at least two all-year research seminars by the end of the fourth year of residence. Normally, participation in a seminar requires one or more oral presentations and the submission of a research paper (which, however, need not be completely separate from dissertation research).

4. Ph.D. Dissertation: the process involves selecting a topic, choosing an appropriate adviser, submitting a prospectus (signed by the adviser) outlining proposed research, selecting a three-member reading committee (usually all from the Department of Economics, although exceptions can be made under certain circumstances), passing the University oral examination at which these three faculty (and two other members of the Academic Council) ask questions about the completed research, and submitting a final draft of the work signed by all members of the reading committee. The student is advised to initiate this process as early as possible.

Ph.D. Minor

To be recommended for the Ph.D. degree with Economics as a minor subject, a student must qualify in three fields of economics, at least one of which must be in the "core economics" sequence. Qualification in these fields is tested in the department’s comprehensive written examinations given annually. The standard of achievement in these examinations is the same for minor as for major candidates.

Joint Degree Programs

The Department of Economics and the School of Law offer a joint program leading to the Ph.D. in Economics and the J.D. in Law. See the Stanford University bulletin Law School for descriptions of its participation in the joint program.

To qualify, the student’s program objectives must clearly justify such a joint program. Decisions are made by the Director of Graduate Study. A student’s program in economics must satisfy the same standards as the Ph.D. degree in Economics taken with a minor in Law. It is expected that dissertation research will cross department lines and that members of the dissertation committee will be drawn from both faculties.

Students normally spend the first year full time in economics or in law and the second year full time in the other department. After the second year, courses in economics and law may be pursued simultaneously.

Other joint programs may be arranged; for example, the Ph.D. in Economics combined with one or two years of study in the School of Law, leading either to the nonprofessional Master of Legal Studies (M.L.S.) degree or the nonprofessional Master of Jurisprudence (J.M.). See the bulletin Law School for the requirements. Conversely, a student taking the J.D. in the School of Law may apply for an A.M. in Economics.

Fellowships and Assistantships

The department awards a number of fellowships for graduate study. Some first-year students are awarded full fellowships, including a stipend and tuition. All students whose record justifies continuation in the program may be assured support for the second through fourth years in the form of employment as a teaching or research assistant. These half-time appointments provide a stipend and tuition allowance. Entering students are not normally eligible for research or teaching assistantships.

Applications should be submitted before January 1 to the department admissions committee.

Courses

(WIM) indicates that the course meets the Writing in the Major requirements.


5 units, Aut (Clerici-Arias)
Win (Bernheim)
Spr (Wright)

50. Economic Analysis I—(Graduate students register for 151.) The neoclassical theory of consumer and firm behavior under perfect competition, partial equilibrium analysis, and the role of markets and prices in a decentralized system. Economic tools are developed concurrently with mathematical techniques from multivariable calculus, including partial differentiation and constrained and unconstrained optimization. Students who have not taken and passed Mathematics 51 take a diagnostic math test covering Mathematics 41 (or equivalent) during the first week of class; the results may preclude some students and require others to register concurrently for 50M. Prerequisite: 1; Mathematics 41 (or equivalent). Recommended: Mathematics 51. GER:2c (DR:4)

5 units, Aut (Bajari)
Win (Hammond)
Spr (Rosston)

50M. Economic Analysis IA—(Graduate students register for 150M.) Only for students registered in 50. Math tutorial complements 50 during the first weeks of the quarter. Students may be required to take this tutorial concurrently with 50 as a result of the diagnostic test. Optional for students who have successfully completed Mathematics 51. Prerequisite: Mathematics 41. Corequisite: 50.

2 units, Win (Russell)
Spr (Willman)

51. Economic Analysis II—(Graduate students register for Welfare Economics 151.) Introduction to neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, intertemporal choice and asset markets, risk and uncertainty, game theory, adverse selection and moral hazard. Multivariable calculus is used. In Autumn and Winter Quarters, all students must have successfully completed either Economics 180 or Mathematics 51. Prerequisite: 50.

5 units, Aut, Win (Frankel)
Spr (Schmidt)

52. Economic Analysis III—(Graduate students register for 152) Growth and fluctuations in the economic system as a whole. National income accounts and aggregate relationships among stocks and flows in markets for goods, labor, and financial assets. Inflation and unemployment. The role of macroeconomic policies in the short and long run. Prerequisite: 50.

5 units, Aut (D. Krueger)
Win (Jones)
Spr (Horvath)

80. Introduction to Statistical Methods (Postcalculus) for Social Scientists—Introduction to statistical methods relevant to the social sciences. Emphasis is on description and examples of the use of statistical techniques. Probability: basic rules of probability, conditional probability, Bayes’ rule, discrete and continuous probability distributions.)
Statistical inference: point estimation, tests of hypotheses, confidence intervals, large-sample methods. Data analysis: linear regression techniques and diagnostics. Statistical computer packages (e.g., Minitab) are used for inference and data analysis. Autumn, section 2, (Switzer) uses Web based tools; limited enrollment. See www.stat/teaching/statl90.

Prerequisites: Mathematics 41 or equivalent, consent of instructor. GER:2c (DR:4)
3-5 units, Aut, Spr (Staff)
Win (Amemiya)

90. Introduction to Financial Accounting—(Graduate students register for 190.) Develops the students' ability to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports. 5 units, Aut, Spr (Staff)

91. Introduction to Cost Accounting—(Graduate students register for 191.) The use of internal financial data for managerial decision making. 5 units, Win (Staff)

99Q. Stanford Introductory Seminar: State, Market, and Development—Preference to sophomores. Development problems in Asia, Latin America, and Africa; development thinking by economists; and the policy relationships between the public and private sector. Focus is on the analytical techniques used by development economists. 5 units, Aut (Meier)

5 units, not given 1999-2000

101. Economic Policy Analysis—Develops skills in economic policy analysis, writing, and oral presentation. Topics vary with instructor. Limited enrollment. Prerequisites: requirements 4 and 5 above. (WIM) 5 units, Aut (Rosston, Topper, Haak)
Win (Pauly, Haak, Gould)
Spr (Uhlig, Aturupane, Perry, Van Biesebroeck)

102. Introduction to Econometrics—Descriptive statistics. Regression analysis. Hypothesis testing. Analysis of variance. Heteroscedasticity, serial correlation, errors in variables, simultaneous equations. Prerequisites: 51, 80 or Statistics 60 (or equivalent). Recommended: computer experience. 5 units, Aut (Wolak)
Win (Rothwell)
Spr (Goldberger)

103. Applied Macroeconomic Analysis—The construction and use of econometric models for analyzing macroeconomic phenomena. Students complete individual projects and core material. Topics vary with the instructor. Limited enrollment. Prerequisites: 52, 102. 5 units, Aut (Uhlig)

104. Applied Microeconomic Analysis—Develops skills in interpreting and conducting econometric analysis of microeconomic data. Topics vary with instructor. Students complete projects and core material. Limited enrollment. Prerequisites: 51, 102. 5 units, Win (Pistaferti)
Spr (Hall)

106. The World Food Economy—(Same as Food Research 103/203.) The interrelationships among food, population, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on the public sector decision making as it relates to food policy. 5 units, Win (Falcon, Naylor)

111. Money and Banking—The structure of financial markets. The monetary system in the U.S. and other countries. The microeconomics of banking, and the macroeconomic role of banks. Theories of money demand, monetary policy, and monetary models of the macro-economy. Prerequisites: 51, 52. 5 units, Aut (Chan)
Win (Kumhof)

113. Technology and Economic Change—The economic causes and consequences of technological change. The historical experience of advanced industrial countries and the more recent experience of less developed economies. Topics: the origins of modern industry in the U.S. and Europe, technology and the growth of large-scale organizations, late-comers to industrialization (Japan and newly industrializing countries), economic growth and slowdown in mature industrial countries, and present concerns and future prospects (the influence of technology on employment, civilian "spillover" from military R&D, and coping with rapid technological change). GER:3b (DR:9)
5 units, Win (Rosenberg)

115. European Economic History—Economic changes and growth in Western Europe from the medieval period to the present. The transformation of Europe from an economically and culturally backward part of the world to the center of the world economy pre-WW I. Topics: attitudes toward technology and science, demography, institutional changes, politics and military technology, and production technology. GER:3b (DR:9)
5 units, Win (Greif)

116. American Economic History—The history of the U.S. economy from colonial times to the present. The application of economic analysis to historical issues, and the role of historical context in economics. Topics: American economic growth in comparative and international perspective, the economics of slavery and regional divergence; the social and cultural aspects of economic growth; recent U.S. economic performance in historical perspective. Prerequisite: 1. GER:3b,4b (DR:3 or 9)
5 units, Aut (Wright)

118. The Economics of Development—The economic problems and policy concerns of developing economies. Theories of economic growth and development, inequality and poverty, agriculture and rural development, fertility, education, the economic role of family. Focus is on economic models rather than case studies. Prerequisite: 51. GER:4a (DR:2)
5 units, Spr (Chan)

120. Socialist Economies in Transition—Privatization, restructuring, and institutional change in Eastern Europe and the former Soviet Union. Analysis of property rights, corporate governance, incentives, and resource allocation in socialist and transitional economies. Emphasis is on liberalization and privatization policies (including mass and voucher programs) as the primary instruments to induce changes in behavior. 5 units, Spr (Earle)

121. The Economics of Greater China and the World—The structure and development of the economy of the People's Republic of China, Taiwan, and Hong Kong. Topics: interregional and international trade;
124. The Economy of Japan—Analysis of the economic institutions of the Japanese economy in comparative and historical perspective. Firms, the employment system, corporate governance and financial institutions, the political economy. Elementary applications of game theory and other analytical tools. Prerequisite: 51. GER:4a (DR:2)
5 units, Spr (Aoki)

125. Introduction to Finance—(Same as Business F221, Industrial Engineering 236.) The foundations of finance, with applications in corporate finance and investment management. The process of valuation, which is central to many of the major financial decisions made by corporate managers and investors. Topics: criteria for making investment decisions, relationships between risk and return, market efficiency, and the valuation of derivative securities (e.g., options). The major financial instruments issued by corporations including short and long term debt, equity, and convertible securities. Conceptually rigorous; cases illustrate applications of the main concepts. Prerequisites: 1 or Engineering 60, and strong analytical background, or consent of instructor; familiar with basic probability and statistics concepts, including random variables, expected returns, variance, and covariance.
5 units, Win (Admati)

126. Comparative Economic Institutions: The Economics of Transition—The problems in building new economic institutions in countries during the transition from plan to market resource allocation. Topics: economic history and theory, law and economics, and comparative economic systems. The creation, evolution, and consequences of alternative economic institutions. Recent experiences in Eastern Europe, Russia, and China are analyzed and compared. Prerequisite: 51.
5 units, not given 1999-2000

127. Information and Incentives—Focus is on the provision of incentives in situations where one part has more information than another. A part may have better information about things that it controls (moral hazard), or about things that are outside of its control (adverse selection). In the former, well-structured contracts give the party incentives to exercise its control in a mutually beneficial way. In the latter, contracts should give the party incentives to reveal its private information truthfully. The general structure of incentive problems and the design of contracts and institutions to deal with such problems. Applications (time permitting): executive and employee compensation in firms, sharecropping, financial contracts and credit rationing, insurance, markets with unobservable quality, monopolistic price discrimination, regulation of natural monopolies, income taxation and redistribution, the provision of public goods, and auctions. Prerequisite: 51.
5 units, Spr (Segal)

128. Risk and Insurance—Insurance affects a large part of the American economy: life insurance and pension funds provide financial capital for the private sector; health insurance funds the 14 percent of GNP spent on medical services. Economic analysis, theoretical and empirical, provides an understanding of how the insurance markets function, how and why they are regulated, and how they might be improved. The organization of the various parts of the insurance industry and the public policy issues concerning earthquake, health, auto, and environmental risk insurance. Insurance-like devices consumers use to affect risk, such as product guarantees, or preventive and precautionary activities.
5 units, Spr (Pauly)

139D. Directed Reading and Research
1-10 units (Staff)
151. Economic Analysis II—See 151.

152. Economic Analysis III—See 152.

154. Economics of Legal Rules and Institutions—Description and analysis of the existence, design, and consequences of legal rules. Topics: common ideas that run through diverse areas of law, including individual rationality, economic efficiency, conventional and Caisson analysis of the existence, design, and consequences of legal rules. Prerequisite: 51.

5 units, Aut (Polinsky)

155. Environmental Economics and Policy—(Same as Earth Systems 112.) The economic sources of environmental problems and the alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). An evaluation of the policies addressing regional air pollution, global climate change, water allocation in the Western U.S., and the use of renewable resources. The connections between population growth, economic output, environmental quality, and human welfare. Prerequisite: 50.

5 units, Spr (Staff)

156. Economics of Health and Medical Care—(Graduate students register for 256; same as Health Research and Policy 256, Medical Information Sciences 256.) Graduate students with research interests should take 248. Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: institutions in the health sector; measurement and valuation of health; nonmedical determinants of health; medical technology and technology assessment; demand for medical care and medical insurance; physicians, hospitals, and managed care; international comparisons. Prerequisite: 51 or consent of instructor. Recommended: some background in statistics or mathematics.

5 units, Win (McClellan)

157. Imperfect Competition—Extends and develops the basic tools of price theory in the context of U.S. industrial market structure. The application of theoretical models and concepts to the behavior of firms and markets when the conditions of perfect competition are not satisfied. Topics: monopoly, oligopoly, monopolistic competition, concentration measures, international competition, advertising, innovation, externalities, economies of scale, and the role of information in markets. Prerequisite: 51.

5 units, Win (Bajari)

158. Antitrust and Regulation—The history, economics, and legal background of the institutions under which U.S. industry is subject to government control. Topics: antitrust law and economics; the economics and practice of public utility regulation in the communications, transportation, and energy sectors; and the effects of licensing. Emphasizes application of economic concepts in evaluating the performance and policies of government agencies.

5 units, Aut (Noll, Wolak)

160. Game Theory and Economic Applications—Mathematically rigorous introduction to game theory and its applications to economics. Topics: strategic and extensive form games, Nash equilibrium, subgame-perfect equilibrium, Bayesian equilibrium, and Perfect Bayesian Equilibrium. The theory is applied to repeated games, auctions, and bargaining. Examples from economics and political science. Prerequisites: 51 and one rigorous course in calculus, or consent of instructor.

5 units, Aut (Carter)

162. Introduction to Dynamic Economics—The dynamics of the allocation process. Calculus required; develops the mathematical tools needed for dynamic analysis. Topics: intertemporal consumer choice and theory of savings, theory of dynamic efficiency, models of aggregate economic growth and capital accumulation, theories of interest and pricing of capital assets, productivity and growth, intergenerational allocation. Prerequisites: 51 or equivalent, 180.

5 units, Win (Razin)

Spr (Kunhof)

165. International Economics—Comparative advantage in production and trade among nations; trade policy; increasing returns, imperfect competition and trade; the international monetary mechanism; domestic monetary, fiscal, and exchange rate policies and their relationship to foreign trade; global financial crises and trade. Prerequisites: 1, 51, 52.

5 units, Win (Razin)

Spr (Kunhof)

167. Economics of European Integration and Monetary Union—The economics of the European Community and the internal market. Analysis of current competition, transportation, and factor market policies, including the problems of agriculture and unemployment. Fiscal harmonization and mercantilist rivalry. European Monetary Union (EMU): genesis, implementation, and consequences of a common currency and central bank. Foreign exchange and foreign trade. Prerequisites: 51, 52, or equivalents.

5 units, not given 1999-2000

170. Intermediate Econometrics I—(Same as 270.)

5 units, Aut (Amemiya)

171. Intermediate Econometrics II—(Same as 271.)

5 units, Win (Goldberger)

172. Intermediate Econometrics III—(Same as 272.)

5 units, Spr (MacCurdy)

181. Optimization and Economic Analysis—The development of optimization techniques, including calculus, linear and nonlinear programming, the calculus of variations, and control theory. Emphasis is on concepts and results rather than techniques and proofs. Examples: static and dynamic theories of the household and the firm, and problems in aggregative planning and control. Prerequisites: 51 and 180, or Mathematics 43 or equivalent.

5 units, Spr (Gonzalez de Lara)

190. Introduction to Financial Accounting—See 90.

191. Introduction to Cost Accounting—See 91.

198. Junior Honors Seminar

5 units, Spr (Rothwell)

199D. Directed Reading and Research—Honors. In-depth study of an appropriate question and completion of a thesis of very high quality. Normally written under the direction of a member of the Department of Economics (or a member of some closely related department). See description of honors program. Register for at least 1 unit for at least one quarter. Meets first week of Autumn Quarter (see Stanford Daily for details).

1-10 units, Aut, Win, Spr (Rothwell)

PRIMARILY FOR GRADUATE STUDENTS

350. A.M. Thesis

by arrangement

400. Ph.D. Dissertation

by arrangement

A. CORE ECONOMICS

202. Core Economics I—Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimi-
203. Core Economics III—Noncooperative game theory including normative and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities and public goods: an introduction to mechanism design. The theory of imperfect competition: static Bertrand and Cournot competition, dynamic oligopoly, entry decisions, entry deterrence, strategic behavior to alter market conditions.
5 units, Aut (Rangell)

204. Core Economics V—The theory of resource allocation over time, competitive equilibrium and intertemporal efficiency, capital asset pricing models, equilibrium with securities, pricing of securities and arbitrage. Overlapping generations models with incomplete market structure and applications. Prerequisite: 203.
5 units, Spr (Kurz)

5 units, Aut (Sargent)

211. Core Economics IV—Monetary theory: evidence on the nature of economic fluctuations, the role of money (overlapping generations, cash in advance, money in the utility function), the dynamic impact of changes in money on the economy, the natural rate of unemployment and job creation/destruction, exchange rate determination, international transmission of money, dynamic stochastic general equilibrium models. Macroeconomic policy: theoretical rationale or central bank independence, time inconsistency, the impact of public debt, rules vs. discretion, interest rate vs. money rules, international monetary policy coordination, rational expectations econometric policy evaluation.
5 units, Win (D. Krueger)

212. Core Economics VI—The theory of contracts, emphasizing contractual incompleteness and the problem of moral hazard. Incentive regulation. Competition with imperfect information, including signaling and adverse selection. Investment theory and empirics, including adjustment costs and the q theory; consumption theory and empirics, focusing on the life-cycle model; and the labor market.
5 units, Spr (Tadelis, Hall)

301A, B, C. Workshop in Microeconomics
10 units (Staff)

310A, B, C. Workshop in Macroeconomics
10 units (Staff)

B. ECONOMIC DEVELOPMENT

To receive comprehensive credit in the field, students must complete any two from 214, 215, or 216 and submit an additional paper. Students wishing to do research in the field are strongly advised to take 267, as well as supporting work in international economics and comparative institutional analysis.

214. Microeconomic Issues in Economic Development—Microeconomic problems of developing economies, emphasizing the rural agrarian. Topics: determination of income, models of savings, role of the household, and issues relating to health, nutrition, and education. Emphasis is on empirical tests of theoretical models and empirical evidence on these issues.
5 units, Spr (A. Krueger, Rosenzweig)
the growth and distribution of output, demographic trends, technological
and organizational changes in trade and industry, and the changing
formal and informal institutions governing political and economic activ-
y.
5 units, Win (Greif)

228. Institutions in Economic History: Form, Function, and Evolu-
tion—See 294.
5 units, not given 1999-2000

325A,B,C. Workshop in Economic History
10 units (Staff)

D. MONETARY THEORY AND ADVANCED
MACROECONOMICS

Requirements for the field are successful completion of 233 and 234.

233. Advanced Macroeconomics I—Topics in the theory of fluctua-
tions and growth.
5 units, Win (Paal)

234. Advanced Macroeconomics II—Topics in the theory of fluctua-
tions and growth.
5 units, Spr (Sargent)

E. PUBLIC FINANCE

To receive credit for the field, students must complete 241 and 242
by passing the final examinations, and submit an acceptable research
paper on a topic approved by the instructor for either course.

241,242. Public Finance and Taxation I and II—Normative and
positive tax policy. Tax incidence and efficiency, corporation financial
policy, expenditure evaluation, social insurance, and public goods.

241. 5 units, Win (Bernheim, Rangel)
242. 5 units, Spr (McClellan, Shoven)

243. Economics of the Environment—Upper-division undergraduates
may attend with consent of instructor. Analysis of the sources of
environmental problems in market economies and of policy options for
addressing these problems. Topics: choice of policy instruments (taxes,
standards, tradeable permits), environmental risk assessment, valuation
of non-marketed commodities (environmental amenities, biodiversity),
environmental policy making under uncertainty, the optimal mix of
corrective and distortionary tax instruments, and the dynamics of eco-
omic growth in the presence of non-reproducible natural resources.

5 units, not given 1999-2000

341A,B,C. Workshop on the Economics of the Public Sector—Issues
in measuring and evaluating the economic performance of government
tax, expenditure, debt, and other policies; their effects on private eco-
nomic activity, saving, investment, labor supply, etc.; alternative poli-
cies and methods of evaluation. Workshop format combines student
research, faculty presentations, and guest speakers. Prerequisite: 241 or
consent of instructor.
10 units (Staff)

354A,B,C. Workshop on Economics of Factor Markets
6 units, Win, Spr

F. ECONOMICS OF LABOR

To receive credit for the field, students must successfully complete
two from 246, 247, and 248.

246. Labor Economics I—The demand for workers and hours of work,
isubstitution among different types of labor in production, technologi-
change, adjustment costs, restrictions on layoffs. The supply of labor,
hours of work, participation, life-cycle models of behavior, welfare
programs. Wage differentials by schooling, age, cohort, gender, and race.

5 units, Win (Greif)

247. Labor Economics II—Econometric modeling of economic behav-
ior, including discrete choice and labor supply. Life cycle decision-
making. Applications of empirical duration analysis. Human capital and
wage determination.
5 units, Spr (Pistaferri)

248. Health, Medical Care, and Aging—Introduction to current re-
search and policy issues in the economics of health, medical care, and
aging. Topics: technological change; demand for medical care; behav-
ior of physicians, hospitals, and health plans; analysis of insurance markets;
effects of health and health insurance on labor supply; health risks and
individual behavior; economic demography; political economy of the
health care sector. Emphasis is on the development and estimation of
microeconomic models.
5 units, Win (McClellan)

345A,B,C. Workshop on Economics of Factor Markets
10 units (Staff)

G. ECONOMICS OF INDUSTRY

To receive credit for the field, students must successfully complete
257 and 258 and submit one research paper, the subject of which has been
approved in advance by one of the faculty teaching 257, 258, or 260.

256. Economics of Health and Medical Care—See 156.

257,258. The Economics of Industry, Regulation, and Firm Organi-
zations I and II—Theoretical and empirical analyses of the determi-
nants of market structure; firm behavior and market efficiency in oligop-
olies; theory and practice of pro-competitive government policies; the
relationship of product quality and technological innovation to market
structure; government regulation of business; public utilities, regulated
competition, licensing, product and worker safety, environmental pro-
tection; the political economy of business policies.

257. 5 units, Aut (Bajari)
258. 5 units, Win (Noll, Wolak)

260. Special Topics in Industrial Organization and Regulation—
Focused, in-depth study of issues of current research and policy interest:
empirical tests of oligopoly theories; dynamics of change in regulatory
policy; theory of economic institutions; antitrust status of joint ventures;
and use of capacity, innovation, and product variety as a barrier to entry.
Significant research issues that remain unresolved and promising ways
to attack them.
5 units, Spr (Bernheim, Noll, Wolak)

262. Experimental Methods of Institutional Analysis—Use and de-
dsign of laboratory methods to test theories of individual behavior in
various institutional settings, including markets, small groups, and
political processes. Reading/lectures on methods of experimental re-
search and the current state of research findings, and individual research
projects in which students design and run an experiment.
3 units, not given 1999-2000

303A,B,C. Workshop in the Economics of Science and Technology—
Sponsored by the department and the Center for Economic Policy
Research. Focus is on applied studies and policy issues relating to the
resource allocation and organization of basic science and engineering
research, commercialization of scientific knowledge, diffusion of tech-
nological and organizational innovations, and impacts on productivity
and economic welfare in the U.S. and other industrially advanced
economies.
10 units, Aut, Win, Spr (Staff)
355A,B,C. Workshop in Industrial Organization, Regulation, and Applied Microeconomics—Working seminar on current research in the field by visitors, presentations by students, and structured discussion of recent papers. Students are required to write an original research paper, make a formal seminar presentation, and lead a structured discussion.

10 units, Aut, Win, Spr (Staff)

358A,B,C. Workshop in Political Economics and Collective Choice—Offered in collaboration with the Graduate School of Business and the Department of Political Science. Multidisciplinary working seminar on current topics in the mechanisms of social choice, political processes, and the politics of economic policy. Participants are required to undertake an original research project, approved by the instructors, and to make an oral presentation.

10 units, Aut, Win, Spr (Staff)

H. INTERNATIONAL ECONOMICS

To receive comprehensive credit in this field, students must complete 265 and 266 and one additional paper. (Special topics course 267 is strongly recommended.) For students doing research in the field, further supporting courses are found in the fields of economic development, industrial organization, and public finance.


5 units, Aut (Kunihof)


5 units, Win (A. Krueger, Razin)


5 units, Spr (A. Krueger, Razin)

365A,B,C. Workshop in International Economics 10 units (Staff)

I. ECONOMETRICS

All Ph.D. students are required to take 270, 271, and 272. To receive credit in the econometrics field, students must complete 273, and either 274 or 275.

270. Intermediate Econometrics I—Probability, random variables, and distributions; large sample theory; theory of estimation and hypothesis testing. Prerequisites: Math and knowledge of probability at the level of Chapter 2, Paul G. Hoel, Introduction to Mathematical Statistics, 5th ed.

5 units, Aut (Amemiya)

271. Intermediate Econometrics II—Linear regression model, relaxation of classical-regression assumptions, simultaneous equation models, linear time series analysis. Prerequisite: 270.

5 units, Win (Goldberger)


5 units, Spr (MacCurdy)


5 units, Aut (Wolak)

274. Limited Dependent Variables—Discrete choice models; Tolls models; Markov chain and duration models. Prerequisite: 273 or consent of instructor.

5 units, Win (Amemiya)


5 units, Spr (Horvath)

276. Special Topics in Econometrics—Possible subjects: robust estimation, stochastic control, prediction theory, Bayesian analysis, face analysis, pooling of sample series and cross-section data. Prerequisite: 271.

5 units, not given 1999-2000

370A,B,C. Workshop in Econometrics 10 units (Staff)

J. MATHEMATICAL ECONOMICS

To receive credit in the mathematical economics field, students must complete two courses from 280, 281, 282, 284, 286, or 287.

280. Welfare Economics—Social choice theory with and without interpersonal comparisons, Pareto efficiency with public goods, externalities, and non-convexities, potential Pareto improvements. private information, incentive constraints, and mechanism design. Welfare measurement, cost benefit analysis, and analysis of economic policy reform.

5 units, not given 1999-2000


5 units, not given 1999-2000


5 units, Spr (Hammond)


5 units, Win (Kurz)

286. Game Theory and Economic Applications—Non-cooperative games, games in extensive and normal forms, games with incomplete information, Nash equilibrium and refinements, repeated games, signaling games, non-Nash solution concepts. Cooperative games, the characteristic function and core. Applications and current selected research.

5 units, Win (Hammond)

with infinitely-lived agents. Prerequisites: 202, 203, 204, or consent of instructor.
5 units, Aut (Kubler)

288. Computational Economics—Computational approaches to solving economic problems. Overview of numerical analysis. Economic problems in computationally tractable forms, and the use of numerical analysis techniques to solve them. Examples of problems solved numerically (general equilibrium models, optimal taxation, dynamic programming, economic growth, life-cycle models, intervention in commodity markets, Bayesian econometrics, equilibria of dynamic and repeated games, and nonlinear rational expectations equilibria with asymmetric information). Prerequisite: equivalent of first-year graduate core economics sequence.
5 units, not given 1999-2000

290. Multiperson Decision Theory—Review of working papers, emphasizing methods of game theory and topics in mathematical economics that use game-theoretic models. The effects of differences in information, limitations on observability and contracts, etc., on strategic behavior. Prerequisites: two courses from the Choice Theory/ Mathematics Economics sequences, or consent of instructor.
5 units, Spr (Milgrom)

385A, B, C. Workshop in Mathematical Economics
10 units (Staff)

386. Interdisciplinary Seminar on Conflict Resolution—(Same as Law 611, Engineering-Economic Systems and Operations Research 489, Psychology 283.) Addresses problems of conflict resolution and negotiation from an interdisciplinary perspective. Presentations by faculty and by scholars from other universities.
1-2 units, Win (Arrow, Ross, Wilson, Alexander)

K. COMPARATIVE INSTITUTIONAL ANALYSIS

To receive credit for this field, students are required to take 291 and then select at least one of: 292, 293, or 294. Students expecting to make Comparative Institutional Analysis their primary field are also required to take the workshop (391).

291. Contracts and Organizations—General issues and recent developments in the theory of contracts. Topics: mechanism design, hidden information and hidden action models; contracting with many agents; problems with dynamic agency, renegotiation and commitment; incomplete contracts, and applications of contract theory to theories of the firm and organizational design. Prerequisites: 202 and 203, or consent of instructor.
5 units, Win (Segal)

292. Comparative Analysis of Institutions and Organizations—Game theoretic (classic and evolutionary analysis of institutions as multiple equilibria. Norms, social embeddedness, organizations as conventions, contract enforcement and corporate governance mechanisms, and states. Institutional complementarities and diachronic institutional linkage.
5 units, Spr (Aoki)

293. Reform and Transition in Socialist Economies—Applications of organization theory to problems in reforming socialist economies. Emphasis is on understanding problems in the creation of market institutions in China, Eastern Europe, and the territory of the former U.S.S.R. Theoretical topics: coordination, incentives, commitment problems, and contract enforcement are related to issues in privatization, the building of fiscal and financial institutions, international trade, and foreign investments.
5 units, not given 1999-2000

294. Institutions and Organizations in Historical Perspective—(Same as 228.) Description and analysis of institutions and organizations in the Western historical experience, emphasizing the formative period from the 11th to the 18th centuries. Discussion of the formation, function, and evolution of institutions highlights alternative conceptual frameworks—neoclassical, transaction cost economics, institutionalism, and Marxism and neo-Marxism, while utilizing game theory, mechanism design, contract theory, etc. Topics: institutions related to trade organization, the organization of production, feudalism, mercantilism, and the state.
5 units, not given 1999-2000

391A, B, C. Seminar in Comparative Institutional Analysis
10 units (Staff)

OVERSEAS STUDIES

The following courses are approved for the Economics major and taught overseas at the campus indicated. Students are encouraged to discuss with their major advisers on campus which courses would best meet individual educational needs. Descriptions can be found in the “Overseas Studies” section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

BERLIN
129X. One Market, One Money, One Europe?
4-5 units, Win (Brückner)

FLORENCE
167X. The Integration of Europe—(Same as Overseas Studies 178F.)
4-5 units, Aut (Spini)

MOSCOW
120X. Economic Reform and Economic Policy in Modern Russia
5 units, Aut (Mau)

OXFORD
168X. Path Dependence of Science and Technology since the Industrial Revolution
5 units, Spr (David)

PUEBLA
112X. Economies of Emerging Financial Markets
5 units, Win (Castañeda)

114X. Developmental Macroeconomics: The Mexican Case—(Same as Economics 118X.)
5 units, Win (Cárdenas)

SANTIAGO
129X. Latin America in the International System—(Same as Economics 163X.)
4-5 units, Win (Rojas)

130X. Latin American Economies in Transition—(Same as Economics 165X.)
5 units, Aut (Muñoz)

ENGLISH

Emeriti: (Professors) W. B. Carnochan, Charles N. Fifer, Albert J. Gel-
Chair: Terry Castle
Vice Chair: Robert M. Polhemus
Director of Creative Writing Program: Eavan Boland
Director of Program in Writing and Critical Thinking: Andrea A. Lunsford (Spring), Ronald Rebholz (Autumn, Winter)
The Department of English offers work in English and American literature, other literature written in English, English philology, creative writing, and expository writing. In connection with these programs, it maintains the William Dinsmore Briggs Memorial Library for the use of graduate students and the Jones Room as a center for its work in Creative Writing.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The English major is designed to provide students with both an understanding of the historical development of English literature and an appreciation of the variety and richness of literary texts. It offers a rigorous training in interpretive thinking and precise expression.

PREPARATION FOR THE MAJOR

Before declaring an English major, students should have satisfied the University writing requirement.

The following departmental requirements are in addition to the University’s basic requirements for the bachelor’s degree. Any two of the requisite courses may be taken on a satisfactory/no credit basis at the discretion of the instructor, but students intending to go on to graduate school should weigh the fact that a grade of satisfactory provides little evidence of their abilities.

MAJOR PROGRAMS OF STUDY

Because the Department of English recognizes that the needs and interests of literature students vary, it has approved several major programs of study in English. Each of these has different objectives and requirements; students should consider carefully which major corresponds most closely to their personal and professional objectives.

MAJOR IN ENGLISH

This program provides for the interests of students who wish to understand the full variety and historical development of English and American literature over the centuries. It is recommended to prospective candidates for admission to graduate schools of English. Of particular value to students selecting this major are courses with broad historical perspectives on literature and language and courses which concentrate on major writers. Students who declared an English major prior to Autumn Quarter, 1999 must choose one 5-unit course from each of the nine areas B-H and P. Students declaring an English major during Autumn Quarter, 1999, or thereafter must choose one 5-unit course from each of the nine areas A-H and P. A student who took a 3-unit sub-100 English course while still a non-major may count it retroactively towards the elective requirement for the major. Only one such course may be applied to the major. If possible, students should take courses in chronological sequence.

At least one of the courses satisfying the major must be English 181-183 (Seminars for English Majors) or 196 (Honors Seminar) or an English seminar offered in the Stanford in Oxford program at St. Catherine’s College. Other English courses which are taught in a seminar format require a substantial amount of critical writing may be approved by the Director of Undergraduate Studies on a case by case basis. Students urged not to postpone satisfying this requirement until late in their major career. Undue tardiness may result in a delay of degree conferral.

In addition, students who declared an English major prior to Autumn Quarter, 1999 must elect three additional courses from among those offered by the Department of English (excluding only English 1-2-3, 74-9, and advanced composition courses). Students declaring an English major during Autumn Quarter, 1999, or thereafter must elect two such courses. In place of one of these elective courses, students may choose one upper-division course in a foreign literature read in the original language.

Students may apply as many as four English courses taken at other approved universities towards their major.

Foreign Language Requirement—Students declaring an English major during Autumn Quarter, 1996, or thereafter are not required to demonstrate proficiency in a foreign language at a higher level than that mandated by the University. However, students who plan to study English literature at the graduate level should be aware that advanced reading skills in one or more foreign languages enhance their chances of admission to and success in most Ph.D. programs.

Students who declared English prior to Autumn Quarter, 1996 must pass a fourth quarter language other than a “conversation” course (for example, French 22) or demonstrate equivalent knowledge (that is, a placement exam). For information about placement exams, contact individual language departments. Students who take a placement exam should ask the coordinator in the department administering the exam to send official verification of exam results to the undergraduate English coordinator.

EMPHASES IN THE ENGLISH MAJOR

English with a Creative Writing Emphasis—This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or fiction. Students must take a total of twelve (those declaring an English major prior to Autumn Quarter, 1999) or thirteen (those declaring an English major during Autumn Quarter, 1999, or thereafter) courses offered through the Department of English and the Program in Creative Writing. Students declaring an English major prior to Autumn Quarter, 1999 must choose one course from each of the eight areas B-H and P (those declaring an English major prior to Autumn Quarter, 1999) or the nine areas A-H and P (those declaring an English major during Autumn Quarter, 1999, or thereafter) and fulfill the seminar requirement.

In addition, they must take four courses specifically designed for either the fiction or the poetry concentration. Fiction writers must first take English 90 (Fiction Writing), then two quarters of 190 (Intermediate Fiction Writing) or 290A (Advanced Fiction Writing), and 137 (Development of the Short Story). Poets must first take English 92, then two quarters of 192 (Intermediate Poetry Writing) or 292 (Advanced Poetry Writing), and one course in poetry in addition to the course that fulfills area requirement P (for students declaring an English major during Autumn Quarter, 1999, or thereafter, English 150 is the only course which...
satisfies Area P), to be approved by a poetry instructor in the Creative Writing program. Courses taken to satisfy an area requirement cannot also satisfy a Creative Writing requirement. English 198 or tutorials taken elsewhere (such as tutorials in the Overseas Studies Program) may not be substituted for required courses. Students should note that they cannot anticipate completing the Creative Writing emphasis until they have been accepted in either 190 or 192.

Admission to English 190, 192, 290, 290A, and 292 is by consent of the instructor and is based on the quality of the student's work. Admission to a single quarter of 190 or 192 does not guarantee admission to a second quarter of 190 or 192. Students should submit a manuscript to the Creative Writing office by the last day of the preceding quarter, and in the case of Autumn Quarter, no later than one week before the beginning of the quarter. Students not admitted to the intermediate courses may take the introductory course a second time.

English with Interdisciplinary Emphasis—This major is intended for students who wish to combine the study of literature of one broadly defined historical period with an interdisciplinary program of courses relevant to that literature. Students are required to fulfill the language and seminar requirements listed under the major in English and to take a total of fifteen (students who declared an English major prior to Autumn Quarter, 1999) or sixteen (those declaring an English major during Autumn Quarter, 1999, or thereafter) courses distributed as follows:

1. One course in area P, Poetry and Poetics.
2. Five courses in one of the two areas of emphasis:
   a) Medieval and Renaissance Literature: students who declared an English major prior to Autumn Quarter, 1999 must take one course in each of the areas A, B, C and D and both English 111 and 112*. Students declaring an English major during Autumn Quarter, 1999, or thereafter must take one course in three of the areas A, B, C, and D and both English 111 and 112*.
   b) English and American Literature from the Enlightenment to the Present: students must take one course in each of the areas E, F, G, and H and English 110*.
3. Three elective English courses in the area of emphasis.
4. Six courses related to the literature of the chosen period from such disciplines as anthropology, the arts (including the practice of one of the arts), classics, comparative literature, European or other literature, feminist studies, history, modern thought and literature, political science, and African-American studies. These courses should form a coherent program and they must be relevant to the historical focus of the courses chosen by the student to meet the requirement. Each of these courses must be approved in advance by the interdisciplinary program director.
5. In addition, students in the interdisciplinary program must write at least one interdisciplinary paper. This may be a senior honors essay (197), a senior independent essay (199), an individual research paper (194 or 198), or a paper integrating the material in two courses the student is taking in two different disciplines.

*Two more focused courses may be substituted for each of the courses 110, 111, and 112, by consent of the student's advisor in the interdisciplinary major.

MINORS

The minor in English offers some flexibility for those students who want to pursue specific interests within English and American literature, while still requiring certain courses that ensure coverage of a variety of periods, genres, and methods of studying literature.

1. Either English 150, Poetry and Poetics, or a course in literary theory (the 166 series).
2. One course in American literature written before 1900.
3. Three courses in either of the following configurations:
   a) English 110, Chaucer, Shakespeare, Milton, and their Contemporaries
   A course in English literature written between 1700 and 1900*
   A course in English literature written after 1900*
   b) English 111, From the Enlightenment to the Modern Period
   A course in English literature written before 1500*

A course in English literature written between 1500 and 1700*
4. Two elective courses in English literature originally written in English. One of these may be a course in Creative Writing.

* "English Literature" here means literature of the British Isles.

INTERDEPARTMENTAL MAJORS

English and French Literatures—This major provides a focus in English literature with additional work in French literature. Candidates for the A.B. in English and French Literatures who declared an English major prior to Autumn Quarter, 1999 complete eight courses in English, one from each of the areas B-H and P listed under the major in English, and fulfill the seminar requirement. Those declaring an English major during Autumn Quarter, 1999, or thereafter complete nine courses in English, one from each of the areas A-H and P listed under the major in English, and fulfill the seminar requirement. In addition, they must complete a coherent program of four courses in French literature, read in the original. The program of each student must be approved by the Director of Undergraduate Studies in English and by the Department of French and Italian.

English and German Literatures—Candidates for the A.B. in this major who declared an English major prior to Autumn Quarter, 1999 must complete a program exactly analogous to the preceding major, with eight courses in English, and a coherent program of four courses in German literature, read in the original, with approval by the departments involved as specified above. Those declaring an English major in Autumn Quarter, 1999, or thereafter, take nine courses in English.

English and Italian Literatures—Candidates for the A.B. in this major who declared an English major prior to Autumn Quarter, 1999 must complete eight courses in English and a coherent program of four courses in Italian literature, read in the original, with approval by the departments involved as specified above. Those declaring an English major in Autumn Quarter, 1999, or thereafter, take nine courses in English.

English and Spanish or Spanish-American Literatures—Candidates for the A.B. in this major who declared an English major prior to Autumn Quarter, 1999 must complete eight courses in English, and a coherent program of four courses in Spanish or Spanish-American literatures, read in the original, with approval by the departments involved as specified above. Those declaring an English major in Autumn Quarter, 1999, or thereafter, take nine courses in English.

ADVANCED WORK

INDIVIDUAL RESEARCH

Students taking 100- or 200-level courses may, with the consent of the instructor, write a follow-up 5-unit paper based on the course material and due no later than the end of the succeeding quarter (register for 194). The research paper is written under the direct supervision of the professor; it must be submitted first in a preliminary draft and subsequently in a final version.

INTEGRATED WORK

Students taking (either simultaneously or consecutively) two or three courses which have a clear thematic or historical relationship to each other may, with the consent of the relevant instructors, write one large-scale paper of 7,000-10,000 words integrating the material in the courses in question.

SENIOR INDEPENDENT STUDY

Independent study is open, on approval by the department, to seniors majoring in English who wish to work throughout the year on a critical or scholarly essay of about 10,000 words. In rare circumstances, advisors may nominate exceptional students for honors if the student's thesis is outstanding and the program of study has been approximately equivalent to that required of regular honors students.

HONORS PROGRAM

Students who wish to undertake a more extensive program in English literature, including a tutorial, a seminar, and independent research, are
invited to apply for the honors program as soon as possible after declaring an English major and no later than Autumn Quarter of the junior year. Application consists of completing a form and submitting a sample of critical writing. Admission is selective. Provisional admission is announced in December. Permission to continue in the program is contingent upon successful completion of a tutorial and submission, by May 15 of the junior year, of a Senior Honors Essay proposal with a bibliography.

In the junior year, students may choose between the following two options: (1) at Oxford, take two quarters of the seminar sequence offered by St. Catherine's College, or at least 5 units of tutorial work arranged by the director of the Oxford program; (2) at Stanford, take 5 units of tutorial work in the Department of English. Students who elect the latter option select a regular English lecture course, registering for 3 rather than 5 units. With that course, they also take a 5-unit tutorial (196T) on the same or related material with an advanced graduate student. The courses taken at Oxford or at Stanford to satisfy this requirement for the honors program can also be used where appropriate to satisfy the area requirements for the English major.

In the Spring Quarter of the junior year, students take a 5-unit honors seminar on critical approaches to literature. (Students who have previously taken an upper-division course in literary theory and criticism may be exempted from this seminar on request and with the approval of the director of the honors program.) In the senior year, honors students complete the senior honors essay for 10 units under supervision of a faculty adviser. In Winter Quarter, all honors students take a 3-unit essay workshop focused on the process of researching and writing the essay. The deadline for submitting the honors essay is May 15.

Students in the honors program complete the following:

Area Requirements (A–H, P), nine courses
One tutorial, 5 units
Junior seminar and workshop, 8 units total
Senior Honors Essay, 10 units
Three electives

Note—For other opportunities for extended essay projects, see Senior Independent Essay and English 194 and 199.

HONORS PROGRAM IN HUMANITIES

An honors program in Humanities is available for English majors who wish to supplement the major with a related and carefully guided program of studies. See the “Interdisciplinary Studies in Humanities” section of this bulletin for a description of the program. Students wishing to take the Comparative Literature option within the honors program in Humanities should see the “Comparative Literature” section of this bulletin.

VISITING STUDENTS

Students who do not wish to become candidates for a graduate degree, but who are qualified to meet the standards of admission to a master’s or Ph.D. program, may apply to Graduate Admissions, Registrar’s Office, Stanford University, for admission as nonmatriculated students for a period of not more than three consecutive quarters. Each quarter they may take up to three English courses numbered 101 to 299, or two such courses and (with the consent of the instructor) one English course numbered above 300.

GRADUATE PROGRAMS

For University regulations governing advanced degrees, see the “Graduate Degrees” section of this bulletin.

Eligibility—Students with a bachelor’s degree of acceptable quality may apply to pursue graduate work toward an advanced degree in English at Stanford. (Formal application for candidacy is a separate step taken somewhat later.) Students whose previous preparation is in a field other than English are expected to make up deficiencies. Credits for previous graduate work at Stanford or elsewhere more than five years old may be reevaluated or rejected.

Graduate students are admitted as candidates for only the Ph.D. or the A.M. in English and American Literature. The A.M. is a one-year program without financial aid. A.M. students may apply to the Ph.D. program.

MASTER OF ARTS IN TEACHING

Candidates for a coterminal master’s degree must fulfill all requirements for the A.M. in English (including the language requirement), as well as general and major requirements for the A.B. in English. A minimum GPA of 3.5 in the major is required of those applying for the coterminal master’s degree. No courses used to satisfy the A.B. requirements (either as General Education Requirements or department requirements) may be applied toward the A.M. However, additional graduate units not applied to any previous degree may be applied toward the A.M. See the description of programs under the "Undergraduate Degrees" section of this bulletin.

Masters of Arts in Teaching

The A.M. in Teaching is offered jointly by this department and the School of Education. The degree is intended for candidates who have teaching credential or relevant teaching experience and wish to further strengthen their academic preparation. The program consists of a minimum of 25 units in the teaching field and 12 units in the School of Education. Detailed requirements for the course are outlined in the "School of Education" section of this bulletin.

Candidates for the A.M. in Teaching may also qualify for the State of California Community College Instructor Credential by completing additional units of academic work at the graduate level. For further information, consult the Credentials Administrator, room 110, School of Education, early in the Autumn Quarter.
DOCTOR OF PHILOSOPHY

University regulations regarding the Ph.D. are discussed in the “Graduate Degrees” section of this bulletin. The following department requirements, dealing with such matters as residence, dissertation, and examinations, are in addition to the University’s basic requirements for the doctorate. (Students should consult the most recent edition of “Informal Notes: Procedures for the Ph.D.” Copies are available in the English Graduate Studies office.)

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the bachelor’s degree. Candidates are expected to offer at least 97 units of graduate work in addition to the doctoral dissertation. At least three consecutive quarters of graduate work, and the final course work in the doctoral program, must be taken at Stanford.

A student may count no more than 20 units of English 398 toward the 97 course units currently required for the Ph.D., without the written consent of the Director of Graduate Studies. A student takes at least 70 graded units (normally fourteen courses) of the 97 normally required total units (397, 398, and 399 do not count toward the 70 graded units). No more than 15 units (normally three courses) may come from 100-level courses. When graduate students are teaching 50-percent time, one course may be taken for 4 units.

This program is designed to be completed in five years. Six sections of supervised teaching (four as a teaching assistant in a literature course and two as the instructor of a Writing and Critical Thinking course) are a requirement of the Ph.D. program.

Students take a Teachers’ Workshop and an Apprentice Teaching Program in the first quarter of their second year. The workshop and apprentice teaching constitute a 50-percent quarter of work as a Teaching Assistant. Apprentice teachers attend the classes, conferences, and tutorials of the master teachers, then take responsibility for conducting a class, holding conferences, and grading papers. All these teaching activities are done under the supervision of the master teachers, who insure the quality of instruction.

ENGLISH LITERATURE

Requirements are as follows:

1. A course in either Old English or Middle English literature read in the original vernacular.

2. A course that focusses on language, linguistics, history of the language, or rhetoric. English courses that satisfy this requirement include: 101, Language of Poetry; 102, History of the English Language; 102A, The Development of Englishes Around the World; 102B, The Structure of English Words; 105, Language of the Short Story; 119, British Modernism and the Problem of Meaning: 1860-1939; 211, Readings in Middle English; 212, History of Rhetoric; 260A, American Literature and the Politics of Language; 293, Seminar in Literary Translation; 295, Interactivity, Narrative, and Artificial Intelligence; 300E, Linguistics and Literary Theory.

3. A minimum of six courses for a letter grade from the graduate colloquia and graduate seminars, of which at least three must be graduate seminars. The colloquia and seminars are given according to the adviser’s judgment and the candidate’s needs. A student may receive graduate credit for three 100-level courses in the Department of English.

4. Consent of the adviser if courses taken outside the Department of English are to count toward the 97-unit requirement.

5. An oral qualifying examination based on a reading guide, to be taken at the end of the summer after the first year of graduate work. The final decision as to qualification is made by the Graduate Studies Committee in consideration of the student’s course record in conjunction with performance in the examination.

A student coming to the doctoral program who has done graduate work at another university must petition in the first year at Stanford for transfer credit for course work completed elsewhere. The petition should list the courses and grades, and describe the nature and scope of course work, as well as the content, contact hours, and writing requirements. A syllabus must be included. The Director of Graduate Studies considers the petition in conjunction with the student’s grades.

A student who has isolated a topic or area which seems promising for a doctoral thesis subject and who wants to explore it right away, and to incur additional specific course requirements insuring coverage and balance in program, may petition on entrance to qualify on the recommendation of a committee of advisers who would oversee and evaluate a full year’s course of study. Such petitions are rigorously scrutinized by the Graduate Studies Committee and granted only in exceptional cases.

6. A University oral examination to be taken no later than the Spring Quarter of the student’s third year of graduate work. This examination covers the field of concentration as defined by the student and the student’s adviser.

ENGLISH AND AMERICAN LITERATURE

Requirements are as follows:

1. A course in either Old English or Middle English literature read in the original vernacular.

2. A course that focusses on language, linguistics, history of the language, or rhetoric. English courses that satisfy this requirement include: 101, Language of Poetry; 102, History of the English Language; 102A, The Development of Englishes Around the World; 102B, The Structure of English Words; 105, Language of the Short Story; 119, British Modernism and the Problem of Meaning: 1860-1939; 211, Readings in Middle English; 212, History of Rhetoric; 260A, American Literature and the Politics of Language; 293, Seminar in Literary Translation; 295, Interactivity, Narrative, and Artificial Intelligence; 300E, Linguistics and Literary Theory.

3. A minimum of 35 units of graduate courses in American literature and 35 units in English. Among these, a minimum of six courses for a letter grade from the graduate colloquia and graduate seminars, of which three must be in American literature, and of which at least three must be graduate seminars. The colloquia and seminars should be in different genres and periods as approved by the adviser. A 5-unit course, Introduction to Graduate Study, and a 2-unit laboratory in pedagogy.

5. Completion, in Autumn Quarter of the second year, of a Teachers’ Workshop, which includes the Apprentice Teaching Program described above, and a Teachers’ Workshop in Winter Quarter. There are no units associated with this work.

6. Students are encouraged to take an advanced course in literary theory or criticism.

7. Consent of the adviser if courses taken outside the Department of English are to count toward the requirement of 97 units.

8. Qualification: see item 9 under requirements of the Ph.D. program in English literature.

9. A University oral examination to be taken no later than the Spring Quarter of the student’s third year of graduate work. This examination covers the field of concentration as defined by the student and the student’s adviser.

ENGLISH AND COMPARATIVE LITERATURE

The Ph.D. program in English and Comparative Literature is designed for students wishing an extensive knowledge of the literature, thought, and history of England and of at least one foreign country, for one period. Approximately half of the student’s course work and reading is devoted to this period, with the remainder of the time given to other periods of English and American literature since 1350.
This degree, administered by the Department of English, is to be distinguished from the Ph.D. in Comparative Literature. The latter program is intended for students unusually well prepared in foreign languages and involves advanced work in three literatures, one of which may be English. Interested students should consult a Department of English adviser, but faculty from Comparative Literature may also provide useful supplementary information.

The requirements are as follows:
1. Qualifications: see item 9 under requirements of the Ph.D. program in English literature. For qualifications in the doctoral program in English and Comparative Literature, candidates are not held responsible for literature before 1350.
2. A knowledge of the basic structure of the English language and of Chaucer. This requirement may be met by examination, or by taking 10 units of courses chosen from among those offered in linguistics, English philology, and early and middle English literature including Chaucer. No particular courses are required of all students.
3. A 5-unit course, Introduction to Graduate Study, and a 2-unit laboratory in pedagogy.
4. Completion, in Autumn Quarter of the second year, of a Teachers' Workshop, which includes the Apprentice Teaching Program described above, and a Teachers' Workshop in Winter Quarter. There are no units associated with this work.
5. A knowledge of one foreign language comparable to that demanded under the basic program and an advanced reading knowledge of a second language.
6. A minimum of 45 units in the history, thought, and literature of one period, in two or more languages, one of which must be English and one foreign. Students normally include at least two courses in a foreign language read in the original language and two courses listed under Comparative Literature or Modern Thought and Literature. As many as 20 units of this requirement may be satisfied through courses in reading and research. A student may receive graduate credit for three 100-level courses in the Department of English.
7. A minimum of six courses for a letter grade from graduate colloquia and graduate seminars, of which three must be graduate seminars and of which at least four must be in the Department of English. Among these courses, students should take one in literary theory or criticism. These colloquia and seminars should be in different genres and periods as approved by the adviser.
8. A University oral examination covering the field of concentration (as defined by the student and the student's adviser). This examination, based on a reading list established by the candidate in consultation with his or her adviser, is normally taken no later than the Spring Quarter of the third year of graduate study. However, those who spend the third year studying abroad may take this examination after their return early in the fourth year.

LANGUAGE REQUIREMENTS

All candidates for the Ph.D. degree (except those in English and Comparative Literature, for whom special language requirements prevail) must demonstrate a reading knowledge of two foreign languages. Candidates in the earlier periods must offer Latin and one of the following languages: Greek, French, German, Italian, or Spanish. In some instances, they may be required to offer a third language. Candidates in the later period (that is, after the Renaissance) must offer either Latin, French, or German as one language and may choose the second language from the following: Greek, Latin, French, German, Italian, Spanish, Russian, or another language relevant to the student's field of study. In all cases, the choice of languages offered must have the approval of the candidate's adviser. Any substitution of another language must be approved by the Director of Graduate Studies.

The Graduate Studies Committee does not accept courses taken as an undergraduate in satisfaction of the language requirement for doctoral candidates. For students coming to doctoral work at Stanford from graduate work done elsewhere, satisfaction of a foreign language requirement is determined by the Director of Graduate Studies based on the contact hours, syllabus, reading list, etc. Transfer is not automatic.

The candidate must satisfy one language requirement by the end of the first year (that is, before registration in the following year), and the other by the end of the third year.

Foreign language requirements for the Ph.D. may be fulfilled in any of the following ways:
1. A reading examination given each quarter by the various language departments, except for Latin and Greek.
2. For Latin and Greek, an examination by the Department of English. The Latin examination is given before registration in the Autumn Quarter in order to permit those who need the course to register for Latin 3. It is also given in the eighth week of the Winter and Spring Quarters, along with other department examinations for languages tested by the Educational Testing Service.
3. Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford, or an alternative for Latin, French, and Spanish, passage of Latin 51 and 52, French 50, Italian 50, and Spanish 50, respectively, with a grade of 'B' or higher.

CANDIDACY

Students are expected to file for candidacy after successful completion of qualifying procedures and, in any event, by the end of the second year of doctoral study. Candidacy is valid for five years, and may be extended, subject to satisfactory progress.

DISSERTATION

As early as possible during their graduate study, Ph.D. candidates are expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. Candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work.

Immediately after the dissertation topic has been approved by the adviser, the candidate should file a formal reading committee form prescribed by the University.

The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree. Dissertations may not be submitted during the Summer Quarter.

JOINT PH.D. IN ENGLISH AND HUMANITIES

The Department of English participates in the Graduate Program in Humanities leading to the joint Ph.D. degree in English and Humanities. For a description of that program, see the "Interdisciplinary Studies in Humanities" section of this bulletin.

PH.D. IN MODERN THOUGHT AND LITERATURE

Stanford also offers a Ph.D. degree in Modern Thought and Literature. Under this program, students devote approximately half of their time to a modern literature from the Enlightenment to the present, and the other half in interdisciplinary studies. Interested students should see the "Modern Thought and Literature" section of this bulletin and consult the chair of the program.

CREATIVE WRITING FELLOWSHIPS

The Creative Writing Program each year offers five two-year fellowships in poetry and five two-year fellowships in fiction. These are degree-granting fellowships. Information is available in the Creative Writing office (650) 723-2637.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

NUMBERING SYSTEM

Writing and Critical Thinking Courses: 1-3
Introduction to Literature: 5

352
Introduction to the Humanities: 7, 8, 9
English Language Courses: 101-109, 200-209
English Period Courses: 10-19, 110-119, 210-219, 310-319
American Period Courses: 20-29, 120-129, 220-229, 320-329
Genre Courses:
  Drama: 40-45, 140-145, 240-249, 340-349
  Poetry: 50-59, 150-159, 250-259, 350-359
Topic Courses: 60-69, 160-169, 260-269, 360-369
Author Courses: 70-79, 170-179, 270-289, 370-389
Seminars for English Majors: 180-189
Graduate Colloquia: 300-309
Writing Courses, Workshops, Individual Study, etc.: 90-99, 190-199, 290-299, 390-399

INTRODUCTORY (FOR NON-MAJORS)

Classes for students whose major is undeclared, or who are not majoring in English.

1. Writing and Critical Thinking—The successful completion in proper sequence of 1 and 2 satisfies the first-year writing requirement (W). Classes meet twice a week for 50 minutes along with individual conferences with instructors. Both involve reading texts and improving writing techniques. First quarter: students concentrate on finding an appropriate thesis and developing and organizing ideas. Second quarter: students concentrate on style and diction and on preparing and writing researched essays. Students choose from one of three general categories (A, B, or C). Readings vary in each, but the primary concern is student writing and its improvement. All are expository and argumentative writing courses, not conventional courses in cultural studies, literature, film, etc. (W)

1A. Writing and the Arts of Persuasion—Writing generally based on readings of effective arguments.
  3 units, Aut-Win, Win-Spr (Staff)

1B. Writing about Social and Political Issues—Writing generally based on readings drawn from social science disciplines.
  3 units, Aut-Win, Win-Spr (Staff)

1C. Writing about Literature—Writing generally based on literature and other creative forms.
  3 units, Aut-Win, Win-Spr (Staff)

2. Writing and Critical Thinking—Fulfills the first-year writing requirement (W) in one quarter; offered only to students scoring 4 or 5 on the English AP exams or 6 or 7 on the International Baccalaureate at the higher level. Classes meet twice a week for 75 minutes along with individual conferences with the instructor. Students concentrate on the same writing techniques as those presented in the 1 and 2 sequence, choosing from one of three general thematic categories (A, B, or C). Readings vary in each, but the primary concern is student writing and its improvement. All are expository and argumentative writing courses, not conventional courses in cultural studies, literature, film, etc. (W)

2A. Writing and the Arts of Persuasion—Writing generally based on readings of effective arguments.
  4 units, Aut, Win, Spr (Staff)

2B. Writing about Social and Political Issues—Writing generally based on readings drawn from social science disciplines.
  4 units, Aut, Win, Spr (Staff)

2C. Writing about Literature—Writing generally based on literature and other creative forms.
  4 units, Aut, Win, Spr (Staff)

4. Directed Writing—For students, especially freshmen and sophomores, who have completed the Writing Requirement and wish further work in writing. Workshops and individual tutorials are tailored to each student’s needs. Graduate credit available.
  3 units (Brawn)

5. Introduction to Literature—Enriches the understanding and appreciation of literature by introducing the essential tools and concepts used in textual analysis. Readings include masterpieces from a wide variety of literary genres, historical periods, and national literatures.
  3 units (not given 1999-2000)

8.9. The Literature of Transformation—(Enroll in Introduction to the Humanities 21A, B.)
  8. 5 units, Win (Evans, Middlebrook)
  9. 5 units, Spr (Evans, Middlebrook)

10. Masterpieces of English Literature I: Chaucer, Shakespeare, Milton, and their Contemporaries—(English majors and others taking 5 units, register for 110.) Introduces medieval and Renaissance literature through the works of Chaucer, Shakespeare, Milton, and selected contemporaries.
  3 units, Aut (Steidle)

11. Masterpieces of English Literature II: From the Enlightenment to the Modern Period—(English majors and others taking 5 units, register for 111.) Introduction to literary masterpieces written in English between 1700 and 1950. Treats fiction and poetry, with some drama. GER:3a (DR:7)
  3 units, Win (B. Gelpi)

12. Masterpieces of American Literature—(English majors and others taking 5 units, register for 112.) Survey of some major works of American literature, 1840-1940. Authors: Hawthorne, Melville, Whitman, Dickinson, James, Fitzgerald, Wright, Faulkner. GER:3a (DR:7)
  3 units, Aut (Jones)

30. The Novel—(English majors and others taking 5 units, register for 130.) Introduction to the novel through a close, sympathetic reading of a variety of major novels, focusing on their construction, narrative technique, and expression of human values. GER:3a (DR:7)
  3 units, Aut (Woloch)
  Win (Drake)

40. Drama—(English majors and others taking 5 units, register for 140.) Principal dramatic forms, development of dramaturgy, and modern masterpieces of the theater from Ibsen to the present.
  3 units, Win (Bartholomew)

60. The English Bible—(English majors and others taking 5 units, register for 160.) Selected readings in important versions of the English Bible as the source, inspiration, and reference for English and American literary works.
  3 units, Spr (Evans, Middlebrook)

65A. Introduction to Medieval Culture—(English majors and others taking 5 units, register for 165A.) Introduction to the development of medieval culture through the study of religious, philosophical, literary, artistic, social, and political sources, emphasizing the interrelationships among them. GER:3a (DR:7 or 8)
  3 units, Win (Brown, Miller)

65B. Arthurian Literature—(English majors and others taking 5 units, register for 165B.) Survey of medieval classics (in translation) that recount the legends of Arthur and his companions. Focus is on the relation between history and fiction, the social uses of literature, and on the construction of gender roles.
  3 units, Spr (Evans, Middlebrook)

65A. Introduction to Native American Studies—(English majors and others taking 5 units, register for 168A.) For students with no background in the area. Introduction to the multidisciplinary field of Native American
Studies as it has emerged in American universities over the past 30 years. Focus is on the study of literary texts by Native American writers, federal policy, western education, and contemporary efforts to bolster tribal traditions in marking out the future for Native American people and communities. GER:4b (DR:5)

not given 1999-2000

68B. Introduction to Afro-American Literature—(English majors and others taking 5 units, register for 168B.) The slave narrative and other representative genres (poetry, short stories, essays, novels): works by Douglass, Jacobs, Chesnutt, Du Bois, Dunbar, Toomer, Hurston, Wright, Ellison, Baldwin, and Morrison. GER:3a (DR:7)

3 units, Win (Boland)

68C. Introduction to Chicana/o Literature—(English majors and others taking 5 units, register for 168C.) Introduction to the literature of the nation’s second largest ethnic minority. Works by Paredes, Gonzales, Alurista, Cervantes, Rivera, Cisneros, Viramontes, Moraga, Anzaldua, Burciaga, Acosta, and Rodriguez are examined to see how these uncertain Americans negotiate their struggles with U.S. immigration policies, racial discrimination, economic exploitation, and cultural transformation through literature.

not given 1999-2000

68E. Introduction to 20th-Century Irish Literature—(English majors and others taking 5 units, register for 168E.) GER:3a (DR:7)

3 units, Win (Boland)

79E. Hemingway and Fitzgerald—(English majors and others taking 5 units, register for 179E.)

3 units, Win (Bacon)

INTRODUCTORY SEMINARS

61N. Stanford Introductory Seminar: The Films of Woody Allen—Preference to freshmen. GER:3a (DR:7)

3 units, Win (Polhemus)

62N. Stanford Introductory Seminar: Eros and Other Problems in Modern American Poetry—Preference to freshmen. GER:3a (DR:7)

3 units, Win (Fields)

63N. Stanford Introductory Seminar: Literature of California—Preference to freshmen. GER:3a (DR:7)

3 units, Win (Jenkins)

64N. Stanford Introductory Seminar: Growing Up in America—Preference to freshmen. GER:3a (DR:7)

3 units, Win (Moya)

65N. Stanford Introductory Seminar: Contemporary Short Story—Preference to freshmen. GER:3a (DR:7)

3 units, Aut (Tallent)

66N. Stanford Introductory Seminar: Landscape and Modern Literature—Preference to freshmen. GER:3a (DR:7)

3 units, Spr (Harkin)

67N. Stanford Introductory Seminar: The Reciprocal Vision—Our Europe, their America—Preference to freshmen. GER:3a (DR:7)

3 units, Win (Evans)

80Q. Stanford Introductory Seminar: Gothic Terror—Preference to sophomores. GER:3a (DR:7)

3 units, Aut (Bender)

81Q. Stanford Introductory Seminar: Authority and Women in the Early Middle Ages—Preference to sophomores. GER:3a,4c (DR:7)

3 units, Aut (Brown)

82Q. Stanford Introductory Seminar: Shakespeare's Plays—Preference to sophomores. GER:3a (DR:7)

5 units, Win (Rehbolz)

FOR MAJORS

BASIC UNDERGRADUATE SURVEYS

Note—Graduate students may receive graduate credit for three 100-level courses.


5 units, Aut (Steidle)

111. Masterpieces of English Literature II: From the Enlightenment to the Modern Period—See 11.

5 units, Win (B. Gelpi)


5 units, Aut (Jones)

130. The Novel—See 30.

3 units, Aut (Woloch)

Win (Drake)

140. Drama—See 40.

5 units, Win (Bartholomew)

160. The English Bible—See 60.

not given 1999-2000

AREA A: LANGUAGE AND RHETORIC

Note—During the academic year 1999-2000, students may satisfy area A by taking Linguistics courses for 3 units.

101. The Language of Poetry—(Enroll in Linguistics 71.)

3-5 units, Win (Kiparsky)

102. History of the English Language—Same as Linguistics 62.

not given 1999-2000

102A. The Development of Englishes around the World—(Same as Linguistics 64.) The emergence of standard English in Britain in connection with the establishment of Caxton’s printing press in the late 15th century. The transformation of English in the context of colonialism and postcolonialism, focusing on the U.S., the Caribbean, S. Asia, and Africa. The characteristics of these languages, and their literary/expres- sive, social, and political uses. The nature of language mixture, and of the simplification and complication processes which resulted in new “pid- gins” and “creoles.” The future of international English. GER:3a (DR:7)

5 units, Spr (Tragossi)

102B. The Structure of English Words—(Enroll in Linguistics 70/270.)

4-5 units, Spr (Leben)

102C. Language and Gender—(Enroll in Linguistics 146.)

4 units, Aut (Eckert)

103A. African-American Vernacular English—(Enroll in Linguistics 73.)

4-5 units, Win (Rickford)

103B. The Literary History of American English—(Same as Linguistics 77.) The development of American English and ideas around “standard” and “literary” with emphasis on the 19th- and early 20th-century writings. Possible topics: American periodicals, dialect literature, folktales, regional literary standards, children’s literature, and women’s ways of conversing in print. GER:3a (DR:7)

5 units, Win (Heath)
104. Language and Literary Theory—(Same as Linguistics 78.) Examination of the central role linguists’ understanding of language structures, uses, and grammatical processes have played in the development of literary criticism and theory. The ways literary language layers affect meaning through genre, imagery, voice, narration, and incorporation of more than one language or dialect. GER:3a (DR:7)
5 units, Spr (Heath)

105. The Language of Short Stories—(Same as Linguistics 72.) Close reading of 20th-century British and American short stories, emphasizing perspective. Introduction to recent works in discourse analysis and conversational structure, as they inform the reading of fiction. (Areas:A,H)

212. The History of Rhetoric—(Same as Comparative Literature 212.) The history of the discipline of rhetoric from Classical Greek and Latin traditions, through medieval, Renaissance, modern, and contemporary treatments. Schemes and tropes (Cicero and Quintilian); grammatical education and the schools (Geoffrey Vinaul, John of Garland); Renaissance handbooks (Wilson, Puttenham); 18th- and 19th-century oratory; current appropriations (e.g., Paul de Man, deconstruction). Texts are read for their deployments of rhetorical devices and their thematic attentions to verbal organization (e.g., selections from the Aeneid, medieval lyrics, Chaucer’s Canterbury Tales, Shakespeare’s Hamlet. Augustan and Romantic Poetry, 19th-century prose fiction). Modern English translations; some emphasis to original-language texts of earlier periods.
4-5 units, Win (Lerer)

206A. American Literature and the Politics of Language—(Areas:A,G)

AREA B: MEDIEVAL

165A. Introduction to Medieval Culture—(Same as History 105A, Medieval Studies 165.) See 65A. GER:3a (DR:7 or 8)
5 units, Win (Brown, Miller)

165B. Arthurian Literature—See 65B.
not given 1999-2000

165E. The Invention of Middle English Literature, 1330-1400—Key texts from a great period of English writing, focusing on the invention of writers, readers, and of literary history itself.
5 units, Aut (Simpson)

165F. From Epic to Romance: Courtly Love and the Heroic Ideal
5 units, Spr (Steidle)

171. Chaucer—His major poetry, concentrating on the Canterbury Tales, with reference to the historical, social, and aesthetic backgrounds of medieval literature. GER:3a (DR:7)
5 units, Win (Summit)

211. Readings in Middle English—The language and dialects of Middle English and readings in the various genres of prose and poetry.
4-5 units, Win (Brown)

AREA C: RENAISSANCE

113. The Renaissance—A basic survey of English literature. GER:3a (DR:7)
5 units, Win (Orgel)

182. Seminar: Renaissance Poetry
5 units, Win (Rehholz)

182A. Seminar: Milton
5 units, Spr (Evans)

AREA D: SHAKESPEARE

173A. Shakespeare—GER:3a (DR:7)
5 units, Aut (Orgel)

173B. Shakespeare—GER:3a,4c (DR:71)
5 units, Win (Parker)

173C. Shakespeare—GER:3a (DR:7)
5 units, Spr (Rehholz)

273. Shakespeare: “The Voice of a Whole Epoch”—Focus is on a number of plays (The Taming of the Shrew, Richard III, Henry V, As You Like It, Hamlet, and Macbeth), written at the height of the Renaissance and on the threshold of the modern era. The plays are studied within their dramatic historical milieu. Early modern art, films, and collateral readings on related issues and theoretical approaches to the plays.
4-5 units, Aut (Brooks)

AREA E: RESTORATION AND 18TH CENTURY

131. The 18th-Century British Novel—GER:3a (DR:7)
5 units, Spr (Harkin)

174B. Gender and Politics in English Literature, 1668-1725—After the 1688 “Glorious Revolution,” the struggle between traditional patriarchalism and modern patriarchy marked various texts. Representations of male and female identities in transition, in novels by Behn and Defoe, plays by Southerne, Pix, and Congreve, poems by Finch, Pope, and Swift.
5 units, Spr (Gabbard)

184. Seminar: The Gothic Novel—(Areas:E,F)
5 units, Aut (Bender)

184A. Seminar: 18th-Century English Poetry
5 units, Spr (Groom)

AREA F: ROMANTIC AND VICTORIAN

132G. The 19th-Century English Novel—GER:3a (DR:7)
5 units, Aut (Alfano)

154. Major Romantic Poets—GER:3a (DR:7)
5 units, Aut (Dekker)

184. Seminar: The Gothic Novel—(Areas:E,F)
5 units, Aut (Bender)

185A. Seminar: The Brontes and Elizabeth Gaskell
5 units, Spr (B. Gelpi)

185G. Seminar: Jane Austen
5 units, Win (Polhemus)

185H. Seminar: Dickens
5 units, Aut (Woloch)

219. Representation and Repression in Fiction
4-5 units, Spr (Woloch)

AREA G: AMERICA BEFORE 1900

121. American Literature and Culture to 1855—(Same as American Studies 150.) Reading texts from Cotton Mather to Melville, examines the major issues in early American cultural and literary history. Developments in the fine and domestic arts; methodological issues associated with the enterprise called “American Studies.” GER:3a (DR:7)
5 units, Win (Fliegelman)

123D. The Multicultural Moment: American Literature from the Civil War to World War I—GER:3a (DR:7)
5 units, Spr (Jones)

175. Henry James—GER:3a (DR:7)
   5 units, Aut (Dekker)

179. Mark Twain and the Gilded Age—The Gilded Age, the satirical novel Mark Twain co-wrote, gave historians the name for the post-Civil War period of rampant corruption, political uncertainty, and flamboyant humbuggery. Mark Twain’s major fictions are read along with related texts of this period of expansion and social conflict, e.g., Twain’s novel of racist delusion, Pudd’nhead Wilson, is read alongside African-American novelist Charles Chesnutt’s fiction of white supremacist terror, The Marrow of Tradition. Other works by Twain: The Innocents Abroad, Roughing It, Adventures of Tom Sawyer, The Adventures of Huckleberry Finn, and A Connecticut Yankee in King Arthur’s Court.
   5 units, Win (Obenzinger)

164G. California Literary Imagination: The 19th Century
   5 units, Spr (J. Moser)

186B. Seminar: Melville
   5 units, Aut (Fliegelman)

186P. Seminar: Representing Poverty in America, 1840-1940
   5 units, Aut (Jones)

186S. Seminar: Poe
   5 units, Win (Merish)

260A. American Literature and the Politics of Language—(Areas:A,G)
   4-5 units, Spr (Jones)

105. The Language of Short Stories—(Same as Linguistics 72.) See Area A. (Areas:A,H) not given 1999-2000

119G. Literature of World War I—GER:3a (DR:7)
   5 units, Win (Bourbon)

126A. 20th-Century American Literature—GER:3a (DR:7)
   5 units, Spr (Rampersad)

133A. Contemporary British Fiction: From Beckett to the Present
   not given 1999-2000

   GER:3a,4c (DR:71)
   5 units, Aut (Tallent)

155A. Modern British Poetry—Survey of several British poets from the 1890s to the present, including Thomas Hardy, G. M. Hopkins, D. H. Lawrence, Philip Larkin, Thom Gunn, and others.
   not given 1999-2000

157A. Modernist Poetry—GER:3a (DR:7)
   5 units, Win (Jenkins)


160I. American Film: The Western
   not given 1999-2000

161E. Modern African Writing in English—Introduces modern writing in English, primarily from E. and W. Africa, in a historical context. Emphasis is on colonial and the immediately postcolonial period, and in the novel, with work in other genres and from other periods.
   not given 1999-2000

162G. Writing by 20th-Century Women of Color—GER:3a (DR:7)
   5 units, Aut (Moya)

162L. Caribbean Literatures in English—Examines various aspects of (post)modern literature written in English and French from within Caribbean cultural sensibility, seeing how authors of Anglophone and Francophone “Third World” novels represent, question, and re/deconstruct the experience of diaspora, hybridity, and ethnicity and their effect on the formation of the subject. Students read a variety of novels that explore the subject’s experience of subalternity socially, politically, and sexually, considering how the different generic, rhetorical, and stylistic representational modes reflect the process of the formation of hybrid identities.
   5 units, Spr (Aldama)

164B. Imagining the Holocaust—How has the literary imagination envisioned the destruction of European Jewry? The Holocaust and European, Israeli, and American responses through documentation; diaries; fiction; poetry by Appelfeld, Borowski, Wiesel, Celan, Levi, Roth, Malamud, Schindler’s List (Keneally); and through visual art. Survivor addresses the class.
   not given 1999-2000

168. American Indian Mythology, Legend, and Lore
   not given 1999-2000

168B. Introduction to Afro-American Literature—See 68B.
   5 units, Spr (Rampersad)

168C. Introduction to Chicana/o Literature—See 68C.
   not given 1999-2000

168D. Introduction to Asian-American Culture—(Enroll in Comparative Literature 168.)
   5 units, Win (Palumbo-Liu)

168E. Introduction to 20th-Century Irish Literature—See 68E.
   GER:3a (DR:7)
   5 units, Win (Boland)

179E. Hemingway and Fitzgerald—See 79E.
   5 units, Win (Bacon)

187. Seminar: Sylvia Plath and Ted Hughes
   5 units, Spr (Middlebrook)

187E. Seminar: British Novels of the Thirties
   5 units, Spr (Jenkins)

187P. Seminar: Short Story Collections
   5 units, Win (Tallent)

187R. Seminar: Literature of Colonialism and Postcolonialism
   5 units, Aut (Drake)

   5 units, Win (Rampersad)

238. The Third World Novel in English
   4-5 units, Aut (Drake)

256F. Black Mountain Poets
   4-5 units, Spr (A. Gelpi)
277B, Virginia Woolf and Bloomsbury
4-5 units, Aut (Halliburton)

279D. Joyce
4.5 units, Spr (Bourbon)

287S. Hardy, Eliot, Auden
4.5 units, Spr (Jenkins)

AREA P: POETRY AND POETICS

92. Reading and Writing Poetry—Introduction to the understanding and writing of poetry. Prerequisite: completion of the writing requirement.

5 units, Aut, Win, Spr (Cohen, Richter)

150. Poetry and Poetics—Introduction to the reading of poetry through a variety of poems, emphasizing the ways the meanings of poems are shaped through diction, imagery, figurative language, and technical elements of verse. GER:3a (DR:7) (WIM)

5 units, Aut (Fields)
Win (Felstiner)
Spr (Boland)

192. Intermediate Poetry Writing—See “Creative Writing.”

5 units, Aut, Spr (Cohen)

THEMES AND TOPICS

100D. Core Seminar: The Protagonist in Literature—(Enroll in Interdisciplinary Studies in Humanities 194W.)

5 units, Win (Woloch)

166D. Introduction to Critical Theory: Literary Theory since Plato—(Same as 266D.) Introduction to the history of literary theory in the Western tradition. Emphasis is on the history of attempts to define, locate, or engage “the literary,” and of attempts to understand it in relation to philosophy, history, politics, sexuality, gender, race, psychology, language, etc.

not given 1999-2000

189D. Seminar: Literature and Technology
5 units, Win (Halliburton)

263. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in 20th-Century America—(Enroll in History 274A/374A.)

4-5 units, Win (Lenoir)

UNDERGRADUATE WORKSHOPS AND DIRECTED READING

191. Expository Writing—Advanced composition open to undergraduates and graduates. Taught through tutorials, short lectures, and general discussion. General instruction in writing.

3 units, Spr (Watters)

194. Individual Research—See section above on “Undergraduate Program, Opportunities for Advanced Work, Individual Research.”

5 units, any quarter

195. Ad Hoc Undergraduate Seminars—Undergraduates (at least three) who wish in the following quarter to study a subject or an area not covered by regular courses, may plan an informal seminar and approach a member of the department to supervise it. A syllabus should be submitted to the director of undergraduate advising at least two weeks before the end of the quarter. No more than 5 units of credit are given for 195 and/or 198 in one quarter. 195 may not be used to fulfill departmental area or elective requirements without permission.

any quarter

196A. Honors Seminar: Critical Approaches to Literature—Required of all seniors in the English honors program.

5 units, Aut (Dunn)
Spr (Bourbon)

196B. Honors Essay Workshop—Required of all English honors students.

3 units, Win (T. Moser)

196T. Honors Tutorial
5 units, Aut, Win, Spr (Staff)

197. Senior Honors Essay
10 units in two quarters, Aut, Win, Spr (Staff)

198. Individual Work—Undergraduates who wish to study a subject or an area not covered by regular courses may, with permission, enroll for individual work under the supervision of a member of the department. No more than 5 units of credit are given for 198 and/or 195 in any one quarter. 198 may not be used to fulfill departmental area or elective requirements without permission. Group seminars are not considered appropriate to 198.

any quarter

199. Senior Independent Study—Open, with department approval, to seniors majoring in English who wish to work throughout the year on a 10,000 word critical or scholarly essay (see “Note” under honors program in English). Applicants should submit a sample of their expository prose and a proposed topic for independent study with a bibliography to the Director of Undergraduate Studies, before preregistration in May of the junior year. Each student accepted is responsible for finding a department faculty director.

10-15 units in three quarters, Aut, Win, Spr (Staff)

CREATIVE WRITING

90. Fiction Writing—Basic problems of narrative and imaginative writing. Prerequisite: completion of the writing requirement.

5 units, Aut, Win, Spr (Brown, Harty, MacDonald, Orozco, Scribner)

190. Intermediate Fiction Writing—May be taken twice. Manuscript must be submitted to Creative Writing Office by last day of preceding quarter. Prerequisite: 90.

5 units, Aut, Win, Spr (Brown, Harty, Scribner, Wolff)

192. Intermediate Poetry Writing—May be taken twice. For admission, manuscript must be submitted to the Creative Writing Office by the last day of preceding quarter. Prerequisite: 92.

5 units, Aut, Spr (Cohen)

290A. Advanced Fiction Writing—Students are selected by the instructor. Promising fiction writers who have completed the 90 and 190 workshops critique their stories with a view toward bringing them to publishable quality. Manuscripts must be submitted to the Creative Writing Office by the last day of the preceding quarter.

4-5 units, Spr (MacDonald)

292. Advanced Poetry Writing—Students are selected by the instructor. Promising student poets write poetry in an atmosphere of mutual aid. Manuscripts must be submitted to the Creative Writing Office by December 15.

4-5 units, Win (Fields)
293. Seminar in Literary Translation—After examining versions of Baudelaire, Rilke, Neruda, Celan, Pagg, Shakespeare, Keats, Dickinson, Whitman, Yeats, Eliot, Frost, and Duncan, students pursue and present their own work in progress, discussing practical and theoretical questions.

3-run, Win (Felstiner)

390. Graduate Fiction Workshop—Primarily for graduate students in the Writing program. May be repeated for credit. Prerequisite: consent of instructor.

3 units, Aut (Wolff)
Win (Tallents)
Spr (L'Heureux)

392. Graduate Poetry Workshop—Primarily for graduate students enrolled in the Writing program. May be repeated for credit. Prerequisite: consent of instructor.

3 units, Aut (Fields)
Win (Boland)
Spr (Kleinzahler)

ADVANCED UNDERGRADUATE/GRADUATE

205. Old English—Introduction to the earliest English literature in its original language, studying the basics of the Old English language and reading select short prose passages of graduated difficulty. After students have some command of the language, class reads choice Anglo-Saxon poems (including portions of Beowulf), not given 1999-2000

209. Introduction to Paleography and Codicology—Introduction to the study of late antique and medieval manuscripts in Latin, of medieval Latin and vernacular scripts, and of the materials and composition of the medieval book.

4-5 units, Aut (Brown)

211. Readings in Middle English—The language and dialects of Middle English and reading in the various genres of prose and poetry. (Area:B)

4-5 units, Win (Brown)

219. Representation and Repression in Fiction

4-5 units, Spr (Woloch)

238. The Third World Novel in English

4-5 units, Aut (Drake)

256F. Black Mountain Poets

4-5 units, Spr (A. Gelpi)

260A. American Literature and the Politics of Language

4-5 units, Spr (Jones)

263. Undergraduate Colloquium: Bodyworks—Medicine, Technology, and the Body in 20th-Century America—(Enroll in History 274A, 374A.)

4-5 units, Win (Lenoir)

266D. Introduction to Critical Theory: Literary Theory since Plato—See 166D.

not given 1999-2000

273. Shakespeare: “The Voice of a Whole Epoch”—See Area D.

4-5 units, Aut (Brooks)

277B. Virginia Woolf and Bloomsbury

4-5 units, Aut (Halliburton)

279D. Joyce

4-5 units, Spr (Bourbon)

284. Concord and Jena: The Coming of Romanticism to America—(Enroll in German Studies 292A.)

3-5 units, Spr (Mueller-Vollmer)

287S. Hardy, Eliot, Auden

4-5 units, Spr (Jenkins)

296. Critical Theory and the Profession: An Introduction to Graduate Study for A.M. Students—Introduces incoming graduate students to literary criticism and theory in the context of the past and presents paradigms, conflicts, and modes of institutionalization. The role of text in relation to social issues, canon formation, and the emergence of “new” approaches (e.g., cultural and ethnic studies) are compared and contrasted with more traditional approaches (e.g., philology, hermeneutics).

5 units, Aut (Haliburton)

GRADUATE

COLLOQUIA

300B. Colloquium: The Bible and Literature—(Same as Comparative Literature 300B.) Combines intensive readings from Genesis to Revelation, with selections from a wide range of literary texts (from Dante to medieval drama, through Shakespeare, Spenser, Renaissance lyrics and Milton to 19th- and 20th-century poetry and novels from British, American, African-American, African, and other writing). Related topics: the relation between biblical eschatology and literary structures, Song of Songs and the history of lyric, the influence on prototypes of race/gender difference, citations in radical and hegemonic political contexts.

4-5 units, Spr (Parker)

300C. Colloquium: Metamorphoses, Myths and Monsters—Metamorphosis was a dynamic principle of classical myths and early modern fairy tales, and returns strongly as a theme in contemporary fascination with beasts and monsters. The changing meanings and functions of shape-changing in writers ranging from Apuleius, Ovid, and Shakespeare to Giambattista Basile, Charles Perrault, Marie-Catherine d'Aulnoy, Leonora Carrington, and Angela Carter.

4-5 units, Spr (Warner)

302H. Colloquium: The Reformation in English Literature

4-5 units, Aut (Summit)

303. Colloquium: 18th-Century Geographies

4-5 units, Win (Harkin)

303A. Colloquium: High and Low Life—Polite and Popular Forms in 18th-Century Literature

4-5 units, Spr (Castle)


4-5 units, Spr (Kaufman)

306. Colloquium: American Enlightenment

4-5 units, Aut (Fliegelman)
314. Seminar: Epic and Empire—(Same as Comparative Literature 314.) Focusing on Virgil's Aeneid and its influence, traces the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period. 5 units, Win (Parker)

356. Seminar: Whitman and Dickinson 4-5 units, Win (A. Gelpl)

366. Seminar: Literary Theory—Structuralism and After—(Same as Comparative Literature 366.) Introduction to the theorists whose ideas shaped the study of literature and culture over the past generation. The entry point is recent works by Butler, Guillery, Spivak, Zizek, and others. Selections from prior theorists focus on issues of present concern: Saussure, Jakobson, Volosinov, Levi-Strauss, Lacan, Althusser, Austin, Foucault, Derrida, Bourdieu, and Kristeva. 5 units, Aut (Simpson)

370. Seminar: Suffering History—Exemplary Lives in Medieval Literature—Considers the representation of a series of lives, of women and men, secular and religious, in which decisive historical transitions are suffered and/or provoked. 4-5 units, Aut (Simpson)

373A-B. Seminar: Shakespeare—Text and Performance 4-5 units, Aut, Win (Orgel)

383B. Seminar: Literary Forgeries—The history and theory of literary plagiarism, authenticity and inspiration, and copying and counterfeiting? Writers such as Chatterton, Gide, Baudrillard. 4-5 units, Spr (Groom)

385H. Seminar: Early 20th-Century Avant-Garde 4-5 units, Aut (Perloff)

389A. Seminar: Realist Theory and the Predicament of Postmodernism 4-5 units, Aut (Moya)

389B. Modern Seminar—(Enroll in Interdisciplinary Studies in Humanities 314.) 3-5 units, Aut (Bourbon)

391. Advanced Work in Writing and Criticism any quarter

394. Independent Study—Preparation for qualifying examination and for the Ph.D. oral examination. any quarter

395. Ad Hoc Graduate Seminars—Three or more graduate students who wish in the following quarter to study a subject or an area not covered by regular courses and seminars may plan an informal seminar and approach a suitable member of the department to supervise it. any quarter

396. Laboratory in Pedagogy—Required for first-year Ph.D. students in English, Modern Thought and Literature, and Comparative Literature (except for Comparative Literature students doing their teaching in a foreign language). Preparation for TA in undergraduate literature courses. Focus is on leading discussions and grading papers. 2 units, Aut (Cormack, Rebholz)

397A. Teachers Workshop I—Seminar and apprenticeship required of second-year graduate students in English, Modern Thought and Literature, and Comparative Literature teaching in the Writing and Critical Thinking Program. Each student is assigned as an apprentice to an experienced teacher and sits in on classes, conferences, and tutorials, with eventual responsibility for conducting a class, grading papers, and holding conferences. Meetings discuss rhetoric, theories of composition, and the teaching of writing. Readings in rhetoric and pedagogy. Each student designs a two-quarter syllabus in preparation for teaching English 1 and 2. 1-5 units, Aut (Reichard, Rebholz, Watters)

399. Thesis 3 units, any quarter

399. Thesis 3 units, any quarter

Program in Ethics in Society

Director: Debra Satz (Philosophy)

Steering Committee: Christopher Bobonich (Philosophy), Arnold Eisen (Religious Studies), John Ferejohn (Political Science), Barbara Koenig (Center for Biomedical Ethics), Susan Okin (Political Science), Rob Reich (Political Science), Bill Simon (Law)

Affiliated Faculty: Kenneth Arrow (Economics, emeritus), Donald Barr (Human Biology), Barton Bernstein (History), Michael Bratman (Philosophy), Albert Camarillo (History), Lori Gruen (Philosophy), Elizabeth Hansot (Political Science), Agnieszka Jaworska (Philosophy), David Kennedy (History), David K. Stevenson (Pediatrics), Susan Okin (Political Science), John Ferejohn (Political Science), Rob Reich (Political Science), Bill Simon (Law)

The Program in Ethics in Society is designed to foster scholarship, teaching, and moral reflection on foundational issues in personal and public life. The program is grounded in moral and political philosophy, but it extends its concerns across a broad range of traditional disciplinary domains. The program is guided by the idea that ethical thought has application to current social questions and conflicts, and it seeks to encourage moral reflection and practice in areas such as international relations, politics, science, medicine, law, and business.

Current and planned initiatives of the program include:

1. Supporting and fostering ethics research.
2. Supporting innovative teaching which focuses on the ethical dimensions relevant to the different disciplines across the curriculum.

3. Establishing a yearly faculty-graduate seminar focusing on topics in ethics and public life.

The program also sponsors public lecture series, including the Tanner Lectures in Human Values, the Wesson Lectures in Problems of Democracy, and the Ethics in Society lecture series on a current social issue.

Students interested in pursuing studies which bring moral and political theory to bear on issues in public life should consult the director.

UNDERGRADUATE PROGRAM
HONORS

The honors program in Ethics in Society is open to majors in every field and may be taken in addition to a department major. Students should apply for entry at the end of Spring Quarter of the sophomore year or at the beginning of the Autumn Quarter of the junior year. Applicants should have a cumulative grade point average (GPA) of 'B+' or higher. They should also maintain this minimum average in the courses taken to satisfy the requirements.

Requirements*—

1. Required courses:
   a) Philosophy 20, Introduction to Moral Theory, or Philosophy 170. This is normally taken in the sophomore year.
   b) Philosophy 30, Introduction to Political Philosophy (same as Public Policy 103A), or Philosophy 171. This is normally taken in the sophomore year. At least one of (a) and (b) must be taken at the upper level.
   c) Ethics in Society 77, The Ethics of Social Decisions (same as Philosophy 77). Ethics in Society honors students must enroll under Ethics in Society. This course is aimed primarily at the junior year and is taken upon admission to the honors program.

2. One 4- or 5-unit undergraduate course on a subject approved by the honors adviser, designed to encourage students to explore those issues in Ethics in Society that are of particular interest to them. Courses of relevance to the Program in Ethics in Society are offered by members of the program committee and by other departments. Students may also take a course with the honors thesis in mind. To promote a broad interdisciplinary approach, this elective should normally be outside the Department of Philosophy. Students are not restricted to choosing from the sample of such courses included below.


4. Ethics in Society 200A,B, Honors Thesis, on a subject approved by the honors adviser, 8-10 units, with work spread over two quarters.

*Courses credited toward the Ethics in Society honors requirements may not be double counted for the Philosophy major or minor.

A typical student takes Philosophy 20 or 170 and 30 or 171 in the sophomore year. On admission to the honors program as a junior, he or she takes Ethics in Society 77, given Winter Quarter. Requirement 3 is also fulfilled in Winter Quarter, and requirement 2 (the optional subject) at any time during the junior year, or possibly Autumn Quarter of the senior year. The honors thesis is normally written during the Autumn and Winter Quarters of the senior year.

GRADUATE STUDIES

In addition to the Ethics in Society Lecture Series, the program’s main provision for graduate students is a seminar on a topic in applied ethics. Students present talks on normative themes of their own choosing, providing an opportunity for graduate students from different disciplines to interact in the process of deliberating over ethical matters of common interest.

COURSES
UNDERGRADUATE

For course information not listed, refer to the relevant department listings elsewhere in this bulletin. See the Time Schedule each quarter for any changes in listings.

11N. Stanford Introductory Seminar: Autonomy—(Enroll in Philosophy 11N.)
   3 units, Spr (Jaworska)

20. Introduction to Moral Theory—(Enroll in Philosophy 20.) What is the basis of our moral judgments? What makes right actions right, and wrong actions wrong? (Existing social rules? The consequences of human happiness? Conformity to a rule of reason?) What sort of person is it best to be? The answers to these classic questions about ethics are examined in the works of traditional and contemporary authors.
   5 units, Spr (Rosner)

30. Introduction to Political Philosophy Theory—(Enroll in Philosophy 30, Political Science 51D, Public Policy 103A.) Critical introduction to issues of state authority, justice, liberty, and equality. The issues are approached through major works in political philosophy. Topics: human nature and citizenship, the obligation to obey the law, democracy and economic inequality, equality of opportunity and affirmative action, religion and politics. Readings: Aristotle, Locke, Rousseau, Mill, Marx, Rawls, the U.S. Constitution, some Supreme Court cases.
   5 units, Aut (Okin)

53N. Stanford Introductory Seminar: Plato and Aristotle on Justice—(Enroll in Political Science 53N.)
   3 units, Aut (Reich)

76. Justice and Public Service—(Same as Philosophy 176A.) The meaning and justification of public service, and its relationship to political activism and to justice.
   4 units (Satz) not given 1999-2000

77. The Ethics of Social Decisions: Racism, Poverty, and Environmental Justice—(Same as Philosophy 77.) The application of moral reasoning to a particular social or political issue.
   4 units, Spr (Grae

78. Medical Ethics—(Enroll in Philosophy 78.)
   4 units, Aut (Jaworska)

100. Computers, Ethics, and Social Responsibility—(Enroll in Computer Science 201.)
   4 units, Spr (Johnson)

110. Ethics and Public Policy—(Enroll in Science, Technology, and Society 110; Public Policy 103B.)
   5 units, Win (McGinn)

   1-4 units, Aut, Win, Spr (Lasagnan, Gupta)

150. Economics and Public Policy—(Enroll in Economics 150, Public Policy 104.)
   5 units, Win (Noll)

151A,B. Undergraduate Colloquium: Poverty and Homelessness in America—(Enroll in History 251A,B.)
   8 units (Camarillo) not given 1999-2000

156. Economics of Health and Medical Care—(Enroll in Economics...
156. Health Research and Policy 256, Medical Information Sciences 256.)
5 units, Win (McClellan)

157. Seminar: Morality and Law—(Enroll in Political Science 157.)
5 units (Hardin) given 2000-01

158R. Children’s Citizenship: Justice across Generations—(Enroll in Political Science 158R.)
5 units, Aut (O’Reich)

159R. Issues in Public Service—(Enroll in Political Science 159R.)
5 units, Win (Reich)

164. Introduction to Race and Ethnicity in the American Experience—(Enroll in History 64, American Studies 164.)
5 units, Win (Castillo)

167/267. Seminar: Gender, Development, and Women’s Human Rights in International Perspective—(Enroll in Political Science 167/267.)
5 units, Aut (Okin)

170. Kantian Ethical Theory—(Enroll in Philosophy 170.)
4 units, Win (Jaworska)

172/272. Is Morality too Demanding?—(Enroll in Philosophy 172/272.)
4 units (Gruen) not given 1999-2000

176B. Philosophy of Law—(Enroll in Philosophy 176B.)
4 units, Aut (Gruen)

177. Philosophical Issues Concerning Race and Racism—(Enroll in Philosophy 177.)
4 units, Spr (Satz)

190. Ethics in Society Honors Seminar—(Same as Philosophy 178.)
Interdisciplinary. Students present issues of public and personal morality; topics are chosen with the advice of the instructors. Student-prepared reading list is made available a week prior to the presentation. Group discussion follows.
3 units, Win (Reich)

200A/B. Honors Thesis—Limited to Ethics in Society honors students.
8-10 units, any two quarters (Staff)

222D. Human Rights Issues in Sub-Saharan Africa—(Enroll in Political Science 222D.)
3-5 units, Spr (Abernethy, Diamond)

266. Seminar: Gender and Western Political Theory—(Enroll in Political Science 266.)
5 units (Okin) not given 1999-2000

268. Seminar: Contemporary Theories of Justice—(Enroll in Political Science 268.)
5 units (Okin) not given 1999-2000

271. Ethics: Topics in Democratic Theory—(Enroll in Philosophy 271.)
3 or 5 units (Ferejohn, Satz) not given 1999-2000

FEMINIST STUDIES

Chair: Estelle Freedman
Program Committee:
Staff: Cathy Jensen, Ineko Tsuchida

Resource Faculty and Staff:
Anthropological Sciences: Hill Gates
Art and Art History: Wanda Corn, Pamela Lee, Suzanne Lewis, Melinda Takeuchi
Asian Languages: Susan Matsioff, Yoshiko Matsumoto
Business: Joanne Martin, Sonja Grier
Chemistry: Carl Djersassi
Classics: Andrea Nightingale, Susan Treggiari
Comparative Literature: Patricia Parker
Cultural and Social Anthropology: Paulla Ebron, Akhil Gupta, Miyako Inoue, Purnima Mankekar, Sylvia Yanagisako
Drama: William Eddelman, Harry J. Elam, Cherrie Moraga, Anna Deaver Smith
Education: Elizabeth Cohen, Francisco Ramirez, David Tyack
English: Eavan Boland, Terry Castle, Sandra Drake, Barbara Gelpi, Maureen Harkin, Sharon Holland, Diane Middlebrook, Paula Moya, Stephen Orgel, Horace Porter, Ramon Saldivar, Jennifer Summit, Elizabeth Tallent
Feminist Studies: Susan Krieger
French and Italian: Brigitte Cazelles, Carolyn Springer
German Studies: Russell Berman, Kathryn Strachota
History: Phillippe Buc, Paula Findlen, Estelle Freedman, Kennell Jackson, Nancy Kollmann, Carolyn Lougee, Mary L. Roberts, Michael Thompson
Human Biology: Ellen Porzig
Institute for Research on Women and Gender: Ineko Tsuchida
Law: Barbara Babcock, Janet Halley, Margaret Radin, Deborah Rhode
Library: Kathryn Kerns
Linguistics: Penny Eckert, Shirley Heath
Medical School: Anne Arvne, Helen Blau, Roy King, Cheryl Koopman, Herbert Liederman, Iris Litt, Charles Massion
Philosophy: Lorie Gruen, Debra Satz
Political Science: Elisabeth Hansot, Terry Karl, Susan Okin
Psychology: Albert Bandura, Laura Carstensen, Peter Hegarty, Hazel Markus
Religious Studies: Rudy Busto, Hester Gelber
Slavic Languages: Monika Greenleaf
Sociology: Cecilia Ridgeway
Spanish and Portuguese: Claire Fox, Mary L. Pratt, Yvonne Yarbro-Bejarano

Feminist Studies is an interdisciplinary undergraduate program investigating the significance of gender in all areas of human life. Feminist analysis is based on the assumption that gender is a crucial factor in the organization of our personal lives and our social institutions. It focuses on how gender differences and gender inequality are created and perpetuated. The courses offered by the program use feminist perspectives to expand and reevaluate the assumptions at work in traditional disciplines in the study of individuals, cultures, social institutions, policy, and other areas of scholarly inquiry.

The Program in Feminist Studies coordinates the courses offered on women, gender, sexuality, and feminism throughout the University and facilitates the undergraduate major and minor in Feminist Studies. In addition, it seeks to encourage feminist analysis and teaching at Stanford, both in courses instituted within the program and those housed within departments.

The committee awards the annual Michelle Z. Rosaldo and Francisco Lopes prizes for the best undergraduate essays on women, gender, or feminism. The prizes are awarded in two divisions: a thesis division for senior honors theses and masters’ papers written by undergraduates in coterminal degree programs, and an essay division. The Rosaldo prizes are awarded for the best work in the social sciences and the Lopes prizes for the best work in the humanities. Submissions are due in the Feminist Studies office April 20 for essays and May 20 for theses. Essays and theses completed later in Spring Quarter may be submitted for consideration the following year.
UNDERGRADUATE PROGRAMS
BACHELOR OF ARTS

The major in Feminist Studies may be taken as a single major, as one of multiple majors, or as a secondary major. If taken as one of multiple majors, none of the 60 units counted toward the major in Feminist Studies may overlap with units counted toward the major in another department or program. But if taken as a secondary major, then up to 30 of the units counted toward the Feminist Studies major may also be counted toward fulfilling the major requirements in another department or program if that department or program consents. A maximum of 10 of the 60 units for the major may be taken on a satisfactory/no credit basis; a maximum of 10 may be taken as independent study or directed reading.

Students interested in Feminist Studies should consult with the chair or program coordinator during sophomore year. The major should normally be declared by the beginning of a student’s third year, and must be declared by the senior year. Curriculum guidelines are available at the Feminist Studies office in Serra House, telephone (650) 723-2412, or visit the web site at www.stanford.edu/dept/femstudies. Majors should choose two faculty advisers, one of whom is usually the chair of the program, from the list of resource faculty (see above) and may consult with peer advisers. Faculty advisers work closely with the student in helping design an appropriate program of study. A proposal explaining the rationale for the plan of study and signed by both advisers must be submitted to the program office. The program office arranges a meeting between the student, chair, and the other adviser at the student’s request.

CURRICULUM

The following course of study is recommended for a major in Feminist Studies: a minimum of twelve courses (a core of five plus seven others) for a total of at least 60 units. The seven courses not in the core should be chosen in consultation with the student’s advisers. To ensure coverage, intellectual focus and breadth in the program, and practical experience, the twelve courses required for the major should be distributed among the core (five courses), the focus (at least five courses), and electives. A practicum is also required, in addition to the twelve courses above. At least one course must focus on cross- or multicultural feminist studies.

CORE

The core consists of five courses. The first three are required and the remaining two should be chosen from the list of feminist studies courses. One of these courses should be in the social sciences, the other in the humanities.

Courses that fulfill the social science requirement in the Feminist Studies (FS) major can be found among courses listed under Cultural and Social Anthropology, Education, History, Human Biology, Law, Political Science, Psychology, and Sociology. Courses that fulfill the humanities requirement in the Feminist Studies major can be found among courses listed in English, Philosophy, Religious Studies, the arts, and languages.

Required Courses—FS 101 (Introduction to Feminist Studies), 102 (a theory course), and 103 (a methodology course). 101 is a prerequisite for FS 102 and 103.

FOCUS

The seven courses not part of the core, at least five should reflect a particular thematic focus, and all seven should be chosen in consultation with the student’s advisers.

1. At least three of the focus courses should be Feminist Studies courses or be selected from the list of affiliated courses in other departments and programs (see below).
2. At least one should be a major survey, methodology, or theory course, offered by a department or interdepartmental program as an initiation into the practice of study in the field.

The following thematic clusters illustrate foci that individual students can design, in consultation with their advisers:

Cross-Cultural Perspectives on Gender
for honors certification no later than the third quarter of the junior year.
To apply, students must first consult the Chair of the Program in Feminist Studies outlining the plan for course work, the rationale for the program, and an honors project. The chair acts as one of the student’s faculty advisers and helps the student select two other faculty advisers to supervise the student’s progress.

Requirements—
1. Thirty units of course work in addition to the units granted for the honors project.
   a) 15 units of core courses: Feminist Studies 101, 102, and 103.
   b) Select the remaining 15 units, in consultation with advisers, from the list of courses approved by the Feminist Studies program. None of the courses selected may simultaneously count toward the student’s major.
2. Submit in the senior year two preliminary drafts, and then a final draft, of a thesis based on substantial research. The thesis must be of acceptable quality on an aspect of Feminist Studies approved by the student’s faculty advisers. The final draft must be submitted three weeks before the end of exam week during Spring Quarter on May 19. Students enroll in FS 105 for 10-15 units of credit for preparation of the honors thesis, but these units do not count toward requirement ‘1.’

COURSES
(WIM) indicates that the course meets the Writing in the Major requirements.

Courses listed under the Core and Interdepartmental Offerings contain a significant component of attention to gender difference, the situation of women in Western or non-Western cultures, or the role of sexism in social organization. Some courses are planned after this bulletin is printed. Updated listings are available at the Feminist Studies office and on the web site at www.stanford.edu/dept/semstudies.

CORE

101. Introduction to Feminist Studies—(Same as History 173C.) How gender inequality is created and perpetuated, and when feminist theory and movements emerge to respond to gender inequality. Topics: theories of inequality; history of feminism; international and multicultural perspectives on feminism; women’s work, health, and sexuality; creativity; spirituality; and movements for social change. GER:3b,4c (DR:9f)
   5-6 units, Aut (Freedman)

103B/203B. Subjectivity in Feminist Research—Development of each student’s personal voice in feminist research and writing. Emphasis is on the diversity of women’s experiences. Fosters skills in personal essay writing. Prerequisites: 101, consent of instructor.
   5 units, Spr (Krieger)

104. Practicum/Senior Seminar—For Feminist Studies majors only. Two-quarter, biweekly senior seminar. Students present oral reports on the relationship of the practicum to their academic work, submit a written analysis of the practicum, and discuss applications of feminist scholarship. Honors majors also begin thesis work in the seminar. (WIM)
   3-6 units, Aut, Win (Townsend)

105,106. Honors Work

108. Internship in Feminist Studies—For non-majors. Augments relevant course work in Feminist Studies with a supervised field, community, or lab experience, e.g., law offices, medical research and labs, social service agencies, legislative and other public offices, and local and national women’s organizations. Credit represents approximately three hours work per unit each week. Required: a 3-5 page statement on the nature of the internship and its relevance to Feminist Studies. Must be arranged in advance through the program office (see application form on our web page). Prerequisites: at least one course in Feminist Studies, written consent of faculty sponsor.
   1-6 units, any quarter

195. Directed Reading

INTERDEPARTMENTAL OFFERINGS

71N. Stanford Introductory Seminar: Language and Gender in Japan—Myths and Reality—(Enroll in Asian Languages 71N.)
   3 units, Spr (Matsumoto)

119. Critical Perspectives on Popular Culture—(Enroll in Cultural and Social Anthropology 13.)
   5 units, Spr (Mankekar)

130. Gender and Education—(Enroll in Education 170.)
   4 units, Aut (Christopher)

134. Sociology of Gender—(Enroll in Sociology 142.)
   3-5 units, Spr (Ridgeway)

139. Rereading Judaism in Light of Feminism
   4-5 units, Aut (Karlin-Neumann)

139A. Education and the Status of Women: Comparative Perspective—(Enroll in Sociology 134, Education 197.)
   4-5 units, Win (Ramirez)

160A. Dance, Gender, and History—(Enroll in Dance 160.)
   3-4 units, Win (Ross)

160B. Dance and Live Art in the 20th Century—(Enroll in Dance 161.)
   3-4 units, Spr (Ross)

168C. Introduction to Chicana/o Literature—(Enroll in English 168C.)
   not given 1999-2000

169B. Race and Sexuality—(Enroll in Spanish and Portuguese 389E.)
   5 units, Win (Yarbro-Bejarano)

170. The 19th-Century English Novel—(Enroll in English 132G.)
   5 units, Aut (Alfano)

179. Stanford Introductory Seminar: Gender, and Interaction in the U.S.—(Enroll in Sociology 40N.)
   5 units, Win (Ridgeway)

214A. Medieval Women—(Enroll in German Studies 134P.)
   4 units (Poor) not given 1999-2000

240/340. Lesbian Communities and Identities—Scholarship and research on lesbian experiences. Issues of homophobia, lesbian intimacy and sexuality, femme and butch roles, lesbian separatism, and the diversity of lesbian communities and identities. Prerequisite: consent of instructor.
   5 units, Spr (Krieger)

260. Seminar: Gender and Western Political Theory—(Enroll in Political Science 266.)
   5 units (Okin) not given 1999-2000

267. Seminar: Gender, Development, and Women’s Human Rights in International Perspective—(Enroll in Political Science 267.)
   5 units, Aut (Okin)

285B. Chicana Cultural Studies—(Enroll in Spanish and Portuguese 285E.)
   3-5 units, Spr (Yarbro-Bejarano)

301. Graduate Seminar in Interdisciplinary Feminist Scholarship
   3-5 units, Spr (Neyer)
AFFILIATED DEPARTMENTAL LISTINGS

These courses also count toward the Feminist Studies major and minor.

ANTHROPOLOGICAL SCIENCES
102. Women, Fertility, and Work
5 units (Gates) not given 1999-2000

CULTURAL AND SOCIAL ANTHROPOLOGY
77. Japanese Society and Culture
5 units, Win (Inoue)

DRAMA
65. American Musical Theater: Broadway/Hollywood
4 units, Aut (Eddelman)

156. Contemporary Ethnic Drama
4 units (Elam) alternate years, given 2000-01

EDUCATION
201. History of Education in the United States
3 units, Aut (Tyack, Williamson)

FRENCH AND ITALIAN
192E. Images of Women in French Cinema: 1930-1990
3-5 units, Spr (Apostolides)

HUMAN BIOLOGY
128. The Human Gamete and Pre-Embryo
3 units, Aut (Porzig)

LAW
307. Gender, Law, and Public Policy—(For graduate students.)
3 term units (Rhode)

LINGUISTICS
146. Language and Gender
4 units, Aut (Eckert)

MEDICINE
237. Women and Health
1-2 units, Aut (Grudzen, Massion)

MUSIC
14N. Stanford Introductory Seminar: Women Making Music
3 units, Win (Hadlock)

PHILOSOPHY
175. Feminist Practical Ethics
4 units (Gruen) not given 1999-2000

POLITICAL SCIENCE
151A. History of Political Thought I: Ancient, Classical, and Christian Worlds
5 units, Aut (Hansot)

151B. History of Political Thought II: The Origins of Modern Democracy
5 units, Win (Okin)

RELIGIOUS STUDIES
109. God and Gender: Christianity through the Eyes of Women
4 units, Win (Pitkin)

FINANCIAL MATHEMATICS

Director: George Papanicolaou
Core Faculty:
Business: D. Duffie, J. M. Harrison, K. Singleton
Economics: T. Amemiya, M. Kurz, F. Wolak
Electrical Engineering: T. Cover
Mathematics: A. Dembo, P. Diaconis, G. Papanicolaou

Steering Committee:

This is an interdisciplinary program that aims to provide a master's level education in applied and computational mathematics, statistics, and financial applications to individuals with strong mathematical skills. The departments of Mathematics and Statistics, in close cooperation with the departments of Economics, Engineering-Economic Systems and Operations Research, as well as the Graduate School of Business, provide many of the basic courses.

GRADUATE PROGRAMS

MASTER OF SCIENCE

The program requires that the student take 36 units of work, or twelve courses of 3 units each, from the list of offerings provided below. Ordinarily, three or four quarters are needed to complete all requirements.

Admission—To be eligible for admission, students are expected to have taken the following courses or their equivalent:

1. Linear algebra at the level of Mathematics 103.
2. Advanced Calculus (Real Analysis) at the level of Mathematics 115.
5. Computer programming at the level of Computer Science 106A.

Some of these courses, for example, Statistics 217-218, are offered as Summer courses and can be taken by candidates lacking the required background. Additional information about summer courses is posted on the program web site; see http://math.stanford.edu/html/fmmath.html.

Candidates for admission must take the general Graduate Record Examination as well as the subject test in Mathematics. Information about this exam can be found in http://www.gre.org.

Requirements—For the M.S. degree in Financial Mathematics, students must fulfill the following six required courses:

1. In stochastic processes and statistics:
   a) Mathematics 236 (Introduction to Stochastic Differential Equations)
   b) Statistics 240 (Statistical Methods in Finance) or Economics 275 (Time Series).
2. In differential equations, simulation, and computing:
   b) Mathematics 240 (same as Statistics 245) (Computation and Simulation in Finance)
3. In finance and economics:
   b) Mathematics 241 (same as Statistics 250 and Economics 289) (Mathematical Finance)

These courses must be taken for letter grades, and an overall 2.75 letter grade point average (GPA) is required. There is no thesis requirement.
Courses that are equivalent to the above and have been taken previously may be waived by the adviser, in which case they must be replaced by elective courses in the same subject area.

In addition, students must take at least six approved elective courses from a list that can be found on the website; see http://math.stanford.edu/html/fmmath.html.

**COURSES**

The following are required core courses.

**MATHEMATICS**

3 units, Spr (Papanicolaou)

3 units, Win (Liu)

3 units, Aut (Mattingly)

3 units, Spr (Papanicolaou)

**241. Mathematical Finance**—(Enroll in Statistics 250.)
3 units, Spr (Lai)

**STATISTICS**

**240. Statistical Methods in Finance**—Regression analysis and applications to the Capital Asset Pricing Model and multifactor pricing models. Smoothing techniques and estimation of yield curves. Classification and credit risk. Statistical analysis and econometric modeling of financial time series. Problem sets include hands-on experience with real data.
3 units, Win (Owen)

**245. Computation and Simulation in Finance**—(Enroll in Mathematics 240.)
3 units, Spr (Papanicolaou)

3 units, Spr (Lai)

**FILM STUDIES**

Stanford does not offer an undergraduate major in Film Studies, but a number of courses are offered in various departments. A professional A.M. curriculum in Documentary Film and Video Production is offered by the Department of Communication.

**COURSES**

**ART AND ART HISTORY**

**140/240. Introduction to Film Study**
4 units, Aut (Bukatman)

**249. Seminar: French New Wave Film (1958-68)—Theory and Practice**
4 units, Spr (Lewis)

**347. Phenomenology of Film**
4 units, Win (Bukatman)

**COMMUNICATION**

The following courses are open to all students:

**122A/222A. Documentary Film**
5 units, Aut (Breitrose)

**141B/241B. History of Film: The Second 50 Years**
5 units, Win (Breitrose)

**CULTURAL AND SOCIAL ANTHROPOLOGY**

**13. Critical Perspectives on Popular Culture**
5 units, Spr (Mankekar)

**ENGLISH**

**3C. Writing about Literature**
4 units, Aut, Win, Spr (Staff)

**61N. Stanford Introductory Seminar: The Films of Woody Allen**
3 units, Win (Polhemus)

**FRENCH AND ITALIAN**

**20B. French Cinema**
2 units, Win (Staff)

**189Q. Stanford Introductory Seminar: Romance—Texts and Movies**
4 units, Win (Caselles)

**191E. The Cinema as a Space of the Sacred**
5 units, Spr (Campani)

**192E. Images of Women in French Cinema: 1930-1990**
3-5 units, Spr (Apostolidès)

**GERMAN STUDIES**

**20M. "Mitt" Movie Series**
1 unit, Aut, Win, Spr (Staff)

**162A. Weimar Cinema**
3 units, Win (Staff)

**HISTORY**

**24S. Sources and Methods Seminar: History and Cinema in East-Central Europe**
5 units, Spr (Kunicki)

**147A. African History in Novels and Film**
5 units, Aut (Jackson)
### OVERSEAS STUDIES

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>179B</td>
<td>German Film and its European Context</td>
<td>4</td>
<td>Aut (Kramer)</td>
</tr>
</tbody>
</table>

### SLAVIC LANGUAGES AND LITERATURE

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>148/248</td>
<td>The Factory of the Eccentric Actor (1921-1929): Between Theater and Film, Avant-Garde and Trivial Genres, East and West</td>
<td>4</td>
<td>Aut (Bulgakowa)</td>
</tr>
<tr>
<td>166/266</td>
<td>Russia on the Silver Screen: U.S., Western European, and Emigré Cinema</td>
<td>4</td>
<td>Spr (Bulgakowa)</td>
</tr>
<tr>
<td>168/268</td>
<td>Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present</td>
<td>4</td>
<td>Aut (Bulgakowa)</td>
</tr>
</tbody>
</table>

### SPANISH AND PORTUGUESE

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>112N</td>
<td>Stanford Introductory Seminar: The U.S.-Mexico Border Region in Film and Literature</td>
<td>3-5</td>
<td>Fox</td>
</tr>
<tr>
<td>168E</td>
<td>Chilean Studies: Modern Chilean Culture through Music, Film, and Literature 1945-1997—(Same as Latin American Studies 120.)</td>
<td>3-5</td>
<td>Spr (Missana)</td>
</tr>
<tr>
<td>191</td>
<td>Contemporary Spanish Cinema I: From Surrealism to Almodóvar</td>
<td>3-5</td>
<td>Aut (Haro)</td>
</tr>
<tr>
<td>192</td>
<td>Contemporary Spanish Cinema II: The New Generation of Film-Makers</td>
<td>3-5</td>
<td>Aut (Haro)</td>
</tr>
<tr>
<td>254</td>
<td>Latin American Cinema: The Short Story in Film</td>
<td>3-5</td>
<td>Ruffinelli</td>
</tr>
<tr>
<td>256</td>
<td>Mexico through the Eyes of Buñuel and Ripstein</td>
<td>3-5</td>
<td>Ruffinelli</td>
</tr>
<tr>
<td>258</td>
<td>Dictatorships Aftermath: New Literature/New Cinema</td>
<td>3-5</td>
<td>Ruffinelli</td>
</tr>
<tr>
<td>269</td>
<td>Borges</td>
<td>3-5</td>
<td>Ruffinelli</td>
</tr>
<tr>
<td>279</td>
<td>Senior Seminar: Heroes or Villains? Transgression in Spanish Art, Film, and Literature</td>
<td>3</td>
<td>Haro</td>
</tr>
<tr>
<td>341</td>
<td>Gabriel García Márquez and Magical Realism</td>
<td>3-5</td>
<td>Win (Ruffinelli)</td>
</tr>
<tr>
<td>363</td>
<td>Third Cinema and After</td>
<td>3-5</td>
<td>Fox</td>
</tr>
</tbody>
</table>

### FOOD RESEARCH INSTITUTE

Emeriti: (Professors) Bruce F. Johnston, Dudley Kirk, Clark W. Reynolds
Director: Carl H. Gotsch
Professors: Carl H. Gotsch, Timothy E. Josling, Scott R. Pearson, Anne E. Peck, Pan A. Yotopoulos

The Food Research Institute (FRI), a research and teaching unit in the School of Humanities and Sciences, was founded 75 years ago to study problems of food supply, distribution, and consumption on a world-wide scale. The range of its investigation comprises the world food and agricultural economy, domestic and international trade in primary products, agriculture and economic development, and world population problems.

FRI will be closed in the near future and no new graduate students are being admitted. During 1999-2000, faculty will offer courses to assist continuing FRI doctoral students complete their graduate programs. Some of the courses offered are open to undergraduate and graduate students from other departments, as indicated. Check the Time Schedule each quarter for course offerings.

### COURSES

#### PRIMARILY FOR UNDERGRADUATES

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>The World Food Economy—(Same as Economics 106; graduate students register for 203.) The interrelationships among food, population, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on the public sector decision-making as it relates to food policy.</td>
<td>5</td>
<td>Win</td>
</tr>
<tr>
<td>119</td>
<td>Development and Population Interactions in the Third World—(Graduate students register for 219.) The determinants and consequences of population growth and interactions with economic development. Historical and contemporary examination of the record of economic development and of population growth suggests a diversity of experience. Country case studies illustrate the systematic components of the experience of economic development and those of population growth, with implications in terms of alternative structures of development, the timing of the demographic transition, income distribution, employment, and migration.</td>
<td>5</td>
<td>Win (Yotopoulos)</td>
</tr>
<tr>
<td>146</td>
<td>The Economics of Regional Agreements—(Graduate students register for 246.) Intended primarily for International Relations and Economics majors and for International Policy Studies graduate students. The economic analysis and political economy of regional trade agreements, and the implications of the movement toward economic and political integration in the post-war period. The nature of European integration is compared and contrasted with that found in the Americas and in Africa. The nature of the challenge to the multilateral trade system, and the relationship between economic integration and domestic policy reform. Traditional free trade areas and customs unions are contrasted with broader negotiating frameworks such as APEC and network agreements such as FTAA.</td>
<td>5</td>
<td>Win (Josling)</td>
</tr>
</tbody>
</table>

#### PRIMARILY FOR GRADUATE STUDENTS

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>202</td>
<td>Research Seminar on El Nino—Critical assessment of the impact of El Nino on food security, emphasizing S.E. Asia. Co-authored research report is a major objective. Enrollment limited to 6. Prerequisite: consent of instructor.</td>
<td>2</td>
<td>Win (Josling)</td>
</tr>
<tr>
<td>401, 402, 403, 404</td>
<td>Dissertation Reading and Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Aut (Staff)</td>
<td></td>
<td></td>
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<tr>
<td>402</td>
<td>Win (Staff)</td>
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<td></td>
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<tr>
<td>403</td>
<td>Spr (Staff)</td>
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<tr>
<td>404</td>
<td>Sum (Staff)</td>
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</tbody>
</table>

### FRENCH AND ITALIAN

Emeriti: (Professors) Robert G. Cohn, John Freccero, Raymond D. Giraud, René Girard, Ralph M. Hester, Alphonse Julliard, Pauline Newman-Gordon, Roberto B. Sangiorgi, Leo Weinstein
Chair: Jeffrey T. Schnapp
The French Section provides students with the opportunity to pursue course work at all levels in French language, literature, cultural and intellectual history, theory, film, and francophone studies. It understands the domain of “French Studies” in the broadest possible sense: as encompassing the complex of cultural, political, social, scientific, commercial, and intellectual phenomena associated with French-speaking parts of the world, from France and Belgium to Canada, Africa, and the Caribbean.

Three degree programs are available in French: an A.B. (with two concentrations, one literary, the other interdisciplinary), a terminal A.M., and a Ph.D. (with various possible minors and combined degrees).

A curator for Romance Languages oversees the extensive French collection at Green Library. The Hoover Institute on War, Revolution, and Peace also includes a wealth of materials on 20th-century France and on French social and political movements.

A distinguished group of visiting faculty and instructors contribute regularly to the life of the French Section. The section maintains frequent contacts with the Ecole Normale Superieure, the Institut d'Etudes Politiques, the Ecole Polytechnique, and other prestigious institutions.

Stanford in Paris — The Stanford Overseas Program in Paris offers undergraduates the opportunity to study in France during the Autumn and Winter Quarters. It provides a wide range of academic options, including course work at the Stanford center and at the University of Paris, independent study projects, and internships. In addition, the program promotes a high degree of interaction with the local community through volunteer employment, homesteads, and internships. The minimum language requirement for admission into Stanford in Paris is one year of French at the college level.

Courses offered in Paris may count toward fulfillment of the requirements of the French major or minor. Specialized offerings at the Stanford home campus and in Paris encourage engineering students to study abroad and to coordinate internships through the department to work in France. All students are encouraged to consult with the Director of Undergraduate Studies before attending the program, and after returning, in order to ensure that course work and skills acquired abroad can be coordinated appropriately with their degree program. Detailed information, including program requirements and curricular offerings, may be obtained from the Overseas Studies section of this bulletin, the Paris website http://www.osp.stanford.edu/Paris/, or from the Overseas Studies Office in Sweet Hall.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The French Section offers a two-track major in French and a minor. Each of these programs encourages students to pursue a course of study tailored to their individual needs and interests. The purpose of an undergraduate degree in French is necessarily variable. For some students such a degree may serve as a stepping stone to entering the domains of international business or law; for others it may provide training for a career as a translator or teacher; for others still it may serve as preparation for graduate studies in French, History, or Comparative Literature. This variability argues for the sort of flexibility that characterizes the French major. Two principal tracks are available. The first consists of a “French Literature concentration.” It corresponds to a traditional French major, with the bulk of course work done within the French Section and devoted to advanced language training and to the study of French literature, culture, and civilization. The second track consists of a “French Studies concentration” and is intended as a non-traditional, interdisciplinary alternative to the first concentration. It allows students to combine work in French with studies in fields such as African Studies, Art History, Economics, History, International Relations, Music, and Political Science, or in other foreign languages and literatures.

Prerequisites — Before declaring a French major, a student must be proficient in written and spoken French at a second-year college level. Such proficiency must be demonstrated either (1) by having completed the entire language sequence up to and including French 23, (2) by having scored a 5 or better on either the French language or the French literature Advanced Placement (AP) exams, or (3) by having demonstrated equivalent proficiency on the departmental placement exam offered at the beginning of each academic quarter. Students not meeting at least one of these criteria are required to complete such portion of the language sequence as deemed necessary by the department before beginning to take courses toward the major.

Declaring a Major — Before declaring a French major, the prospective major is required to schedule an appointment with the Director of Undergraduate Studies. This informal meeting is designed to introduce the student to the department and to answer any questions that the student may have regarding the various options that are available.

After this meeting, the student is asked to draft a brief statement of purpose (one-to-two pages) describing his or her intellectual goals and interests within the discipline, and his or her intentions as regards the different concentrations. This statement is a nonbinding draft meant to encourage each student to carefully consider his or her course plans, with an eye towards the Senior Project (see below) or honors thesis.

Majors are formally accepted into the department upon review of the statement and of their language competency. Once accepted, a student should declare the French major with the Registrar’s Office and arrange for the academic file to be delivered to the Department of Undergraduate Studies.

REQUIREMENTS

Irrespective of the concentration chosen, the French major requires a minimum of 56 units, to be selected in accordance with the following requirements:

1. Introductory Series on French and Francophone Literature and Culture (12 units): three courses must be taken from the French 130, 131, 132, and 133 sequence.
2. Advanced Language (4 units): French 261 (prerequisite; 123, 124, 125, or consent of instructor) or Overseas Studies 126P must be taken. Either course fulfills the Writing in the Major (WIM) requirement.
3. Research Seminar (3 units): a majors-only seminar, French 289, must be taken in the Autumn Quarter of the senior year. This course prepares and assists students as they undertake either their Senior Project (see below) or honors thesis. It also familiarizes them with research resources in the department and University and helps students think critically about their research topics. By the end of the course, students must have chosen either a project adviser or a thesis adviser, generally a faculty member in the department, who offers support and feedback throughout the development of the Senior Project or honors thesis.

Senior Project — In order to demonstrate the quality of his or her scholarly work and command of written French, each major not writing an honors thesis (see “Honors Program” below) is required to submit a senior project to the project adviser before May 15 of the senior year.

The French Section offers a two-track major in French and a minor. Each of these programs encourages students to pursue a course of study tailored to their individual needs and interests. The purpose of an undergraduate degree in French is necessarily variable. For some students such a degree may serve as a stepping stone to entering the domains of international business or law; for others it may provide training for a career as a translator or teacher; for others still it may serve as preparation for graduate studies in French, History, or Comparative Literature. This variability argues for the sort of flexibility that characterizes the French major. Two principal tracks are available. The first consists of a “French Literature concentration.” It corresponds to a traditional French major, with the bulk of course work done within the French Section and devoted to advanced language training and to the study of French literature, culture, and civilization. The second track consists of a “French Studies concentration” and is intended as a non-traditional, interdisciplinary alternative to the first concentration. It allows students to combine work in French with studies in fields such as African Studies, Art History, Economics, History, International Relations, Music, and Political Science, or in other foreign languages and literatures.

Prerequisites — Before declaring a French major, a student must be proficient in written and spoken French at a second-year college level. Such proficiency must be demonstrated either (1) by having completed the entire language sequence up to and including French 23, (2) by having scored a 5 or better on either the French language or the French literature Advanced Placement (AP) exams, or (3) by having demonstrated equivalent proficiency on the departmental placement exam offered at the beginning of each academic quarter. Students not meeting at least one of these criteria are required to complete such portion of the language sequence as deemed necessary by the department before beginning to take courses toward the major.

Declaring a Major — Before declaring a French major, the prospective major is required to schedule an appointment with the Director of Undergraduate Studies. This informal meeting is designed to introduce the student to the department and to answer any questions that the student may have regarding the various options that are available.

After this meeting, the student is asked to draft a brief statement of purpose (one-to-two pages) describing his or her intellectual goals and interests within the discipline, and his or her intentions as regards the different concentrations. This statement is a nonbinding draft meant to encourage each student to carefully consider his or her course plans, with an eye towards the Senior Project (see below) or honors thesis.

Majors are formally accepted into the department upon review of the statement and of their language competency. Once accepted, a student should declare the French major with the Registrar’s Office and arrange for the academic file to be delivered to the Department of Undergraduate Studies.

REQUIREMENTS

Irrespective of the concentration chosen, the French major requires a minimum of 56 units, to be selected in accordance with the following requirements:

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Senior Project — In order to demonstrate the quality of his or her scholarly work and command of written French, each major not writing an honors thesis (see “Honors Program” below) is required to submit a senior project to the project adviser before May 15 of the senior year. The
project consists of a research paper with a target length of 20 pages and must be written in French.

The senior project is not graded and no credit is offered for it. However, acceptance of the senior project by the project adviser is a condition for graduation from the department. A paper deemed unsatisfactory by the project adviser is returned to the student for reworking and resubmission by an agreed-upon date.

Students are advised to begin thinking about their senior projects as early as their junior year, even if they are in Paris. While in Paris, students should avail themselves of the unique resources the city has to offer for research on their chosen topic.

THE TWO CONCENTRATIONS (36 units minimum each)

All majors, whether or not they are applying for honors, must choose one of the following two concentrations in structuring their course of study.

FRENCH LITERATURE

This concentration is appropriate for students whose interests are such that most of their course work towards the major is done within the French Division. In addition to the required courses listed above, they must enroll in at least nine additional courses. Of these nine, four must fulfill the Ancien Régime requirement detailed below.

1. Ancien Régime Courses (approx. 16 units): at least four courses must concern the period before July 1789. Courses fulfilling this requirement within the department must be drawn from above the 190 level. Courses chosen from outside the department must be preapproved by the Director of Undergraduate Studies.

2. Remaining Courses (approx. 20 units): the student is encouraged to use the remaining five or more courses to develop a specialized knowledge of a specific domain related to either the Senior Project or the honors thesis.

FRENCH STUDIES

The department also accommodates students who would like to combine their interest in French with the study of other disciplines or literatures. In the past, students have completed majors in French and African Studies, French and Economics, French and English, French and European Studies, French and German, French and Italian, and French and Linguistics. Students who wish to elect the French Studies Concentration are required to draw up a proposal for a rigorous and coherent course of study (consisting of a paragraph-long description of the field of concentration and a course plan) and present it to the Director of Undergraduate Studies for approval no later than May 15 of the junior year. Proposals must include no more than 24 units of study pursued outside the department, all of which must be at the upper-division level and must be drawn from above the 190 level. Courses chosen from outside the department must be preapproved by the Director of Undergraduate Studies.

CROSS-DISCIPLINARY STUDIES

FRENCH AND ENGINEERING

Engineering majors may elect to include in their program from four to six specially designed courses in French. The actual number of courses is dependent on competency in French and is determined in consultation with an adviser. Courses in engineering taken at French institutions during a student’s attendance at the Stanford Paris Program, as well as internships in French firms may count as part of this extended major. Admission to engineering courses in Paris requires an advanced proficiency level, to be determined with a department adviser. Engineering majors successfully completing a major in French are also eligible for a Certificate of Advanced Proficiency in French upon their passing an official proficiency test for technological and scientific French sanctioned by the French government. This certificate, which is noted on the official transcript, is widely accepted by French-speaking countries of the European Union and in most Francophone countries throughout the world, as guaranteeing the certificate holder’s high-level competency in French. Engineering students wishing to extend their major to include French and to include Paris Program courses and internships in France must consult closely with advisers in Engineering, French, and Overseas Studies.

The program includes the following courses given in French specially designed for students in technology and science:

- Course No. and Subject
- Unit

126. Technological and Scientific French 3-5
127. French Media and Communications 3-4
128. Technocritique 3-5
129. Advances of Technology in Europe 3-5

Two courses in Engineering have discussion sections in French (see below under content-based discussion sections):

50. Introductory Science of Materials 1-3
60. Engineering Economy 1-3

The School of Engineering, the Department of French and Italian, and the Stanford Overseas Studies Office have information on engineering courses offered through the Stanford Center in Paris by affiliated French institutions (Ecole Polytechnique, Ecole des Mines, Conservatoire National des Arts et Metiers).

FRENCH AND LINGUISTICS

Linguistics majors may elect to specialize in the French language. In addition to 50 units in Linguistics, of which two courses (110 and 160) may be replaced by comparable courses in French, students opting for French Language Specialization must take three courses in the introductory series devoted to French and Francophone literature and culture (130-133). For full details, please contact the Department of Linguistics.

HONORS PROGRAM

Majors are eligible to apply to the honors program if they have maintained an average grade point average (GPA) of 3.5 in five upper-division French courses. The honors program candidate must fulfill all reg-
ular requirements for the major, save the Senior Project, from which he or she is exempt. Instead, the student undertakes the writing of a research paper no shorter than fifty pages in length, written in French, on a specialized topic. No later than the end of the Spring Quarter of the junior year, preferably after completion of the research seminar, the student must submit to the Director of Undergraduate Studies an Application for Honors in French, the central portion of which must contain an outline of the proposed honors essay. If it is in need of revisions, the Director of Undergraduate Studies helps the student through the revision process until the proposal is granted his or her approval. (The Director of Undergraduate Studies also helps the student identify an appropriate adviser for the essay.) Once the application is approved, the student may receive 9 to 12 units of credit for independent work on the honors essay by enrolling in French 198. All honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15 of the terminal year. If an essay is found deserving of grade of ‘A-’ or ‘A’ by the thesis adviser, honors are granted at the time of graduation.

Honors College—The Department of French and Italian encourages all honors students to enroll in the honors college run by the Division of Literatures, Cultures, and Languages. The college meets at the end of every summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted by the Spring Quarter of the same calendar year. For more information, contact the department administrator.

LA MAISON FRANÇAISE

La Maison Française, 610 Mayfield, is an undergraduate residence that serves as a campus French cultural center, hosting in-house seminars as well as social events, film series, readings and lectures by distinguished representatives of French and francophone intellectual, artistic, and political life.

GRADUATE PROGRAMS

Admission to the A.M. and Ph.D. Programs—Applications and admission information may be obtained from Graduate Admissions, in the Registrar’s Office. Applicants should read carefully the general regulations governing degrees in the “Graduate Degrees” section of this bulletin. They should have preparation equivalent to an undergraduate major in French and should also have reached a high level of speaking and writing proficiency in French. Previous study of a language other than French is also highly desirable. Recent Graduate Record Examination (GRE) results are required, as is a writing sample representative of the applicant’s best undergraduate work.

MASTER OF ARTS

[Terminal Program]

The terminal A.M. in French provides a flexible combination of language, literature, cultural history, and methodology course work designed to enhance the preparation of secondary school, junior college, or college teachers.

Candidates must complete a minimum of 36 units of graduate work, with a grade point average (GPA) of ‘B+’ as well as pass the master’s examination at the end of their training. To fulfill the requirements in a single year, enrollment must be for an average of 12 units per quarter.

Applications for admission to the Masters of Arts program must be received by May 31 of the prior year. Candidates for this degree are not eligible for financial aid or for teaching assistantships.

Requirements

The basic program of 36 units requires the following course work:

1. One teaching methodology course, ordinarily “The Learning and Teaching of Second Languages,” the second-language-pedagogy course offered by the Stanford Language Center.
2. A cultural history course (to be taken either inside or outside the Department of French and Italian).
3. A course in stylistics and textual analysis (261 or equivalent).
4. All remaining units are to be taken in advanced literature courses (200 level or above), three of which must be concerned with the prerevolutionary period of French cultural history.

The Stylistics and Textual Analysis (261) requirement is designed to insure that A.M. students have achieved a high level of proficiency in written and oral expository French and a familiarity with various modes of literary-critical writing. Master’s students who have already achieved a high degree of competence in writing in French (either at Stanford or elsewhere) may, with the approval of the Director of Graduate Studies, be exempted from this requirement upon presentation of a sample seminar paper in the quarter prior to that during which 261 would otherwise be taken.

EXAMINATION

The terminal A.M. examination is normally administered two weeks before the end of the Spring Quarter by the three members of the examination committee, selected each year by the Director of Graduate Studies. It consists of two parts:

1. The written exam (two hours) tests the candidate’s general knowledge of French literature and is based on the same reading list as that for the Ph.D. qualifying exam (see below).

   The exam requires that the candidate answer four questions (out of six) in a manner that demonstrates his/her ability to synthesize and draw parallels between periods, genres, and systems of representation on the basis of the standard reading list. At least one question must be answered in French and two in English. Use of a dictionary is allowed.

   If the student’s performance on the exam is deemed a “pass” by two out of three of the members of the examining committee, the student is then permitted to go on to the oral examination (which is ordinarily taken later the same week).

   Should the candidate fail the A.M. written exam, he/she is given a second chance at the end of the Spring Quarter.

2. The oral exam (one-hour) assumes as its point of departure the student’s answers on the written exam. It examines the candidate’s knowledge and understanding of French literary history on the basis of the standard reading list.

   At the conclusion of the oral exam, the examination committee meets in closed session and discusses the student’s performance on the written and oral portions of the examination. If it is judged adequate, the A.M. degree is granted. In no event may the master’s written and oral exams be taken more than twice.

DOCTOR OF PHILOSOPHY

The Department of French and Italian provides students with the opportunity to pursue advanced work in French language, literature, cultural history, theory, and francophone studies within a uniquely flexible interdisciplinary framework. Unlike conventional Ph.D. programs, it encourages students to construct a highly individualized course of study, integrating specialization in a particular literary period or area with work in such fields as art history, classics, film studies, the history of science and technology, linguistics, literary theory, music, and philosophy. The program is founded on the belief that such a balance between period/area specialization and interdisciplinary breadth is not only desirable but essential in a field such as French Studies. Students in the Ph.D. program are normally admitted as French Fellows on a four to five year fellowship plan that integrates their financial support with rigorous training as scholars and as prospective university faculty.

Students admitted to the program work closely with the Director of Graduate Studies in structuring a plan consistent with their needs and interests. Aside from the benefits of the program’s flexible structure, a number of unique resources are available to students. The French Section’s exchange program with the Ecole Normale Supérieure provides candidates (selected on a competitive basis) with the opportunity to pursue dissertation research in Paris.
ADVISORY

Given the interdisciplinary nature of the Ph.D. program in French and the opportunity it affords each student to create an individualized program of study, regular consultation with an advisor is of the utmost importance. The advisor for all entering graduate students is the Director of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the first year of study, each student must choose a faculty advisor whose expertise is appropriate to his or her own area of research and interests.

Entering graduate students are also paired with a faculty mentor as a function of their stated research interests at the time of admission. The role of the mentor is to advise the student on an informal basis regarding the student’s academic program and plans.

REQUIREMENTS

A candidate for the Ph.D. degree in French must complete at least 72 units of graduate-level study beyond the bachelor’s degree and teach five language courses in the section.

Students entering with a master’s degree or previous graduate work may receive credit as determined on a case-by-case basis, up to a maximum of 36 units. Fellowship funding and teaching requirements are adjusted according to University regulations.

REQUIRED/RECOMMENDED COURSES

Three courses are required:

1. **The Disciplines of Literature (French and Italian 369E),** a 5-unit seminar offered in the Autumn Quarter of each year, designed to acquaint students with the theoretical and methodological concerns of literary study. This course must be taken in the first quarter of study.

2. **Definition and Inquiry: Colloquium on Research Methods in French and Italian (French and Italian 201E),** a 3-unit course designed to familiarize graduate students with research materials and techniques. This course must be taken no later than the end of the third year of study.

3. **The Learning and Teaching of Second Languages, the second-language-pedagogy course offered by the Stanford Language Center in the Spring Quarter of each year in order to prepare entering graduate students for teaching in their second year.**

In addition to the above-required courses, native English speaking students are encouraged to enroll in Stylistics and Textual Analysis (French 261).

**Distribution of Elective Courses—**Apart from these requirements, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. Of the 72 minimum units of graduate course work required for the Ph.D., at least 52 units must be taken within the Department of French and Italian.

**Language Requirements—**Attaining a native or near-native fluency in French is the individual responsibility of all candidates in the Ph.D. program and remedial course work needed to achieve such fluency cannot count towards the Ph.D. degree. In addition, candidates are required to achieve a high level of proficiency in one additional foreign language, with the language in question to be determined by the student and his or her advisor as a function of the student’s area of specialization. Such proficiency may be demonstrated either by successfully completing a third-year level or above undergraduate course or, better, a graduate seminar in the language in question; or by passing an exam that establishes a high level of proficiency, which is judged sufficient for admission to candidacy for the Ph.D. If the overall exam is judged insufficient for admission to candidacy for the Ph.D., students may be asked either to retake the qualifying exam, to submit a new paper, or they may be admitted to candidacy on a probationary basis.

The examining committee consists of two faculty members selected by the student, as well as the Director of Graduate Studies.

Two weeks before the exam, the student must submit a graduate seminar paper which he or she considers representative of the quality of his or her graduate work at Stanford. Students may receive up to 3 units of credit for the reworking, in close cooperation with a faculty member of this paper prior to its submission. The goal of this reworking is to produce a text of publishable quality.

On the basis of this paper, the results of the qualifying examination, and an evaluation of the student’s overall progress, the members of the student’s examining committee will vote for or against admission to candidacy for the Ph.D. The terminal master’s degree may be awarded to students who have completed the qualifying procedure, but whose work is judged insufficient for admission to candidacy for the Ph.D. If the overall exam is judged insufficient for admission to candidacy for the Ph.D., students may be asked either to retake the qualifying exam, to submit a new paper, or they may be admitted to candidacy on a probationary basis. Subject to approval by the Director of Graduate Studies and department Chair, students already holding an advanced degree in French Studies, when admitted to the French Ph.D. program, may be excused from the qualifying exam. However, they must present a formal request for waiver to the Director of Graduate Studies upon their arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the qualifying exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

**Special Topic Examination—**The second oral examination, which normally takes place at the end of Spring Quarter of the second year of study, concerns a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his or her advisor and the Director of Graduate Studies. Students should design this research project so that it has the breadth and focus of a book they might write or a seminar they might teach. The proposed topic should be discussed with the Director of Graduate Studies before the end of the quarter preceding the quarter in which they plan to take the exam. The student and the Director of Graduate Studies choose a committee of two faculty members
with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Director of Graduate Studies, who serves in an ex officio capacity as the third member of the examination committee.

At the beginning of the quarter in which he or she takes this examination, the student discusses plans for the section with committee members, who offer suggestions on the project and on the reading list. In general, the reading list should be between one and two single-spaced pages in length. In the course of the quarter, the student should regularly consult with committee members to discuss his or her progress. The actual examination lasts one hour. The candidate must present a tentative reading list to the members of the committee about twelve weeks before the examination and a final reading list at least one week before the examination. This list, to be headed by a title describing the topic of the examination, may be divided into two parts: "core" works that the student has found to be central to his or her topic, and works that fill out the "periphery" of the topic. Two copies of the final reading list must be given to the Student Services Officer for the Division of Languages, Cultures, and Literatures: one for the student's file and one for a special file which subsequent students can consult. The examination assumes the form of an oral colloquium between the student and the examining committee. It concentrates on the conclusions to which the student's research has led him or her, and aims to determine the student's overall mastery of the research topic in question. At the beginning of the examination, the student presents a talk of no longer than 20 minutes (not to be written out, but to be presented from notes) reviewing the results of his or her reading and outlining the major features and implications of the chosen topic. The remainder of the hour is devoted to a discussion between the student and the committee regarding the problems the student raised in the talk and the reading list itself.

The following procedures are applicable to both the qualifying and special topic exams:

1. The committee meets briefly at the end of the hour and immediately informs the student as to whether he or she has passed the examination.
2. In the week after the examination, the student is expected to meet individually with members of the committee to discuss strengths and weaknesses revealed during the qualifying exam or colloquium.
3. The Director of Graduate Studies places a brief letter describing each one-hour oral exam in the student's file, a copy of which is also be furnished to the student.

THE UNIVERSITY ORALS

The University Ph.D. examination follows most of the same procedures outlined above. Normally students put one, and at most two, full-time quarters of study into preparation for the exam. The University oral exam should virtually always be taken at the end of Spring Quarter of the third year of study. Students must complete minimum course requirements (as listed in the Stanford Bulletin) and all language and course requirements before the quarter in which they take the University oral examination.

Early in the quarter before they intend to take the University Ph.D. examination, students must discuss the scope and nature of the period to be covered, as well as the dissertation proposal, with the Director of Graduate Studies. The reading list should include works in all genres relevant to the period covered. The amount of "non-literary" or cross-disciplinary material on the reading list varies according to the period and the research interests of the student. Students ordinarily cover about a century of writing in great depth. As with the preceding examinations, the Director of Graduate Studies and the student determine the committee's makeup.

The governing principle is that the University oral examination in French must be a period examination rather than one on the specific concerns of the dissertation proposal, which is dealt with separately in a later colloquium. It follows from this basic principle that the examination will cover the major authors and genres in the student's period of choice. The lists may well include critical and scholarly works or texts from outside the traditional domain of French literary studies (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's "field."

The aim of the University oral is to establish the student's credentials as a specialist in the period of his or her choosing, so the core of the reading list must be made up of texts that constitute the cultural baggage essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interests. The tendency to bias reading lists toward the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and major genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work will prove relevant, but they should also remember that the examination is the central means of certifying their expertise in a literary period.

The exam committee consists of four members, in addition to a committee chair from outside the Department of French and Italian whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list. Students are required to discuss the reading list for the examination with the Director of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be in the hands of the committee and the Student Services Officer for the Division of Literatures, Cultures, and Languages no later than two weeks preceding the examination. Students must submit the Request for University Oral Exam form to the Student Services Officer for the Division of Literatures, Cultures, and Languages at least three weeks before the proposed date of the exam. At the same time this form is submitted, students should also submit the Notice of Appointment of the Ph.D. Dissertation Reading Committee. In addition, a Report on Ph.D. Foreign Language must be completed, certifying a reading knowledge of the two foreign languages the student presents to meet the language requirements. The two-hour examination consists of the following two parts:

1. Forty minutes: a 20-minute talk by the candidate followed by a 20-minute question and answer period concerning the talk. Working with the committee members, the candidate's adviser will prepare three or more questions to be presented to the candidate at 8:00 a.m. on the day of the examination. These questions concern broad topics pertinent to the candidate's reading list and period of specialization, including concerns relevant (but by no means limited to) the student's projected dissertation. The candidate chooses one of the questions and develops a 20-minute talk in response. Students must not read from a prepared text, but rather must speak from notes. They are free to consult any necessary materials while preparing the talk. The candidate is questioned for 20 minutes on the talk, with the dissertation adviser starting the questioning.
2. One hour, 20 minutes: questions on the area of concentration. Each member of the committee, except for the chair, is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications.

The University oral examination is a formal University event with a chair appointed from an outside department. It represents the last occasion for the faculty to evaluate a student's overall preparation as a candidate for the Ph.D. After the University orals, only the colloquium on the dissertation prospectus and certification of the final dissertation by the student's reading committee stand in the way of conferral of the Ph.D. The examination, therefore, is a unique significant event and is designed to evaluate the student's preparation as a specialist in a given sector of French studies, but within a broader context than that provided by a single course, hour examination, or even the dissertation itself.

DISsertATION

The doctoral dissertation should demonstrate the ability to carry out research, organize, and present the results in publishable form. The scope
of the dissertation should be such that it could be completed in 12 to 18 months of full-time work.

Colloquium on the Dissertation Proposal — The colloquium normally takes place in the quarter following the University oral examination; in most cases this means early in Autumn Quarter of the student’s fourth year of study. The colloquium lasts one hour, begins with a brief introduction to the dissertation prospectus by the student (lasting no more than ten minutes), and consists of a discussion of the prospectus by the student and the three readers of the dissertation. At the end of the hour, the faculty readers vote on the outcome of the colloquium. If the outcome is favorable (by majority vote), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory (by majority vote), the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second colloquium.

The prospectus must be prepared in close consultation with the dissertation director during the months preceding the colloquium. It must be submitted in its final form to the readers no later than one week before the colloquium. A prospectus should not exceed ten double-spaced pages, in addition to which it should include a working bibliography of primary and secondary sources. It should offer a synthetic overview of the dissertation, describe its methodology and the project’s relation to prior scholarship on the topic, and lay out a complete chapter-by-chapter plan.

It is the student’s responsibility to schedule the colloquium no later than the first half of the quarter subsequent to the quarter in which the student passed the University oral examination. The student should arrange the date and time in consultation with the Student Services Officer and with the three examiners. The Student Services Officer schedules an appropriate room for the colloquium.

Members of the dissertation reading committee ordinarily are drawn from the University oral examination committee, but need not be the same.

JOINT DEGREES AND MINORS

A candidate may also take a joint degree in French and Humanities, as described in the “Interdisciplinary Studies in Humanities” section of this bulletin. Minors are possible in Comparative Literature, Italian, Linguistics, Modern Thought and Literature, and other departments offering related courses such as Art and Art History, History, Music, Philosophy, Spanish, and so on.

Students interested in a joint degree or a minor should design their course of study with their adviser(s). Joint degrees and minors usually require 24 additional units. With careful planning, students may complete course work for the Ph.D. and the minor in a total of nine quarters.

Ph.D. Minor in French Literature — The department offers a minor in French Literature. The requirement for a minor in French is successful completion of 24 units of graduate course work in the French Section with a grade point average (GPA) of ‘B’ or above. Interested students should consult the graduate adviser.

ITALIAN SECTION

The Italian Section offers a variety of graduate and undergraduate programs in Italian language, literature, culture, and intellectual history. Course offerings range from small and highly specialized graduate seminars to general courses open to all students on authors such as Dante, Boccaccio, and Machiavelli.

On the undergraduate level, a number of options are available. In addition to the Italian major, students may choose from a minor in Italian, an honors program in the Humanities (see the Interdisciplinary Studies in Humanities section of this bulletin), an honors program in Italian, and a fourth major — one in Italian and French literature and one in Italian and English literature.

On the graduate level, programs of study leading to the A.M. degree and the Ph.D. degree are offered in Italian literature. Joint programs for the Ph.D. degree with the graduate programs in Comparative Literature, Humanities, and Modern Thought and Literature are also available.

Special collections and facilities at Stanford offer the possibility for extensive research in Italian studies and related fields. These include the undergraduate and graduate libraries and the Hoover Institution for the Study of War, Revolution, and Peace. Collections in Green Research Library are especially strong in the Medieval, Renaissance, and contemporary periods; the Italian section is one of the larger constituents of the Western European collection at the Hoover Library; and the Music Library has excellent holdings in Italian opera.

Stanford in Italy — Stanford in Florence affords undergraduates with at least three quarters of Italian the opportunity to take advantage of the unique intellectual and visual resources of the city and to focus on areas: Renaissance History and Art, and Contemporary Italian and European Studies. The program is structured to help integrate students fully as possible into Italian culture through homestays, Florence University courses, the Language Partners Program, research, internship, and public service opportunities, and by conducting some of the program's classes completely in Italian. Many of the courses offered in Florence count toward the fulfillment of requirements for the Italian major or minor. Students are encouraged to consult with the Italian undergraduate adviser before and after a sojourn in Florence to ensure that their course selections meet Italian Section requirements. Information on the Florence program is available in the “Overseas Studies” section of this bulletin, the Florence website http://www-opf.stanford.edu/Florence/, or at the Overseas Studies Office, Sweet Hall.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The Italian major offers students the opportunity to develop an in-depth knowledge of Italian literature, language, and civilization through a highly flexible program combining core work in Italian with work in such fields as art history, classics, comparative literature, economics, English, French, history, international relations, music, philosophy, and political science. All Italian majors are required to have completed two second-year language courses: Italian 21, 22, and/or 23 (or the equivalent taken at the Florence campus). Students considering an Italian major should consult with the Italian undergraduate adviser as early as possible (even before completing the language requirement) in order to ensure a maximum of flexibility in designing a course of study suited to individual needs and cultural interests.

Italian majors must complete 60 units of course work above the 10 level.

The remaining requirements for the major are the following:
1. A minimum of 32 units of Italian courses (selected from courses numbered 100 and above).
2. Of these courses, at least one on Dante is required, as well as at least one in each of the following areas: (a) the Middle Ages, (b) the early modern period, and (c) the modern period. A Dante course may fulfill the Middle Ages requirement.
3. The intermediate-level survey sequence (Italian 127, 128, 129).
4. One advanced language course beyond the level of Italian 114.

Of the 60 units required for the major, up to 28 units of course work in related fields may be taken outside the department.

EXTENDED MAJORS

Requirements for both extended majors are essentially identical to those of the Italian major with a concentration in Italian literature.

Italian and English Literatures — In addition to the 32 units required for the A.B. in Italian, candidates must complete four English literature courses numbered 100 and above related to the field of concentration in Italian Studies.

Italian and French Literatures — In addition to the 32 units required for the A.B. in Italian, candidates must complete four French literature courses numbered 100 and above related to the field of concentration in Italian Studies.

MINORS

Students considering a minor in Italian are encouraged to design a course of studies that fosters their understanding of the interaction be-
tween Italian and their second area of expertise. A minimum of 24 units of graduate work beyond the Italian 3 level must be completed.

Requirements for the minor include two intermediate language courses (chosen from 21, 22, and 23); all three of the introductory series on Italian literature and culture (127, 128, 129); and a minimum of one advanced course in language or literature numbered 114 and above. All courses must be chosen in consultation with the Director of Undergraduate Studies, who is responsible for evaluating all requests and individual study plans for the minor.

HONORS PROGRAMS

ITALIAN

Italian majors with a grade point average (GPA) of 'B+' or better in all Italian courses are eligible for department honors. In addition to the requirements listed above, honors candidates must complete an honors essay representing 6 to 9 units of academic work through enrollment in Italian 198. Proposals for essays must be submitted to the Italian faculty by the end of the candidate’s junior year. If the proposal is accepted, a member of the Italian faculty is assigned to serve as the student’s advisor for the essay. Students interested in the honors program should consult the Italian undergraduate advisor early in their junior year.

HUMANITIES

An honors program in the Humanities is available for Italian majors who wish to supplement their studies with a carefully structured program of humanistic studies. See the "Interdisciplinary Studies in Humanities" section of this bulletin for further information.

LA CASA ITALIANA

La Casa Italiana, 562 Mayfield, is an undergraduate residence devoted to developing an awareness of Italian language and culture. It works closely with the Italian Cultural Institute in San Francisco and with other local cultural organizations. It often hosts visiting representatives of Italian intellectual, artistic, and political life. A number of departmental courses are regularly taught at the Casa, which also offers in-house seminars. Assignment is made through the regular undergraduate housing draw.

GRADUATE PROGRAMS

Admission to the Program—Although they need not have been undergraduate Italian majors, candidates are expected to be proficient in the Italian language and to have done significant course work in Italian literature and/or Italian studies on the undergraduate level. Candidates with a broad humanistic and linguistic background are especially encouraged to apply. Contact Graduate Admissions, the Registrar's Office for application information. Recent Graduate Record Examination (GRE) results are required.

MASTER OF ARTS

(TERMINAL PROGRAM)

The A.M. in Italian provides a combination of language, literature, civilization, and general courses designed to prepare secondary school, junior college, or college teachers. Applicants should be undergraduate and/or Italian studies on the undergraduate level. The basic course program (36 units) is nine graduate courses in Italian literature and/or Italian studies within an unusually flexible interdisciplinary framework. It is fully independent of the Ph.D. program in Italian and aims to encourage students to bring broader methodological and interdisciplinary concerns to bear on the study of Italian literature. Like conventional Italian Ph.D. programs, it places primary emphasis on developing a command of Italian literature as a whole. Unlike conventional Italian Ph.D. programs, it allows students to construct a highly individualized course of study, integrating specialization in a particular literary period with work in such fields as art history, classics, comparative literature, feminist studies, film, French, history, history of science, linguistics, literary theory, Medieval or Renaissance studies, philosophy, and religion. The program is founded on the belief that this sort of balance between period specialization and interdisciplinary breadth is not only desirable but also essential in a small field such as Italian studies, particularly given the diversity of the Italian literary canon, which extends over a wide variety of disciplines.

Students admitted into the Ph.D. program in Italian work closely with the adviser in structuring a plan of study appropriate to needs and interests. Such a plan usually involves a mix of teaching and courses within the Italian program, courses taken in other departments, and independent work under supervision of a member of the Italian faculty, thus integrating financial support with training as scholars and prospective university teachers. Assuming satisfactory academic progress, fellowships are offered for one or two years. Graduate-level work completed elsewhere may be counted as fulfilling part of the requirements for the degree. Students in the fifth year normally apply for outside fellowships or part-time teaching positions in the department.

Aside from the benefits of the program's structure and fellowship plan, a number of unique resources are available to Ph.D. students in Italian at Stanford. During their years of study, students may be permitted to take courses, pursue dissertation research, and do independent work at the Stanford campus in Florence under supervision of a member of the Italian faculty. The Florence center, located in a palazzo along the Arno, is near important Florentine libraries and archives and the University of Florence. An additional resource is the graduate student publication, Constructions, a scholarly journal published twice annually by the Department of French and Italian. Graduate students also have at their disposal the resources of La Casa Italiana, a residential theme house which serves as an Italian cultural center and hosts such events as colloquia, lectures, and film series.

REQUIREMENTS

Residency and Course Work—In accordance with University regulations, candidates for the Ph.D. must complete at least nine quarters (three years) of full-time work, or the equivalent, in graduate study beyond the bachelor’s degree. For a graduate student entering with an A.B., the Ph.D. program should normally be completed in four years. The first year is devoted to full-time study; the second and third years to teaching and the completion of course requirements (for a total of no fewer than 72 units of graduate work), and the fourth to dissertation work. Students entering with a master's degree receive credit for previous graduate work as determined on a case-by-case basis, up to a maximum of 36 units. Fellowship funding and teaching requirements are adjusted according to University regulations.

Students should read carefully the general regulations governing degrees in the "Graduate Degrees" section of this bulletin.
Teaching—In addition to training capable and creative scholars, one of the program’s primary objectives is to promote the effective teaching of Italian at all levels. To this end, students teach three or five Italian language courses (normally during the second and third year). During the first term of teaching, students must enroll in Italian 301, Graduate Workshop on Pedagogy, a seminar which permits working closely with a master-teacher and involves a regular schedule of class visitsations.

Language—As soon as possible, but not later than the end of the third year, the candidate must have passed reading examinations in two additional foreign languages. If the candidate’s period of concentration is earlier than the Romantic period, one of these must be Latin, if Romantic or later, French. Completion of the language requirement is a prerequisite for taking the University oral examination.

Course Requirements—Three courses are required:
1. Introduction to Graduate Study (French and Italian 369), a 5-unit seminar, offered in Autumn Quarter of each year, designed to acquaint students with the theoretical and methodological concerns of literary study. This course must be taken in the first quarter of study.
2. Definition and Inquiry: Colloquium on Research Methods in French and Italian (French and Italian 201E), a 3-unit course designed to familiarize graduate students with research materials and techniques. This course must be taken no later than the end of the third year of study.
3. The Learning and Teaching of Second Languages, the second language pedagogy course offered by the Stanford Language Center in the Spring Quarter of each year in order to prepare entering graduate students for teaching in their second year.

Apart from the above requirements, students are granted considerable freedom in structuring a course of study appropriate to individual needs. During the first year, most course work is usually done within the Italian Section in order to ensure an adequate preparation for the qualifying examination. In the second and third years, the students’ programs normally consist of a combination of course work done inside and outside the Italian Section, supplemented by tutorials and independent work pursued under supervision of the Italian faculty.

Qualifying Procedures—Students are admitted on a probationary basis. The probationary period ends once a student is officially admitted to “candidacy” for the Ph.D. as a result of successful completion of the qualifying procedure. The qualifying procedure takes place at the end of the third or during the fourth quarter of graduate study, at which time the student: (1) takes the oral qualifying exam (equivalent to the master’s exam), and (2) submits to the Italian faculty a sample graduate seminar paper which the student considers representative of the quality of his or her graduate work at Stanford. On the basis of this paper, the results of the qualifying examination, and the student’s overall progress, the faculty members of the department vote for or against admission to candidacy.

The terminal A.M. degree is awarded to students who have successfully completed the oral qualifying exam but who are not admitted to candidacy for the Ph.D.

Examinations—Two oral examinations are required of candidates for the Ph.D.: the qualifying examination (mentioned above), and the University oral examination.

1. The qualifying examination tests the student’s general knowledge of Italian language and literature and is taken at the end of the third or during the fourth quarter of graduate study. It is composed of two sections, the first consisting of a 20-minute presentation by the candidate, the second of a 70-minute question and answer period on the candidate’s talk and on his or her reading list. The examination committee for the qualifying examination is made up of the members of the Italian faculty, including the student’s faculty adviser who chairs the examination. While the reading list for the qualifying examination must be based on the department’s standard list, it should be amplified in consultation with the student’s adviser so as to reflect each student’s particular areas of interest.
2. The University oral examination is normally taken at the end of the third year of graduate study or at the beginning of the fourth year. The reading list for the oral examination must be established in consulta-

tion with the student’s dissertation director, who chairs a committee of readers (usually three) selected jointly by the dissertation director and the student according to the list’s emphasis. The University oral examining committee is ordinarily drawn from the committee of readers for the dissertation. Reading lists for the University oral examination must cover all periods of Italian literature, with the student’s area of specialization the primary focus, covered in depth. Aside from this general guideline, students are given considerable latitude in establishing a list which reflects their individual scholarly concerns.

The examination is divided into four sections. The first, 30 minutes, consists of a formal presentation addressing one of the questions that the student received the morning of the examination. The second, also 30 minutes, is a question and answer period concerning the student’s presentation. The third, one hour, takes the form of an oral colloquy on the student’s reading list as a whole. The fourth, lasting 30 minutes, is allocated to a defense of the student’s dissertation proposal (a copy of which is submitted to the examiners one week in advance of the examination). Successful completion of the examination constitutes approval of the proposal.

Dissertation—The fourth and (if necessary) fifth years of graduate study are devoted to writing and researching the doctoral dissertation.

JOINT DEGREES AND MINORS

A joint degree program in Humanities and Italian Literature is described in the “Interdisciplinary Studies in Humanities” section of this bulletin. Minors are possible in a wide variety of related fields. Joint degree programs and minors frequently require 24 additional units of work, making completion of all course requirements in nine quarters difficult if careful advance planning is not done.

Ph.D. Minor in Italian Literature—The section offers a minor in Italian Literature. The requirement for a Ph.D. minor is a minimum of 24 units of graduate course work in Italian literature. Students interested in a minor in Italian should consult the graduate adviser.

COURSES

(FWM) indicates that the course meets the Writing in the Major requirement.

FRENCH SECTION

Note—Changes in course offerings after this bulletin has gone to press are sometimes necessary. Students are advised to consult the department bulletin board regularly. Courses are taught in French unless noted.

Introductory and Intermediate Language Courses (1-99)
Advanced Language Courses (100-125)
Courses in French, Technology, and Science (126-129)
Undergraduate courses in Literature and Culture (130-199)
Courses for Advanced Undergraduates and Graduates (200-299)
Graduate Seminars (300-399)

GENERAL

These courses are open to all undergraduate and graduate students, are taught in English, and do not require a knowledge of French.

2E,3E. Great Works—(Enroll in Introduction to the Humanities 2, 3)
2E. The Afterlife—(two-quarter sequence)
5 units, Win (Harrison, Schnapp)
3E. The Here and Now—(two-quarter sequence)
5 units, Spr (Harrison, Schnapp)

108N. Stanford Introductory Seminar: Female Saints—The Rhetoric of Religious Perfection—Preference to freshmen. The medievals lives of saintly women. Traditional motifs in the portrayal of perfection (the saint as founding hero); perfection in the literary context of 12th- and 13th-century France (the Lady as Saint); and the rhetorics of female perfection (the body sacrificed). Readings from medieval poems in English translation. Limited enrollment. GER:3a,4c (DR:8†)
4 units, Aut (Cazelles)
the feminine idol in French films is understood by placing it in its
ticism to the Impressionist and Surrealism, the high moments and context—Preference to sophomores. From Roman-
temporary movie makers. Focusing on salient components of the
ies
debates on ethnosciences. The problems involving intellectual histories,
come.
theoretical essays, students assess Sartre's importance for the century to
French philosopher, used literature to make philosophical ideas available
Preference to sophomores. Sartre, the most important 20th-century
Lectures in English. Films in French, with English subtitles. GER:3a,4c
modern nation after 1945. Analysis of films from Renoir to Truffaut and
vehicle that helped France to change from a traditional society into a
the love story motif and the reason for its attraction.
the various responses provided by texts and movies. The significance of
myth (the quest for love, its obstacles, and its tragic resolution), examines
of frustrated passion whose fatalistic overtone exerts
Tristan and Isolde,
(Enroll in Comparative Literature 171.)
171E. Comparative Narrations of Race, Ethnicity, and Nation—
(Earll in Comparative Literature 171.)
5 units, Spr (Palumbo-Liù)
189Q. Stanford Introductory Seminar: Romance—Texts and Mov-
ies—Preference to sophomores. The concept of romance through an
analysis of the “love story” motif in literature and cinema. The myth of
Tristan and Isolde, of frustrated passion whose fatalistic overtone exerts
a wide influence on Western imagination from medieval romance to
contemporary movie makers. Focusing on salient components of the
myth (the quest for love, its obstacles, and its tragic resolution), examines
the various responses provided by texts and movies. The significance of
the love story motif and the reason for its attraction.
4 units, Win (Cazelles)
190Q. Stanford Introductory Seminar: Parisian Cultures of the 19th
and Early 20th Centuries—Preference to sophomores. From Romantic-
ticism to the Impressionist and Surrealism, the high moments and context
of the cultural history of 19th- and 20th-century France. Illustrated with
slides.
4 units, Win (Bertrand)
192E. Images of Women in French Cinema: 1930-1990—The myth of
the feminine idol in French films is understood by placing it in its
historical and cultural context. The mythology of stars was the
imaginative vehicle that helped France to change from a traditional society into a
modern nation after 1945. Analysis of films from Renoir to Truffaut and
Nelly Kaplan, the evolution of the role of women in France over 60 years.
Lectures in English. Films in French, with English subtitles. GER:3a,4c
(DR:7+)
3-5 units, Spr (Apostolidès)
201E. New Methods and Sources in French and Italian Studies—
(Same as Italian 201E.) Based on students' individual interests, surveys
changes in research methods: the use of digitized texts, Web resources,
and the expanding databases available through Stanford Library's vari-
ous gateways. Emphasis is on the strategy for the most effective explo-
ration of broad and specialized topics through a mix of new and
traditional methods. Using a flexible schedule based on enrollment and
the level of students' prior knowledge, may be offered in various forms,
including a shortened version on the basics, independent study, or a
syllabus split over two quarters. Unit levels are adjusted accordingly.
1-4 units, Aut (Parrisse)
220A. Verse Translation: From Intuition to Artistry—(Enroll in
Slavic Languages 220A.)
4 units, Spr (Hofstadter)
254E. Introduction to French Philosophy: From 1943 to the Present—
From the florification of subjectivity (existentialism) to the funerals of
the subject (structuralism, post-structuralism, deconstruction) to a mod-
est theory of agency in the contemporary revivial of social, moral, and
political philosophy. Readings: Sartre, Camus, Lévi-Strauss, Lacan,
Foucault, Bourdieu, Derrida, Dumont, Lefort, Castoriadis, Ricoeur,
Manant, Dupuy, Ferry, Renault, Gauchet. GER:3a (DR:8)
3-5 units, Spr (Dupuy)
259E. Michel Foucault and the Archaeology of Knowledge—(Same as
Comparative Literature 259E.) Introduction to, and explanation of, the
basic tenets and methods of Michel Foucault's theses and methods, and
their significance for the individualization and specification of each
culture and individual. Close reading of Foucault's major works.
3-5 units, Aut (Mudimbe)
271E. On Honor—(Enroll in Comparative Literature 271.)
5 units, Spr (Mudimbe)
287E. Myth and the Bible—Seminar on the separation of the Bible and
mythology, and about religious inspiration in these texts and how it
relates to mythology without being mythology. Readings: Oedipus the
King, Sophocles; The Bacchae, Euripides; The New Oxford Bible (Re-
vised Standard Version).
3-4 units, Win (Girard)
331E. What Intellectually Mattered between 1958 and 1968: In Paris
and in the Rest of Europe—(Same as Comparative Literature 331E.) In
relation to the present-day agenda in the Humanities (if there is a “shared
agenda”), the years 1958-68 are both extremely remote and close.
Remote because the “quietism” of the post-WW II period and the
“student revolution” of 1968, as a reaction to it, appear as episodes long
left behind. Those years seem close because some of those intellectual
protagonists (mostly “French theorists”), who are still agenda-setting for
us, published their first (or most important) books between 1958 and
1968: Roland Barthes, Jacques Derrida, Michel Foucault, Jacques Lacan,
Jürgen Habermas, Carlo Ginzburg, Raymond Williams, etc. Seminar
analyzes the texts that have become foundational of our own present-day
intellectual situation in their specific historical contexts (and their often-
complicated interrelations).
3-5 units, Win (Gumbrecht)
358E. The Practice of Sociology and the Humanities: An Analysis of
Pierre Bourdieu’s Work—Specialized study of the work of Pierre
Bourdieu, focusing on themes such as the function of the school, the
practice of social sciences, and the politics of knowledge. Emphasis is on
the philosophical presuppositions of Bourdieu’s work and the logic of his
investigation.
4 units, Aut (Mudimbe)
369E. The Disciplines of Literature—(Same as Comparative Litera-
ture 369E, Italian 369E)
5 units, Aut (Lerer, Schnapp)
FIRST- AND SECOND-YEAR LANGUAGE
Note—Students registering for the first time in a first- or second-year
course must take a placement test if they had any training in French be-
fore entering Stanford. All entering students must take Part I (written)
of the placement test on-line during the summer, followed by Part II (oral),
to be administered on campus 9/1999. Consult the Stanford Language
Center for further information or http://language.stanford.edu/.
Basic French grammar and vocabulary are covered in French 1.1, 2.1, and
3. At the completion of 3, students will have acquired beginning level
functional proficiency in listening comprehension, speaking, reading, and
writing in satisfaction of the University Foreign Language Requirement.
Students may continue with second-year French courses (22 or 23) or at a
higher level upon recommendation of the Language Program Coordina-
tor.
Auditing is not permitted in lower division language courses.
1,2,3, First-Year French—Introduction to basic communication skills
using an all-in-French, student-centered approach. By the end of the
three-quarter sequence, students are able to engage in interactions with
speakers of French for a variety of purposes and contexts using appropri-
5A, B. Accelerated First-Year French—Completes the first-year language sequence in two rather than three quarters. Recommended only for students who have previous knowledge of French and who place into 5A on the placement test. Prerequisite: consult Language Program coordinator prior to enrollment.

5 units, Aut, Win, Spr (Langmuir)

10. First-Year Conversation—Introduction to French conversation for students who have completed French 2 or equivalent. Emphasis is on the development of authentic discourse at the first-year level. May be repeated for credit.

2 units, Aut, Win, Spr (Staff)

15. Conversation in Everyday Life—Second-year French conversation for students who have completed French 3 or equivalent. Topics: the family, student life, films, theater, fashion, food, politics, etc. Useful information for students planning to travel/study abroad. May be repeated for credit. Prerequisite: 3 or equivalent.

2 units, Aut, Win, Spr (Staff)

15S. Intermediate Conversation—Second-year French conversation designed to improve communication in everyday situations. Topics: student life, films, theater, fashion, food, politics, etc. No auditors. Prerequisite: one year of college French or equivalent.

3 units, Sum (Staff)

20A. French Survival Skills—Second-year French conversation for students who have completed French 3 or equivalent. Learn to use Paris subway system, make hotel reservations, use the Minitel, travel by TGV, etc. Prerequisite: 3 or equivalent.

2 units, Aut (Staff)

20B. French Cinema—Second-year French conversation for students who have completed French 3 or equivalent. Introduction to major French film-makers, stars, and trends. Discussion in French of selected films. Prerequisite: 3 or equivalent.

2 units, Win (Staff)

20C. France and Francophone—Second-year French conversation for students who have completed French 3 or equivalent. Exposure to regions of France and the Francophone world. Topics: travel, food, cross-cultural comparisons, etc. Useful information for students planning travel/study abroad. Returning students are encouraged to enroll. Prerequisite: 3 or equivalent.

2 units, Spr (Dozer)

22. Second-Year French (Part A)—Content-based, intermediate-level, and designed to integrate culture and language in the development of authentic discourse. Review of present and past narrative, pronominal verbs, etc. Combines the study of grammar with discussion of French and Francophone texts. Utilization of language lab, multimedia, and computer facilities in the language learning process. Extra unit for individual or group projects. Satisfies the foreign language requirement for students majoring in International Relations. Prerequisite: 22 or equivalent or consent of coordinator.

4-5 units, Aut, Win, Spr (Staff)

Note—Special sections of second-year French (22, 23) with emphasis on certain topics (communications, Francophone or women writers, law, politics, trade, etc.) can be arranged through the coordinator and are indicated in the Time Schedule by a suffix (e.g., 22F, 22W).

23. Second-Year French (Part B)—Content-based, intermediate-level, and designed to integrate culture and language in the development of authentic discourse. Review of future, conditional, and subjunctive. Combines the study of grammar with discussion of French and Francophone texts. Utilization of language lab, multimedia, and computer facilities in the language learning process. Extra unit for individual or group projects. Prepares students for advanced courses and for study abroad. Satisfies the foreign language requirement for students majoring in International Relations. Prerequisite: 22 or equivalent or consent of coordinator.

4-5 units, Aut, Win, Spr (Staff)

24. Intensive Review of French Grammar—(Same as 124.) Intensive review of French grammar for highly motivated students who plan to enroll in advanced courses on campus and/or abroad. Emphasis is on individual work in the language lab with class time spent on contextualized activities and textual analysis. Prerequisite: 23 or equivalent, or consent of coordinator.

3-4 units, Aut, Spr (Staff)

40. Intensive French Specials—By petition only and with consent of instructor. Students with special programmatic needs for an alternate curriculum may complete 3-7 units through a combination of coursework and tutorials. No auditors.

3-7 units, Sum (Staff)

41A, B. Intensive French for Beginners—Accelerated first-year course covering all essential grammar. An all-in-French method is used for developing competence in listening, speaking, writing, and reading. Written exercises, compositions, conversational drills, and daily work in the language lab. No auditors.

9-12 units, Sum (Staff)

50. Reading French—For graduate students or seniors seeking to meet the University reading requirement for advanced degrees. Accelerated, designed specifically for the acquisition of reading ability. No auditors.

4 units, Aut (Staff)

ADVANCED LANGUAGE

99. Language Specials—With consent of department only. See instructor for section number.

1-5 units (Staff)

120. Advanced Conversation: France Today—Third-year conversation. Discussion of contemporary issues and topics of general interest. May be repeated for credit after two quarters. Prerequisite: 23 or equivalent.

3 units, Aut, Win, Spr (Staff)

121A, B. Business French—For students who wish to function and communicate in the French-speaking business community. 121A emphasizes résumé-writing and the job application process for on-site employment. 121B emphasizes acquisition of specialized vocabulary, discussions, and written work, including translations and business letters. Prerequisite: 23 or equivalent.

121A. 1-3 units, Aut (Servant)
121B. 1-3 units, Win (Staff)

121C. Advanced Topics in Business French—Advanced language course for students interested in practicing professional business French. Discussion of selected topics pertaining to international economics, management, and marketing. Based on materials presented in, e.g., international financial markets, global management, etc. Prerequisite: 23 or equivalent.

1-3 units, Spr (Marchand)

122. Introduction to French Civilization—Content-based language course introducing French civilization and culture through the reading of selected texts. Stresses the development of language skills through the...
study of art, geography, history, political and social institutions, etc. Prerequisite: 23 or equivalent.

123. Creative Writing—Writing as practical communication and as literature. The cultural and social determinants in shifting from spoken to written French, formal and informal. Textual analysis and creative writing is centered on various genres and styles (e.g., letters, essays, short stories, poems; description vs. narration). Grammar and vocabulary review. Class discussion in French focuses on model texts and original writing done by students. Prerequisite: 23 or equivalent. (WIM)

4 units, Win (Staff)

124. Intensive Review of French Grammar—(Same as 24.)

3-4 units, Aut, Spr (Staff)

125. Contemporary French Usage: Spoken and Written—Can serve as adjunct to Paris program. Grammar, syntax, and stylistics, emphasizing the similarity and divergence of oral and written French, including written French slang. Prerequisite: 23 or equivalent.

4 units, Spr (Staff)

127. French Media and Communications—For students interested in acquiring knowledge and developing practice in technical, legal, and business French. The technological policy of contemporary France in a historical perspective, and in reference to contemporary issues in the French computing, broadcasting, telecommunications, and multimedia industries. Readings from current journals are a basis for acquisition of specialized vocabulary. For extra unit, research paper or a multimedia presentation on a topic of choice. Prerequisite: 126 or equivalent or consent of instructor.

3-4 units, Win (A. Giraud)

128. Technocritique—The French tradition of social and philosophical criticism of technology. The apparent contradiction between being at the forefront of technological and scientific development and the demand for prudence, because technological development is not always perceived as a synonym of social and moral progress.

3-5 units (Dupuy) not given 1999-2000

LITERATURE AND CULTURE

UNDERGRADUATE

130. Middle Ages and Renaissance France—Introduction to the literature and culture of France, 11th-16th century. Readings from the epics (The Song of Roland), medieval romances (Yain, Chretien de Troyes), post-Petrarchan poetry (Du Bellay, Ronsard), and prose humanists (Rabelais, Montaigne). GER:3a (DR:7)

4 units, Aut (Cazelles)

131. 17th- and 18th-Century France—Introduction to the literature and culture of France from the Baroque to the Enlightenment. Readings: Corneille, Diderot, Moliere, Montesquieu, Rousseau, and Voltaire. Criticism of excerpts from contemporary filmed versions of French "classical" literature. GER:3a (DR:7)

3-5 units, Win (Russo)

132. 19th- and 20th-Century France—An approach to the intellectual history of modern France, viewed as a recognition of and response to the "absurd." A specifically modern crisis of subjectivity and of belief, accompanied by a broad range of responses: from art for art's sake to existentialist revolt and the bitter laughter of the theater of the absurd. Readings are from poetry and drama, but provide an overview of movements and styles from the period. GER:3a (DR:7)

4 units, Spr (Schilling)

133. Literature and Society: Introduction to Francophone Literature from Africa and the Caribbean—Focus is on major African and Caribbean writers, and the major issues raised in literary works which reflect changing aspects of the societies and cultures of Francophone Africa and the French Caribbean: meeting the challenge of acculturation and the search for identity; of tradition competing with modernity; the use of oral tradition and writing: women's role and status; writers' social responsibility. Visual material: readings from fiction, poetry, plays, and criticism. GER:3a,4a (DR:2 or 7)

4 units, Win (Apostolides)

142. From Romanticism to Symbolism: Transformations of French Poetry in the 19th Century—The evolution of poetry between creative revolutions and classical forms; the tension between prose and poetry; and the invention of modern consciousness for the poet, between the lyric voice and the analytic spirit, through the works of French poets Alphonse de Lamartine, Victor Hugo, Alfred de Musset, Charles Baudelaire, Paul Verlaine, Arthur Rimbaud, Jules Laforgue, Gerard de Nerval, Stephane Mallarme, Paul Claudel, Paul Valery, and Guillaume Apollinaire.

4 units, Aut (Pompidou)

198. Honors—Open to juniors and seniors with consent of adviser; 9-12 units total credit for completion of honors essay.

3-12 units (Staff)

199. Individual Work—Open only to majors in French with consent of department. Normally limited to 4-unit credit toward the major.

1-12 units (Staff)

ADVANCED UNDERGRADUATE AND GRADUATE

Note—The prerequisite for the following courses taught in French is one course from the 130 series or equivalent.

221. 17th-Century French Theater—Analysis, through contemporary literary theories, of the works of Corneille, Rotrou, Moliere and Racine. Modern stagings of classical French theater. GER:3a (DR:7)

3-5 units, Win (Apostolides)

229. Baroque, Classicism, and the Enlightenment: The Emotion of the Rational—The cultural history of France during the period from the cessation of the religious wars to the Revolution of 1789. The culture of the elite (Baroque, Préciosité, Classicism, Cartésianism, and themes of the Enlightenment), and the content, forms, and diffusion of the popular culture (written and iconic graphic elements; Almanacs). The approach is that of French contemporary historiography: from study of the levels of cultural productions, to ways of life (material civilization), to collective sensibilities. Slides illustrate iconic graphic elements. GER:3a (DR:7)

3-5 units, Aut (Bertrand)

237. Gallants and Libertines in 17th- and 18th-Century Fiction—The representation of love, eroticism, and gender in the novel and theater. From neo-platonist ideas to the cruelties of libertinage, love was seen as an instrument of social initiation, a civilizing force, a source of dissolution, a social game, a heroic ideal, or a bitter failure. Focus is on the relationship between love and the novel as a genre: strategies of disguise and deceit, euphemistic veiling of the body, eroticism and reading, shifting boundaries between feminine and masculine identities. Works by d'Urfe, Marivaux, Crebillon, Laclos, Denon, Choisy.

3-5 units, Spr (Russo)


3-5 units, Spr (Dupuy)

261. Stylistics and Textual Analysis—Designed to assure a high-level proficiency in written French. In-depth textual analysis and commentary of excerpts from various genres. Different styles of criticism. The exposé, written and spoken. Prerequisite for undergraduates: 123. (WIM)

3-5 units, Win (Hester)

262. Pronunciation and Phonetics—Theory study and corrective work: articulation, intonation, rhythm, phonetic alphabet, etc.

3-5 units, Aut (Hester)
264. Contemporary French Women Novelists—What does it mean to write as a woman? If, for Simone de Beauvoir, it meant simply to write like a man, fiction written by women in France since 1960 has suggested other interpretations, from feminist essentialism and working-class realism to post-modern Ludism. The role of class and family in identity formation, linguistic experiment as a challenge to patriarchy, and the reuse of minor genres such as the fairy tale in subverting the gendered literary imaginary. Readings from Cixous, Duras, Etcherelli, Wittig, Emaux, Redonnet, and Ndiaye. GER:3a (DR:7)
3-5 units, Aut (Schilling)

271. Collective Memory and Occupation France—The most divisive event in 20th-century French collective memory, the German Occupation (1940-44) split France, according to national myth, into two camps: collaborators and resisters. Through a selection of literary and filmic texts, from Vercors’s early Resistance writings to explorations of Judauty in the 1990s, addresses the ways artists have interpreted a conflicted national past in terms of amnesia, collective responsibility, victimhood, and memorialization. Authors: Calaferte, Delbo, Duras, Hitchcock, Kofman, Lanzmann, Malle, Modiano, Resnais, and Wiesel.
3-5 units, Aut (Schilling)

294A. Buffon, Diderot, and Rousseau—Five-week course.
2 units, Aut (Serres)

294B. Topics in French Literature and Philosophy—Five-week course.
2 units, Spr (Serres)

299. Individual Work—For students engaged in special work.
1-12 units, any quarter (Staff)

GRADUATE

312. Hagiography—Exploration of Saints’ Lives, composed in verse from the 9th to the 13th century. Topics: hagiography as a literary genre the theater of sanctity; sanctity in the wilderness; holy androgyyn, the saint’s exemplarity. Prerequisite: 204.
4 units, Win (Cazelles)

350. Contemporary French Fiction—Contemporary fiction and autobiography in France today, from Nouveau Roman formalism to today’s life stories of societal integration by young Beur writers and other minority voices. Readings: Modiano, Daniel Pennac, Eric Holder, Chimo, Claire Fredrie, Malika Mokkedem, Michel Houellebecq.
3-5 units, Spr (Bertrand)

374. Perec/Leiris: lectures croisees—Michel Leiris (1901-91) and Georges Perec (1936-1982) are recognized as key figures in the 20th-century literary imaginary. Readings: Modiano, Daniel Pennac, Eric Holder, Chimo, Claire Fredrie, Malika Mokkedem, Michel Houellebecq.
3-5 units, Spr (Bertrand)

399. Individual Work—For students in French working on special projects or engaged in predissertation research.
1-12 units, any quarter (Staff)

AFFILIATED DEPARTMENT OFFERINGS

ART AND ART HISTORY

1. Introduction to the Visual Arts
5 units, Aut (Marrinan)

120A/220A. 18th-Century Art in Europe, ca. 1660-1780
4 units (Marrinan)

ITALIAN SECTION

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Introductory Language Courses (1-99)

Advanced Language Courses (100-129)

Undergraduate courses in Literature and Culture (130-199)

Courses for Advanced Undergraduates and Graduates (200-299)

Graduate Seminars (300-399)

GENERAL

These courses are open to all undergraduate and graduate students; they are taught in English, and do not require a knowledge of Italian.

2E, 3E. Great Works—Enroll in Introduction to the Humanities 2, 3.
2E. The Afterlife—(two-quarter sequence)
5 units, Win (Harrison, Schnapp)
3E. The Here and Now—(two-quarter sequence)
5 units, Spr (Harrison, Schnapp)

166E. Women’s Voices in Contemporary Italian Literature—Introduction to 20th-century women’s writing in Italy, from Sibilla Aleramo’s A Woman to the narrative experiments of the last decade. Readings: Grazia Deledda, Anna Banti, Dacia Maraini, Fabrizia Ramondino, Francesca Duranti. GER:4c (DR:†)
4 units, Spr (Springer)

190E. The Decameron and the 1001 Nights—(Same as Comparative Literature 190E.) Boccaccio’s Decameron and the 1001 Nights begin with a “frame-story” describing a catastrophe that threatens a city, then present a series of scintillating tales to distract the audience from looming disaster. Beginning from these structural echoes, the two works are compared and contrasted, considering the role of women in the frame story and in the tales; difference and exoticism; the salvific narrative, science, knowledge, and moral education in Christianity and Islam; and modern retellings of the two works in film and fiction. GER:3a (DR:7)
4-5 units, Aut (Mallette)

191E. The Cinema as a Space of the Sacred—Is the film-text a map of sacred allegories? How does the cinema screen the Sacred? Are there any religious dimensions in secular texts like films? The phenomenology of the Sacred, its reinvention, and symbolism are probed through an analysis of a number of films. Readings: Mircea Eliade, René Girard, film theory and criticism. GER:3a (DR:7)
3-5 units, Spr (Campani)

201E. New Methods and Sources in French and Italian Studies—(Same as French 201E.) See French 201E.
1-4 units, Aut (Parrine)

225E. Pirandello, Sartre, and Beckett: Self and World in Modern Literature—Problems of identity, self-alienation, and human relationships as portrayed in novels and plays of Luigi Pirandello, Jean-Paul Sartre, and Samuel Beckett. Comparison of styles and ideas demonstrates the common vision of “abandonment” underlying their work. Readings: Pirandello’s Fu Mattia Pascal, Cost e (se vi pare), and S6 Personaggi; Sartre’s La Nausée and Huis Clos; Beckett’s Molloy. Readings available in translation.
3-5 units, Win (Harrison)

233E. Dante’s Divine Comedy—(Same as Comparative Literature 233E.) A reading of Dante’s poem, with reference to his other works (especially Vita Nuova) and the European literary traditions of his age. Topics: Dante’s afterworld in relation to Christian and Islamic visionary writings; his response to the Provencial and Sicilian poetry of courtly love; the idea of history, both personal and political, in
25E. F. T. Marinetti and Futurism—Inquiries into the history and influence of the Futurist movement. The links between avant-garde cultural experimentation and themes of speed, acceleration, intensification, and novelty that have shaped modern/postmodern ideas concerning experience, subjectivity, rhythm, power, and production.
3-5 units, Win (Schnapp)

36E. Italo Calvino in Translation—Calvino’s development as a writer. The increasing degree of his experimentation with structure and literary language, and the enduring component of fantasy. The Path to the Nest of Spiders, Marcovaldo, The Baron in the Trees, Cosmicomics, Invisible Cities, Mr. Palomar, and Six Memos for the Next Millennium.
3-5 units, Win (Schnapp)

31E. Seminar: Epic and Empire—(Enroll in Comparative Literature 314.)
5 units, Win (Parker)

320E. The Avant-Gardes of the Middle Ages—(Same as Comparative Literature 320E.) The medieval courtly love movements parallel many of the social and aesthetic tensions of the modernist avant-gardes. Readings of Provencal, Arabic, and Italian poetry highlight similarities to the avant-garde and issues peculiar to the Middle Ages: the revolution in poetic language and form; the relational argument with literary tradition; the role of the court in the evolution of new literatures; orality and the lyric text; gender and courtly love; vernacular literatures and the construction of cultural identity. Readings available in translation.
4-5 units, Win (Malleite)

369E. The Disciplines of Literature—(Same as Comparative Literature 369E.) Open to all entering graduate students in the Division of Languages, Cultures, and Literatures. Introduction to the history, structure, and intellectual debates of the disciplines of literary study. The origins of comparative and national literatures in the study of philology and the institutions of the European university. Key theoretical moves that shaped literary theory, criticism, and history in America: semiotics and structuralism, deconstruction, and post-structuralist critiques; the renewed interest in the rhetoric and rhetorical reading, identity politics, and ethnic studies; views of the literary canon and the impact of cultural studies.
5 units, Aut (Lerer, Schnapp)

389E. Common Roots: A Perspective on the History of Linguistics and Linguistic Ideas—A relevant feature of European cultural history is the diversity, the competition, and the changing predominance of languages, from Greek and Latin to Spanish, Italian, French, German, and English. The notion of “linguistic root” in the labyrinth of grammatical and philosophical reflections on language in Europe. Topics: the Classical tradition (where the notion of “root” is well established), the philosophy of language of the 17th-18th century (searching for the “roots” of language), the discovery of Sanskrit grammar and the beginning of the comparative linguistics, the changing concept of “root.” Encounters, detours, and unity in the history of European linguistic ideas.
3-5 units, Aut (Gambarrara)

FIRST- AND SECOND-YEAR LANGUAGE

Note—Because the Italian Language Program does not have a formal placement test, students registering for the first time in a first- or second-year course must see the instructor for proper placement if they have had any prior training in Italian.

1. First-Year Italian (First Quarter)—Intensive introduction to the Italian language, with emphasis on speaking and oral comprehension. Language lab.
5 units, Aut, Win, Spr (Staff)

2. First-Year Italian (Second Quarter)—Continuation of 1 with emphasis on the development of reading and writing skills, and on Italian culture. Language lab. Prerequisite: 1 or equivalent.
5 units, Aut, Win, Spr (Staff)

3. First-Year Italian (Third Quarter)—Continuation of 1 and 2 with additional cultural and literary readings. Language lab. Prerequisite: 2 or equivalent.
5 units, Aut, Win, Spr (Staff)

21. Second-Year Italian (First Quarter)—Comprehensive review of Italian grammar combined with further study of advanced grammar and Italian culture through literary texts. Prerequisite: 3 or equivalent.
3-4 units, Aut, Win (Devine)

22. Second-Year Italian (Second Quarter)—Continuation of 21 with emphasis on translation, stylistics, and composition. Prerequisite: 21 or equivalent.
3-4 units, Win, Spr (Devine, Napolitano)

23. Second-Year Italian (Third Quarter)—Continuation of 22. Prerequisite: 22 or equivalent.
3-4 units, Aut, Spr (Napolitano)

30. Conversation: Conoscere l’Italia—Conversation for students planning to go to Florence. Films, slide shows, and lectures on Italian culture, including opera, modern music, wine, and food. A preview of the Florentine experience. Prerequisite: consent of instructor. Recommended: two to three quarters of Italian.
3 units, Win, Spr (Tempesta)

31. Parlare dell’Italia—Open only to students who have studied at the Florence program. Have you got a favorite Italian wine or city, a favorite author, or movie director that you have studied in depth? Students share their experiences with their comrades from Florence and those preparing to go to Italy. Brief presentation to students in the beginning first-year Italian sequence. Prerequisite: studio abroad in Florence or equivalent.
3 units, Win (Napolitano)

41A, B, C. Accelerated First-Year Italian—Covers one, two or three quarters of Italian. Conversational drills and daily work in the language lab. All-in-Italian method is used, developing the four basic skills: listening, speaking, writing, and reading. No auditors.
9-12 units, Sum (Staff)

50. Reading Italian—Open to advanced undergraduates with consent of instructor; primarily for graduate students seeking to fulfill University foreign language requirements for advanced degrees. Accelerated, designed for the acquisition of reading skills in Italian. No auditors.
3 units, Win (Devine)

60. Italian Opera from the Early 19th Century (Rossini) to the Early 20th Century—Italian history through the operatic melodramas from the heroic epic of the Risorgimento to the social anguish of Venismo, which brings Italian opera to California as in the Girl of the Golden West by Puccini. Students attend at least two opera performances.
3-4 units, Aut (Napolitano)

99. Language Specials—With consent of department only. See instructor for section number.
1-5 units (Staff)

114. Advanced Styh’stics and Composition—Designed to achieve a high level of proficiency in written and spoken Italian. Readings of literary and non-literary texts with in-depth textual and grammatical analysis in class, oral reports, translations, and weekly writing assignments. Prerequisite: 22 or consent of instructor. (WIM)
3-4 units, Win (Napolitano)
115. Translation and Composition—Continuation of 114. Emphasis is on composition, writing of short essays, and short stories. Prerequisite: 114 or consent of instructor. 
3-4 units, Spr (Napolitano)

INTERMEDIATE-LEVEL LITERATURE

120. Stile Italiano—Tailored to the needs of advanced second-year students returning from the Florence campus, develops written and verbal skills within the framework of a reflection on the contradictions that define 20th-century Italy. Through readings, discussion, and slide presentations, it emphasizes the conflict between two Italics: the traditional Italy of art, culture, gastronomy, and the Mafia; and the new Italy that emerged in the postwar era as a world leader in contemporary design, art, architecture, and graphics.
3 units, Spr (Poli)

127. Framing Italian History—Overview of Italian history: medieval, Renaissance, baroque, Enlightenment, Risorgimento, Fascist, postwar, contemporary. Films, slides, videos, readings. (In Italian) Prerequisite: 3 or equivalent. GER:3a (DR:7)
4 units, Aut (Springer)

128. Inventing Italian Literature: Dante/Petrarca/Boccaccio—The origins of Italian literature in poetry (the love lyrics of Dante and Petrarch) and prose (stories from Boccaccio’s Decameron). Prerequisite: 3 or equivalent. GER:3a (DR:7)
4 units, Win (Springer)

129. The Path to Modernity: Renaissance to Pirandello—Analysis of a series of influential Italian texts from the 16th to the 20th century. Readings: Ariosto, Tasso, Goldoni, Leopardi, Verga, Pirandello. Prerequisite: 3 or equivalent. GER:3a (DR:7)
4 units, Spr (Springer)

198. Honors—Open to juniors and seniors with consent of adviser; 9-12 units total credit for completion of honors essay.
3-12 units (Staff)

199. Individual Work—For students engaged in special work. See instructor for section number.
1-12 units (Staff)

290. Pier Paolo Pasolini: From Poetry and Novels to Cinema and Film Theory—The life and work of the Italian poet, novelist, critic and film-maker. Pasolini as a political poet; poetry, novels, and film caught between the theory and the practice of Pasolini’s own notion of realism; the “myth” and the “sacred” in a consumption-orchestrated society; death, reality and myth as narrative strategies; semiotics, psychoanalysis and the cinema. Pasolini’s work in the light of his own theoretical writings and contemporary film theory.
3-5 units, Spr (Campani)

ADVANCED LITERATURE

299. Individual Work—For students engaged in special work. See instructor for section number.
1-12 units, any quarter (Staff)

GRADUATE

301. Graduate Workshop on Pedagogy—Introduction to the theory and practice of teaching Italian. Observations of demonstration classes taught by the master teacher and regular class visitsations.
2 units, Spr (Napolitano)

379. Italian Linguistic Theories and Practices, from Dante to Croce—Until 1950, what we now know as “standard Italian” was used mainly in literature. For centuries, writers debated which dialect or combination of dialects would become the official language of Italy. This debate was just one side of wider reflections on language, and grammatical and philosophical theories. Their European context, and the actual practice of the authors: Dante, Machiavelli, Vico, Leopardi, Manzoni, Croce, and others.
3-5 units, Aut (Gambarara)

399. Individual Work—For graduate students engaged in work on a special project in the field of Italian studies or predissertation research. May be repeated for credit. See instructor for section number.
1-12 units, Aut, Win, Spr, Sum (Staff)

AFFILIATED DEPARTMENT OFFERINGS

ART AND ART HISTORY

110D/210D. The Venetian Renaissance
4 units, Win (Berdini)

181/281. Theories of Architecture
4 units, Spr (Berdini, Turner)

214B. Seminar: Humanistic Discourse on Art
4 units, Spr (Berdini)

The following courses are accepted for credit in the major. See respective department listing for course descriptions and General Education Requirements (GER) information.

CLASSICS

205A,B. The Semantics of Grammar
2 units, Aut (Devine)
1 unit, Win (Devine)

HISTORY

12Q. Stanford Introductory Seminar: “The Mind Has No Sex”? 3 units, Win (Findlen)

13. The Emergence of Modern Medicine
5 units, Win (Findlen)

206P/306P. Many Histories of Science: The Scientific Revolution
4-5 units, Aut (Findlen)

213/313A. Graduate Colloquium: New Worlds, Imaginary Worlds
4-5 units, Spr (Findlen)

213C/313C. Undergraduate Colloquium: Power, Art, and Knowledge in Renaissance Italy
5 units, Win (Findlen)

413. Graduate Seminar: Early Modern Europe
8-10 units, Spr (Findlen)

LINGUISTICS

1. Introduction to Linguistics
4 units, Win (Leben)

GERMAN STUDIES

Emeriti: (Professors) Theodore M. Andersson, Gerald Gillespie, Walter F. W. Lohnes, Katharina Mommsen, Kurt Mueller-Vollmer; (Adjunct Professor) Gertrude Mahrholz

Chair: Russell A. Berman

Professors: Russell A. Berman, Elizabeth Bernhardt, Orrin W. Robinson III (Berlin, Autumn)

Assistant Professors: Karen J. Kenkel (on leave), Sara S. Poor (on leave), Arthur C. Strum

Senior Lecturers: William E. Petig, Kathryn Strachota, Brigitte Turza

Lecturer: Harriet Jernigan

Assistant Professor: Amir Eshel
The department offers a variety of programs in German language and linguistics, literature, culture, and thought. Courses are open to majors and all interested students. Candidates are accepted for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy.

By carefully planning their programs, students may fulfill the A.B. requirements for a double major in German Studies and another subject. An extended undergraduate major in English and German literature is available as a certiﬁmal program for the A.B. and A.M. degrees in German Studies, and joint programs for the Ph.D. degree with Comparative Literature, Interdisciplinary Studies in Humanities, Linguistics, and Modern Thought and Literature.

Special collections and facilities at Stanford offer possibilities for extensive research in German studies and related ﬁelds pertaining to Central Europe. Facilities include the Stanford University Libraries and the Hoover Institution on War, Revolution, and Peace. Special collections include the Hildebrandt Collection (texts and early editions from the 16th to the 19th century), the Austrian Collection (with emphasis on source material of the time of Maria Theresa and Joseph II, the Napoleonic wars, and the Revolution of 1848), and the Stanford Collection of German, Austrian, and Swiss Culture. New collections emphasize culture and cultural politics in the former German Democratic Republic. The Hoover Institution has a unique collection of historical and political documents pertaining to Germany and Central Europe from 1870 to the present. The department also has its own reference library. Extensive use is made of the language lab in the Undergraduate Library as well as the department’s own audio-visual equipment, films, tapes, and slides.

The Republic of Austria has endowed the Distinguished Visiting Professorship in Austrian Studies. The professorship rotates on a yearly basis through several departments.

Haus Mitteleuropa, the German theme house at 620 Mayﬁeld, is an undergraduate residence devoted to developing an awareness of the culture of Central Europe. A number of department courses are regularly taught at the house, and there are in-house seminars and conversation courses. Assignment is made through the regular undergraduate housing draw.

**UNDERGRADUATE PROGRAMS**

**BACHELOR OF ARTS**

The major in German Studies provides students with the linguistic and analytic facility to explore the signiﬁcance of the rich cultural traditions and political histories of the German-speaking countries of Central Europe. At the same time, the interdisciplinary study of German culture, which can include art, history, literature, media theory, philosophy, political science, and other areas, also encourages students to evaluate broader and contradictory legacies of modernity. For example, the literary, artistic, and cultural responses to the belated and rapid modernization of Germany allow for reﬂection on the modern condition in general.

Similarly, the German experience of national identity and political unification sheds light on wider issues of cultural cohesion and diﬀerence, as well as on the causes and meaning of phenomena such as racial prejudice, anti-Semitism, and the Holocaust. In general, an education in German Studies integrates work done abroad into their degree program. Returning interns who wish to develop a paper based on their experience should enroll in 298. All undergraduates interested in Germany are urged to enroll in the Berlin program, which is open for academic study Autumn, Winter, and Spring Quarters. The program also offers internships in German industry, government, and cultural organizations year round. Through the center, students with at least two years of college-level German can also take courses at Freie Universität, Technische Universität, or Humboldt Universität. Most students live in homes with German hosts. Multiple majors are especially recommended for students spending one or more quarters at the Stanford Center in Berlin.

**MINORS**

There are two minor options.

**German Language and Culture**—Students may choose to minor in German Language and Culture if they are particularly interested in developing a strong ability in the German language, or in pursuing linguistic issues pertinent to German. Students satisfy the requirements for the minor in German Language and Culture by completing 35 units of coursework, including at least three courses at the 100-129 level, taught in German. Study at the Stanford Center in Berlin for at least one quarter is highly recommended.

**German Cultural Studies**—Students who wish to study German literature, culture, or thought, without necessarily acquiring facility in the German language, may pursue a minor in German Cultural Studies. Students meet the requirements for the minor in German Cultural Studies by completing 35 units of coursework in German literature, culture, and thought in translation, including at least three courses at the 130 or 140 level. (Five units of the CTX sequence Myth and Modernity may be counted towards the completion of requirements for the minor in German Cultural Studies).

**HONORS**

Majors with a minimum grade point average (GPA) of 'B+' in German courses are eligible for departmental honors. In addition to the requirements listed above, each honors candidate submits an essay representing 6 to 9 units of academic work. The essay topic is chosen in consultation with a faculty member of the department. Opportunities to commence research projects are offered at the Berlin Center.

**STANFORD IN BERLIN**

All undergraduates interested in Germany are urged to enroll in the Berlin program, which is open for academic study Autumn, Winter, and Spring Quarters. The program also offers internships in German industry, government, and cultural organizations year round. Through the center, students with at least two years of college-level German can also take courses at Freie Universität, Technische Universität, or Humboldt Universität. Most students live in homes with German hosts.

Most credits earned in Berlin can be applied to the undergraduate major in German Studies. All students who are planning to study at the Stanford Center in Berlin or engage in an internship are encouraged to consult with their major advisers and the Overseas Studies oﬃce about integrating work done abroad into their degree program. Returning interns who wish to develop a paper based on their experience should enroll in 298. More detailed information is available at the Overseas Studies Oﬃce in Sweet Hall or with the faculty adviser in the department.

**COTERMINAL PROGRAMS**

Students may elect to combine programs for the A.B. and A.M. degrees in German Studies. For details, see the "Undergraduate Degrees" section of this bulletin.
GRADUATE PROGRAMS

The University requirements for the A.M. and Ph.D. degrees are described in the “Graduate Degrees” section of this bulletin.

MASTER OF ARTS

This program is designed for those who do not intend to continue studies through the Ph.D. degree. Students desiring the A.M. degree must complete a minimum of 36 units of graduate work. If students enroll for three quarters for a minimum of 12 units per quarter, they can fulfill the A.M. requirements in one year. The program normally includes at least one course in each of the three areas of concentration: language and linguistics, literature, and thought.

In addition, students must take graduate-level courses in German and/or approved courses in related fields such as art history, comparative literature, linguistics, history, or philosophy.

A.M. candidates must take an oral examination toward the end of their last quarter.

DOCTOR OF PHILOSOPHY

The requirements for the Ph.D. include: (1) a minimum of 36 graduate units during the first year of graduate study and a minimum of 9 units per quarter during the six quarters following the first year; (2) a reading knowledge of one language other than English and German, normally French; (3) a master’s oral examination, unless the student already has an A.M. upon entering the program; (4) a qualifying paper; (5) a qualifying examination; (6) the University oral examination; and (7) a dissertation. Students in Medieval Studies must also have a reading knowledge of Latin.

The first year of work, which leads to the A.M. degree, is designed to introduce each student to the three major areas of study. During Spring Quarter of the first year, all students, except those admitted with a master’s degree, must take an oral A.M. examination. During the one-hour examination, the student is questioned by three examiners, chosen by the student, on work undertaken in specific graduate courses.

By July 1 of the summer following the first year of graduate study, students should present as a qualifying paper an example of their course work. Although ordinarily not meant to represent an original contribution to scholarship, it should demonstrate the candidate’s ability to grasp complex subject matter with sufficient competence to organize materials and to present arguments in a clear and concise manner commensurate with scholarly standards. The paper is submitted to the department chair, who passes it on for approval by the student’s faculty adviser and a second reader appointed by the chair in consultation with the adviser.

Students who enter the program with a master’s degree from another institution must submit, in lieu of a qualifying paper, a master’s thesis or a major research paper as evidence of ability to pursue advanced scholarly work.

At the end of the sixth quarter of study (and only if the qualifying paper has been accepted), the student takes a one-hour oral qualifying exam with two examiners, the student’s chosen adviser, and another faculty member appointed by the chair. The purpose of this examination is to demonstrate a broad familiarity with the literature of the major periods, movements, and some major figures. Only after successful completion of the qualifying procedure will the department approve the student’s admission to candidacy. A student who fails the qualifying examination may retake it once at the beginning of the seventh quarter.

The University oral examination in the Department of German Studies consists of an area examination; on consultation with the four prospective examiners, the student prepares a specialized list of relevant literature from an area of concentration, as well as appropriate secondary literature. The area of concentration is considerably broader than a dissertation topic but nevertheless allows for intensive work. Examples of areas of acceptable scope are: a 100-year period with some thematic emphasis, problems emerging from a particular genre in various contexts, a major literary movement, institutional setting, or discursive structure.

At least two weeks before the examination date, the student distributes the definitive version of the bibliography as well as a position paper, approximately 25 pages in length, addressing a major issue in the area of study. The examination consists of questions regarding this paper and the area of bibliography. The examination lasts at least two hours, permitting each of the four examiners a 30-minute question period and reserving an optional 10 minutes for questions from the chair of the examination.

Within three months of successful completion of the University oral, the student must submit a dissertation proposal to the department, approved by all members of the reading committee. The topic of the dissertation normally is directly related to the area of concentration in the University oral.

Students, regardless of their future fields of concentration, are expected to acquire excellence in German and thorough knowledge of the grammatical structure of German. The department expects Ph.D. candidates to demonstrate teaching proficiency in German; 200, Learning of German, is required. The teaching requirement is six quarters during the second and third years of study.

The department expects candidates to demonstrate research skills appropriate to their special areas of study. The requirement can be fulfilled in the capacity of either a University Fellow or a Research Assistant.

Graduate students are also advised to start developing skills in teaching literature by participating in the teaching of undergraduate literature courses. Students can earn up to 3 units of graduate credit for practice teaching in literature.

INTERDISCIPLINARY PROGRAMS

The department participates in the Graduate Program in Humanities leading to a joint Ph.D. degree in German Studies and Humanities. For description of that program, see the “Interdisciplinary Studies in Humanities” section of this bulletin.

Students may work toward a Ph.D. in German Studies with minor in such areas as comparative literature, modern thought and literature, linguistics, or history. Students obtaining a Ph.D. in such combinations may require additional training.

STANFORD TÜBINGEN GRADUATE EXCHANGE

One or two Stanford graduate students in German Studies may be accepted as exchange students by the University of Tübingen, and the counterparts from Tübingen participate in academic programs at Stanford.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

GENERAL

(IN ENGLISH)

These courses do not require a knowledge of German and are open to all students.

8A, 9A. Myth and Modernity: Culture in Germany—(Enroll in Introduction to the Humanities 8A, 9A.)

8A. Reason and Revolution—GER:1 (DR:1) (two-quarter sequence) 5 units, Win (Strum)

9A. Rationalization and the Return of Myth—GER:1 (DR:1) (two-quarter sequence) 5 units, Spr (Eshel)

38A. Introduction to the Germanic Languages—(Same as 138) Survey of the oldest attested stages of the Germanic language family, including Gothic, Old Norse, Old Saxon, Old English, Old Frisian, Old Low Franconian (Old Dutch), and Old High German. The linguistic interrelationships, prehistory, Germanic tribal groupings, and written literature (if any). GER:3a (DR:7) 3 units, Win (Robinson)
120N. Stanford Introductory Seminar: Virtue and Terror—Kant, Rousseau, and the French Revolution—Preference to freshmen. As a culmination of the European Enlightenment, the French Revolution can be understood as an effort to construct state and society in the image of reason. A philosophical interpretation of the central features of revolutionary culture and politics (festivals, paintings, the Terror, etc.), and of their importance to modern conceptions of revolution and social change is made through "Kantian" and "Rousseauian" perspectives, and Enlightenment philosophical ideas, which are themselves at play in the Revolution. Works by Rousseau, Kant, Robespierre, others; paintings by David, others; music by Mozart. GER:3a (DR:7)

4 units, Spr (Lowood)

126A. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91.) Taught simultaneously at different overseas campus sites and at Stanford. The institutional structures and contexts for literature in different cultures, i.e., how literature is presented to the public at various levels. What sorts of literature are discussed in the press, and what issues are raised by such literary criticism? What is literature presented in schools? (Is it primarily the "local" national literature or is "world literature" read?) Do students read "minority authors"? What texts are taught at universities, what plays performed, and what films are screened in theaters? Students work as project groups in local sections, communicating with the instructor at Stanford and with students at distant sites through the Web. Group projects involve students at several locations and include comparisons of local literary institutions (e.g., the range of theater performance or the character of literacy criticism in the different sites). GER:3a (DR:7)

4 units, Win (Berman)

145A. Holocaust and Literature—(Same as 293A.) Questions of remembrance, representation, and cultural politics surrounding the Holocaust. The possibility of "poetry after Auschwitz;" relations between aesthetic form and historical experience; changing generational perspectives; the Holocaust in mass culture, especially film. Readings by: Paul Celan, Nelly Sachs, Dan Pagis, Tuvia Riebue, Imre Kertesz, Aharon Appelfeld, Primo Levi, Eli Wiesel, Günter Grass, and others. (In English)

3-5 units, Win (Eshel)

161A. The Arthurian Legend in Literature and Film—The "origins" of legend in the 6th century (Gildas, Bede, Geoffrey of Monmouth), through medieval ( Chrétien, Wolfram von Eschenbach, Malory), and to modern interpretations (Twain, Malamud). Focus is on variations in social meaning of different heroes in different contexts. Films from cult favorites (Excalibur, Monty Python and the Holy Grail) to the more obscure (Lancelot du Lac, Feuer und Schwer). Readings and discussion in English.

3-5 units (Poor) not given 1999-2000

162A. Weimar Cinema—Introduction to Weimar cinema and the cultural and political environment of the Weimar Republic (1919-33), focusing on film's formal aspects and consideration of film as entertainment and cultural expression in Germany. How to "read" and discuss film. Selections from Weimar and contemporary film theorists. Films, readings, discussion in English; some texts in German for German majors.

3-5 units, Aut (Lee)

175A. Modernization, Technology, and Culture in Germany, 1900 to 1945—(Same as 175/275.) Open to advanced undergraduates and graduate students. Interactions of material life, technology, and culture in Germany 1900-45. Lectures, readings, films, and reports are organized around the identification and sorting out of modernist and anti-modernist, rational and anti-rational, technocratic and anti-technocratic strands. Technology as a source and artifact of social, political, and cultural movements. Topics: industrialization, urban development, new means of transportation and communication, literature and technology, film and technology, "Amerikanismus," military technology, and the engineering culture of National Socialism. GER:3a (DR:7)

4 units, Spr (Lowood)

221A. Modernism and the Jewish Voice in Europe—(Same as Slavic Languages and Literatures 221.) Some of the most haunting literary voices of the 20th century emerged from the Jewish communities of Eastern and Central Europe. The Jewishness of the modernists is thematized, asking whether it contributed to shared attitudes toward text, history, or identity. Their works are situated in specific linguistic traditions: Yiddish, Hebrew, Russian, Polish, or German. Primary readings from Ansky, Bialik, Mandelstam, Babel, Schulz, Kafka, Celan, and others; secondary readings in history, Eastern European literature, and theory, including Marx, Freud, Benjamin, and Arendt.

3-4 units, Aut (Safra, Eshel)

241A,242A,243A.—Open to graduate students, advanced undergraduates, and sophomores with consent of instructor. The history of German thought from 1700 to the present and its significance for understanding modern culture and society. Authors such as: Leibniz, Mendelssohn, Kant, Schiller, Hegel, Marx, Kierkegaard, Nietzsche, Lukács, Husserl, Heidegger, Adorno, Arendt, Habermas, Kluge.

241A. Deutsche Geistesgeschichte I: 18th-Century German Thought—(Same as 241.) Introduction to 18th-century German thought, and to some distinctive problems of modern philosophy and cultural theory, through an analysis of Leibniz, Mendelssohn, Lessing, Kant, Schiller, and others. Discussions of the concept of modernity and its critics, of the politics of theory, and of the political and epistemological functions of art. (In English)

3-5 units, Aut (Strum)

242A. Deutsche Geistesgeschichte II: 19th-Century German Thought—(Same as 242.) Preludes to the 20th century: from the philosophy of culture and of history to utopian constructionism, and its disillusionments. Reading and discussion of relevant texts by representative thinkers: Hegel, Humboldt, Feuerbach, Marx, Stirner, Mainländer, Schopenhauer, and Nietzsche.

3-5 units, Win (Mueller-Vollmer)

243A. Deutsche Geistesgeschichte III: 20th-Century German Thought—(Same as 243.) German thought in the 20th century, especially critical theory, hermeneutics, and psychoanalysis. Readings of representative texts by Weber, Freud, Lukács, Benjamin, Schmitt, Heidegger, Adorno, Habermas. (In English)

3-5 units, Spr (Safra, Eshel)

292A. Concord and Jena: The Coming of Romanticism to America—American transcendentalism and the encounter of its major figures (Emerson, Fuller, Thoreau, and Parker) with Classical and Romantic German writers, e.g., Goethe, Schiller, Novalis, Jean Paul, Fichte, the Schlegels and Schieremacher. Focus is on the integration of specific Germanic traditions into the transcendentalists' conceptions of literature, poetic discourse, criticism, aesthetics, and new style of writing.

3-5 units, Spr (Mueller-Vollmer)

293A. Holocaust and Literature—(Same as 145A.)

3-5 units, Win (Eshel)

INTRODUCTORY

Note—Students registering for the first time in a first- or second-year course must take a placement test if they have studied German before entering Stanford.

FIRST-YEAR

1N. Stanford Introductory Seminar: German Studies—Preference to freshmen. Introduction to the language and culture of the German-speaking peoples for students who have had little or no prior exposure to German, but have a substantial interest in learning the language and understanding the complexities of German-speaking culture. Emphasis is on analyzing modern life against a socio-historical backdrop. German
language learning provides the basic tools to comprehend issues in German culture and history. GER:3a (DR:7)
5 units, Aut (Bernhardt)

20N. Stanford Introductory Seminar: German Studies—Preference to freshmen. Emphasis is on building language skills and expanding the understanding of German cultural history for students with some prior exposure to German (equivalent to one quarter of college-level study). The acquisition of basic competence in the language is coupled with explorations of history, literature, and the arts to achieve a basic cultural literacy in German Studies.
5 units, not given 1999-2000

1,2,3. German Language and Culture—Comprehensive, balanced introduction to listening and speaking, and reading and writing.
5 units, Aut, Win, Spr (Staff)

IX. Accelerated German—Equivalent to German 1 and 2 combined. For students who want an accelerated start in German language and culture with practice in all four skills. Appropriate for, but not limited to, students intending to study at Stanford in Berlin in Winter Quarter.
8 units, Aut (Strachota)

5. Intensive First-Year German—Equivalent of 1, 2, and 3 combined.
12 units, Sum (Staff)

10. Elementary German for Seniors and Graduate Students—Intensive, designed for students who need to acquire reading ability in German for the Ph.D. and/or for advanced research in their own field. No auditors.
4 units, Win, Sum (Petig)

11P. Individually Programmed Beginning German—For those who wish to complete more or less than 5 units a quarter, have scheduling conflicts, or prefer to work independently. Students proceed at their own pace, working on their own with the text and tapes. The instructor is available for consultation on a regular basis. Conversation classes may be attended for listening and speaking practice.
3-12 units, Aut, Win (Strachota)
Spr (Petig)

HAUS MITTELEUROPA

20A. Beginning Conversation—(AU)
1 unit, Aut, Win, Spr (Staff)

20B. Intermediate Conversation—(AU)
1 unit, Aut, Win, Spr (Staff)

20C. Advanced Conversation—(AU)
1 unit, Aut, Win, Spr (Staff)

20F. Everyday Life during WW II—(AU)
1 unit, Spr (Staff)

20K. Küche Mitt (German Cooking Class)—(AU)
1 unit, Aut (Staff)

20M. “Mitt” Movie Series—(AU)
1 unit, Aut, Win, Spr (Staff)

20N. German Music—(AU)
1 unit, Spr (Staff)

20P. Germany Today—(AU)
1 unit, Aut (Staff)

20Q. German Drama—(AU)
1 unit, Win (Staff)

20S. Speaking German “Mitt”—(AU)
1 unit, Win (Staff)

20T. Teaching German Conversation—(AU)
1 unit, Aut, Win, Spr (Staff)

INTERMEDIATE

At this level, students have several options depending on their interests. After completing German 3 or the equivalent, students may enroll directly in courses on the 120-level, which consider special topics in German culture while encouraging additional language learning. Alternatively, 21 and 22 emphasize a systematic review of the language, with 21W and 22W study the language of business and economics.

3-4 units, Aut, Win (Turneaure)

21W. Intermediate German I: Business German—Equivalent to 21, but readings, discussion, and exercises focus on the business world. Recommended for students planning to do a business internship in Germany. Prerequisite: 3.
3 units (Petig) not given 1999-2000

22. Intermediate German II—Continuation of 21, with greater emphasis on reading and writing skills. Literary texts of major 20th-century writers in their historical context.
4 units, Win (Turneaure)

22W. Intermediate German II: Business German—Equivalent to 22, but continues the business focus of 21W. Recommended for students going to Germany to do an internship. Prerequisite: 21 or 21W.
4 units (Petig) not given 1999-2000

100. 100 German Years—Hones German language skills while introducing the history and culture of Germany as experienced by ordinary people over the 20th-century; based on the Deutsche Welle video series. Themes: Germans and war, democracy, work, family, religion, sex, humor, crime, etc. Complementary readings. Presentations using related internet links, short written commentaries.
3-4 units, Win (Strachota)

101. Advanced Language Study I—Short fictional and expository readings, discussions, essays. Review of grammatical structures. Vocabulary building with emphasis on phrases and idiomatic expressions used in common communicative situations and lexical distinctions between various German equivalents of high-frequency English words. Practice conversations using the structures and expressions studied. Prerequisite: 22 or equivalent.
3-4 units, Aut (Turneaure)

102. Advanced Language Study II—Continuation of 101.
3-4 units, Win (Turneaure)

105. Advanced Business German—Case studies of typical business situations in German with accompanying videos, listening comprehension exercises, and computer drills. Business correspondence and reports in German. Prepares students for the International Business German exam.
3-4 units, Spr (Petig)

110. German Newspapers—Articles from the weekly Die Zeit and line dailies and news magazines are read and discussed. Short written commentaries. Systematic vocabulary building.
3-4 units, Aut (Turneaure)

111. Television News from Germany—For intermediate and advanced students. Viewing of current news reports and features. Emphasis is on the acquisition of basic competence in the language is coupled with explorations of history, literature, and the arts to achieve a basic cultural literacy in German Studies.
5 units, not given 1999-2000
121. Pop Culture in Contemporary Germany—Current trends in German popular culture. Reading materials from newspapers, magazines, comics, web, plus one contemporary novel. Weekly video and film viewings include TV talk shows, soaps, detective shows, and new German comedy films. Web-research, newsgroup, oral presentations, and 4-5 short papers.  
4 units (Poor) not given 1999-2000

122N. Stanford Introductory Seminar: The Brothers Grimm and their Fairy Tales—Preference to freshmen. A historical, biographical, linguistic, and literary look at the famous Kinder- und Hausmärchen of Jacob and Wilhelm Grimm. Readings from the fairy tales, plus materials in other media (film and the visual arts). Small-group performances of dramatized fairy tales. Prerequisite: 3 or equivalent. (In German) GER:3a (DR:7) (WIM)  
4 units, Spr (Jermigan)

126Q. Stanford Introductory Seminar: Reading German Literature—An Introduction—Preference to sophomores. The fundamental skills and concepts needed to read literature in German, strengthening language skills with an introduction to the central questions of literary study: how to interpret a text, the relationship between an author’s intention and a reader’s interest. Why does the literature of another age and another country continue to interest us and how does this distance influence our judgments? Authors: Luther, Goethe, Heine, Rilke, Kafka, and Brecht. Conducted primarily in German with short writing assignments. Prerequisite: 3 or equivalent. GER:3a (DR:7) (WIM)  
4 units, Aut (Berman)

127. The Culture of Seduction in German Plays—Introduction to some major German-language plays, including Goethe’s Faust; Schnitzler’s Hands Around; Wedekind’s Spring Awakening; and Brecht’s Threepenny Opera. The plays are approached by asking “how do the methods of seduction and the subsequent results in the plays reflect the cultural and social values of their times?” Dramatic interpretation.  
4 units, Win (Jermigan)

131-133. German literature and culture from the 18th century to present. Topics vary each year and courses may be repeated with consent of the instructor. Readings in German.

132. 19th-Century Literature and Culture: Romanticism—Responses to the Enlightenment and the French Revolution; the aesthetic discourse of the “sublime;” women and romanticism. Redefinitions of identity and emancipation, Romantic philosophy and evaluations of art and music. Authors such as Goethe, Holderlin, Novalis, Hoffmann, Schlegel, Heine, and others. GER:3a (DR:7)  
4 units, Aut (Eshel)

133. 20th-Century Literature and Culture: German Modernism—Introduces the major movements and authors of German Modernism in literary and visual culture. Authors: Hauptmann, Nietzsche, Wedekind, Mann, Kafka, Brecht, Lasker-Schüler. Readings and discussion in German.  
4 units, not given 1999-2000

133C. Minority Literature from Germany—Literary texts by writers of various cultural backgrounds (Jewish, Turkish, Russian, E. German, etc.) who live in Germany and who thematize difference. Emphasis is on a critical understanding of the concept of minority discourse in the German context. The nature of minority discourse and its relation to literature in various categories: e.g., mainstream, outsider, minority, and difference. Taught in German, building the appropriate vocabulary for literary and linguistic analysis of literary texts in spoken and written German.  
4 units, Spr (Kührch)

134P. Medieval Women—The place, participation, and images of women in medieval culture, emphasizing German-speaking contexts. Prominent historical women (e.g., Queen Matilda), images of women in medieval poetry (Minnesang), romance (Hartmann von Aue’s Erec, Gottfried’s Tristan), and texts authored by women (autobiographical writings of women mystics). Modern conceptions of medieval women in film. Primary texts in German, some secondary material in English. Discussion in German and English. GER:4c (DR:1)  
4 units (Poor) not given 1999-2000

138. Introduction to the Germanic Languages—(Same as 38A.)  
GER:3a (DR:7)  
3 units, Win (Robinson)

145A. Holocaust and Literature  
3-5 units, Win (Eshel)

175. Modernization, Technology, and Culture in Germany, 1900 to 1945—(Same as 175A/275.) GER:3a (DR:7)  
4 units, Spr (Lowood)

191. Mentoring Comparative Institutions—Introduction to mentoring and teaching on a web-based learning environment for students at dispersed sites and in diverse cultures. Weekly sessions and extensive on-line interaction. Prequisite: 126A or Comparative Literature 91.  
2 units, Win (Berman)

194. German Studies Colloquia—Stanford faculty, students, and visiting scholars present and discuss their works in German Studies and related fields.  
1 unit, Aut, Win, Spr (Staff)

195. Colloquium on the Contemporary Novel—(Same as 295.) Hans-Ulrich Treichel’s acclaimed novel Der Verlorene. A “close and slow reading” open to German majors and graduates dedicated to contemporary German novels. Focus is on developing analytical skills, presenting and reflecting on different, contradictory possible readings of the same text. (In German)  
1-3 units, Win (Eshel)

199. Individual Reading—36 hours of reading per unit, weekly conference with instructor. May be repeated for credit. Prerequisite: consent of instructor.  
1-2 units, Aut, Win, Spr (Staff)

ADVANCED UNDERGRADUATE AND GRADUATE

231-239. German Literature and Culture—The major periods of German literature from the early Middle Ages to the present. Undergraduate prerequisite: consent of instructor.

234B. Literary and Philosophical Revolutions around 1800—The critical commonplace suggests the Germans had their revolution only in spirit or in thought, a sign of German political backwardness, of the Deutsche misère. It may be that German literary and philosophical “revolutions” just preceding and directly following 1789 were not so much expressions of, or even simple reactions to, the political backwardness of the Germans, but instead enacted a distinctive literary-philosophical politics, sometimes explicit, sometimes coded. Readings: Heine, Goethe, Schiller, Wieland, Friedrich Schlegel, Novalis. Prequisite: consent of instructor. (In German)  
3-4 units, Spr (Strum)

236J. Weimar Republic—(Same as Comparative Literature 236J.) The relationship between literature and democracy during the 1920s. The impact of military defeat and revolution on the restructuring of the institutions on cultural life. Problems of nationhood and popularity; the tensions between engagement and tradition; literature and film; representations of war.  
3-5 units, Aut (Berman)
241-243. The history of German thought from 1750 to the present and its significance for an understanding of modern culture. Authors: Lessing, Herder, Kant, Schiller, Hegel, Marx, Nietzsche, Lukács, Husserl, Heidegger, Adorno, Habermas. (In English)

241. Deutsche Geistesgeschichte I: 18th-Century German Thought—(Same as 241A.)
3-5 units, Aut (Strum)

242. Deutsche Geistesgeschichte II: 19th-Century German Thought—(Same as 242A.)
3-5 units, Win (Mueller-Vollmer)

243. Deutsche Geistesgeschichte III: 20th-Century German Thought—(Same as 243A.)
3-5 units, Spr (Staff)

255. Middle High German—Introduction to medieval German language and culture. Selections from various authors (e.g., Hartmann von Aue, Gottfried von Strassburg) and genres (e.g., Minnesang, epic, romance). Grammar is reviewed and elucidated; emphasis is on rapid and accurate reading.
3-5 units, Win (Robinson)

275. Modernization, Technology, and Culture in Germany, 1900 to 1945—(Same as 175A/175.)
4 units, Spr (Lowood)

295. Colloquium on the Contemporary Novel—(Same as 195.)
1-3 units, Win (Eshel)

298. Individual Work—Open only to German majors and to students working on special projects, including written reports for internships. Honors students use this number for the honors essay. May be repeated for credit.
1-15 units each quarter (Staff)

300. Methods and Materials for German Studies—Techniques and library resources for investigating German literature and culture, particularly in its historical dimensions. Readings/assignments on the multiple aspects of the production of texts in historical context, emphasizing the location and interpretation of relevant cultural, economic, social, and literary sources. Bibliography; non-canonical and extra-literary sources; film and other non-print media; archives and special collections.
3-5 units (Lowood) not given 1999-2000

ADVANCED GRADUATE

400. Dissertation Research—Exclusively for graduate students in German working on dissertations.
1-12 units, Aut, Win, Spr, Sum (Staff)

OVERSEAS STUDIES

These courses are approved for the German major and taught at the campus indicated. Students should discuss with their major advisers which courses would best meet educational needs. Course descriptions can be found in the “Overseas Studies” section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

BERLIN

3B. German Language and Culture
4 units, Aut, Win, Spr (Staff)

22B. Berliner Geschichte(n): Second-Year German
4 units, Aut, Win, Spr (Staff)

100B. Aktives Deutsch
2 units, Aut, Win, Spr (Staff)

123. The Brothers Grimm and their Fairy Tales
4 units, Aut (Robinson)

126A. Literary Institutions: A Comparative Approach—(Same as Overseas Studies 91.)
4 units, Win (Berman)

177A. Culture and Politics in Modern Germany
4-5 units, Win (Kramer)

179B. German Film and its European Context
4 units, Aut (Kramer)

195. Contemporary Theater—(Same as Overseas Studies 101A.)
4-5 units, Spr (Kramer)

AFFILIATED DEPARTMENT OFFERINGS

COMPARATIVE LITERATURE

30N. Stanford Introductory Seminar: Opera and Literature
3-5 units, Aut (Lindenberger)

115Q. Stanford Introductory Dialogue: Thinking in the Present—20th Century European Philosophy
2 units, Win (Gumbrecht)

311A. Visions of History
5 units, Win (White)

HISTORY

22N. Stanford Introductory Seminar: Ethnic Cleansing in the 20th-Century Europe
4 units, Aut (Naimark)

136A. European Thought and Culture in the 19th Century
5 units, Win (Robinson)

224. Undergraduate Colloquium: Stalinism in Eastern Europe
5 units, Spr (Naimark)

MUSIC

4G. The Operas of Richard Wagner
3 units, not given 1999-2000

15Q. Stanford Introductory Seminar: The Music of J. S. Bach and his Time
3 units, Win (Cohen)

17N. Stanford Introductory Seminar: The Operas of Mozart
3 units, Win (K. Berger)

143. Studies in Classical Music
4 units, Aut (K. Berger)

310. Research Seminar in Musicology
3-5 units, Win (K. Berger) Spr (Mahrt)

PHILOSOPHY

125/225. Kant’s Critique of Pure Reason
4-5 units, Win (Anderson)

170. Kantian Ethical Theory
4 units, Win (Jaworszka)

RELIGIOUS STUDIES

7N. Stanford Introductory Seminar: Religion in the Age of Enlightenment
3 units, Spr (Sockness)

274. From Kant to Kierkegaard
5 units, Spr (Sockness)

386
338. Mystics and Mysticism
4 units, Win (Gelber)

HISTORY

Chair: Carolyn Lougee Chappell
Associate Professors: Philippe Buc, Gordon H. Chang (on leave), Ahmad Dalal, Paulina Findlen, Kennell A. Jackson Jr., Mary L. Roberts (on leave)
Assistant Professors: Brad S. Gregory (on leave), Kathryn Miller, Ellen G. Neskar, Michael Thompson, Amir Weiner (on leave)
Visiting Professors: Paul David, Avner Greif, Susan M. Treggiari, Gavin Wright
Senior Lecturer: Joseph J. Corn
Lecturers: Margo Horn, Bertrand Patenaude, Richard Street
Consulting Professor: Thomas W. Simons, Jr.
Visiting Professors: Thomas Hughes, Colin Jones, Herbert Klein, Arnold Suppan, Katherine Tachau
Visiting Associate Professors: Pedro Castillo, Glenna Matthews, Julie Saville
Visiting Assistant Professors: Madeline Hsu, Roger Thompson
Acting Instructors: Timothy Lane, Angus Lockyer

History courses teach the foundational knowledge and skills (analytical, interpretive, writing) necessary for understanding the deep connections between past and present. History is a pragmatic discipline in which the synthesis of change over time involves sifting the multiple influences and perspectives that affect the course of events, as well as evaluating critically the different forms of evidence historians exploit to make sense of them. Teaching students how to weigh these sources and convert the findings into a persuasive analysis lies at the heart of the department's undertaking. History majors with interdisciplinary emphasis (HMIE)

In pursuing the above requirements for all History majors, the student in the General History major is required to satisfy breadth and concentration requirements.

1. Breadth: to ensure chronological and geographical breadth, at least two courses must be completed in a "premodern" chronological period and in each of three geographical fields: Field I (Africa, Asia, and Middle East); Field II (the Americas); and Field III (Europe, including Western Europe, Eastern Europe, and Russia). Courses fulfilling the "premodern" chronological period may also count for Fields I-III.

2. Concentration: to develop some measure of expertise, students must complete four courses in one of the following fields of concentration: Africa, Asia, Eastern Europe and Russia, Europe before 1700, Europe since 1700, Jewish history, Latin America, science and technology, the United States, the Middle East, Comparative Empires and Cultures; or a thematic subject treated comparatively, such as war and revolution, work, gender, family history, popular culture, high culture, and so on. The proposed concentration must be approved by the major adviser; a proposal for a thematic concentration must have the approval of both the adviser and the department's Undergraduate Studies Committee. At least one and preferably two of these four courses should be an undergraduate colloquium or seminar.

Certain Introduction to the Humanities courses taught by History faculty in a Winter-Spring sequence count toward the General History major.

HISTORY MAJORS WITH INTERDISCIPLINARY EMPHASIS (HMIE)

These majors are designed for several types of students: students interested in other disciplines who want to focus on the historical aspects of the subject matter covered by that discipline; students in History who want to understand how interdisciplinary approaches can deepen their understanding of history; and students primarily interested in developing interdisciplinary approaches to historical scholarship by combining the careful attention to evidence and context that motivates historical research with the analytic and methodological tools of science, humanities, and social science. In pursuing the above requirements for all His-
History majors, students in HMIE are required to complete their twelve courses for the major as follows:

Gateway Course (one course)—Students are required to take the appropriate gateway course for their interdisciplinary major. This introduces students to the application of particular interdisciplinary methods to the study of history. See the section on each HMIE for the gateway course appropriate to that major.

Methodological Cluster (three courses)—This cluster is designed to acquaint students with the ways in which interdisciplinary methods are employed in historical scholarship, both by practicing historians and by scholars in other disciplines whose work is historical. This program of study must provide methodological coherence and must be approved in advance by the student’s adviser. See the section on each HMIE for the appropriate Historical Methods courses.

Geographic Cluster (four courses)—History is embedded in time and place. This cluster is designed to emphasize that the purpose of studying methodology is to more fully understand the history of a particular region of the world. Students select a particular geographic region, as specified in the History major, and complete four courses in that area.

Interdisciplinary Cluster (four courses)—These courses, taken outside the Department of History, acquaint students with the methods and approaches of another discipline appropriate for the interdisciplinary study of history. This program of study must provide methodological coherence and must be approved in advance by the student’s adviser. See the section on each HMIE for appropriate interdisciplinary courses.

HMIE majors do not mandate the breadth or concentration requirements of the General History major. Introduction to the Humanities courses taught by History faculty may apply to HMIES only insofar as their content is specifically appropriate to the particular methodological or geographic cluster. Courses pre-approved for the clusters in Interdisciplinary tracks are listed on the History advising website.

HISTORY, LITERATURE, AND THE ARTS

The History, Literature, and the Arts major is designed for the student who wishes to complement his or her work in history with study in literature, particularly in a foreign language. For the purposes of this major, literature is defined broadly, including art, drama, films and poetry, memoirs and autobiography, novels, as well as canonical works of philosophy and political science. It appeals to students who are interested in studying literature primarily in its historical context, or who want to focus on both the literature and history of a specific geographical area while also learning the language of that area.

Gateway Course—History 206A, History, Literature, and Arts, gives students a broad introduction to the study of literary texts in history.

Methodological Cluster—This cluster teaches students how historians, in particular, analyze literary texts as documentary sources. Students choose three courses from among the pre-approved HLA Methodology curriculum; other courses must be approved by the HLA coordinator. These courses need not be in the student’s geographic concentration.

Geographic Cluster—Students select four History courses in one of the following geographic areas: Continental Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, or Africa. These four courses must be taken in addition to the three methodological courses required above.

Interdisciplinary Cluster—Four courses, taken outside the Department of History, must address the literature and arts, broadly defined, of the area chosen for the geographic concentration. The student’s adviser must pre-approve all courses in this cluster; these courses may not be double-counted towards a minor or major other than History.

HISTORY AND SOCIAL SCIENCE

History and Social Science HMIE is a collaborative program of the Department of History and the Social Science History Institute. The curriculum is designed to acquaint students with the application of the analytic and quantitative tools of the social sciences to issues in historical causality and explanation.

Gateway Course—History 206, The Logic of History, focuses on the way that historians sustain arguments on the basis of logical models and documentary evidence. It is divided into two modules: the first focuses on readings in the philosophy of history and causal model building, the second focuses on the reading of a wide variety of historical scholarship in order to allow students to identify particular kinds of confirmatory logics in a practical sense.

Methodological Cluster—Three History courses employ social scientific methods to address historical questions. The choice of courses depends on the student’s particular methodological and substantive interests, and must be selected from courses preapproved for this cluster, or approved in advance by the faculty adviser.

Geographic Cluster—See above.

Interdisciplinary Cluster—Students must define an interdisciplinary methodological cluster with the approval of their adviser. This cluster must constitute a coherent curriculum of tools oriented courses in the departments of Classics, Economics, Political Science, or Sociology. The cluster requirement may be fulfilled in either of two ways: by taking four courses in a single department; or by taking four courses that are built around a particular set of approaches in multiple departments. An example of the former might be a curriculum that allows a student to become acquainted with the methods and approaches of political science to the study of political history (what is often called “new political history”). Such a curriculum would include courses in the Department of Political Science on quantitative methods (Political Science 100A and 100B) along with courses in the historical analysis of American Politics (courses taught, for example, by professors Brady and Weingast). An example of the latter might be a focus on economic history, in which a student took American economic history, European economic history, and history of technological change in the Department of Economics, along with the ancient economy in the Department of Classics. In either case, the program of study must be approved in advance by the student’s adviser. Courses in this cluster may not be double-counted towards a minor or major other than History.

HISTORY AND SCIENCE

History and Science is a collaborative program of the Department of History and the Program in the History and Philosophy of Science. The major is designed for the science student who wishes to complement his or her work in science with a History major that focuses explicitly on science; students in the humanities and social sciences whose interests science is primarily historical and contextual; and students contemplating medical school who are interested in a History major that allows them to study the history of medicine, biology, and allied sciences in conjunction with fulfilling the premed science requirements that give them a general grounding in science.

Gateway Course—206P, Many Histories of Science, is designed to introduce students to approaches and methods in the history of science, technology, and medicine. It is primarily concerned with definitions of scientific methodology, practice, and institutions, and exposes students to some of the fundamental debates in the history of science. Case studies vary depending upon the particular instructor.

Methodological Cluster—Three History courses focusing on the history of science, technology, and medicine. Courses must be approved by the student’s adviser. The choice of courses depends on the student’s particular interests (for example, premodern science, history of medicine and biology, history of technology, contemporary science).

Geographic Cluster—Students select a geographic area (for example, America, Europe, Asia, or Africa) and complete four history courses in that area. Courses in history of science, technology, and medicine that have a geographic focus may be used to fulfill this requirement, but cannot be double-counted for the methodological cluster.

Interdisciplinary Cluster—This four-course cluster can be defined in any of three ways: (1) a disciplinary concentration that entails taking four courses in a single scientific discipline; (2) an interdisciplinary concentration that entails taking two anthropology of science, philosophy of science, or sociology of science courses, and two complementary Sc.
CREDENTIAL

SECONDARY (HISTORY) TEACHER’S CREDENTIAL

Applicants for the Single Subject Teaching Credential (Secondary) in the social studies may obtain information regarding the requirements by applying to the Credential Administrator, School of Education.
Upon enrollment in the graduate program in History, the student has a member of the department designated as an adviser with whom to plan the Ph.D. program. Much of the first two years of graduate study is spent taking courses, and, from the outset, the student should be aware that the ultimate objective is not merely the completion of courses but preparation for general examinations and for writing a dissertation.

Admission to the Department of History in the graduate division does not establish any rights respecting candidacy for an advanced degree. At the end of the first year of graduate study, students are evaluated by the faculty and given a progress report. A final decision as to whether she or he will be allowed to continue to work towards the Ph.D. is normally made by the middle of the student’s third year.

After the completion of certain further requirements, students must apply for acceptance for candidacy for the doctorate in the graduate division of the University.

REQUIREMENTS

1. In consultation with the adviser, students select an area of study from the list below in which to concentrate their study and later take the University oral examination. The major concentrations are:
   - Europe, 300-1400
   - Europe, 1400-1789
   - Europe since 1700
   - Jewish History
   - Russia
   - Eastern Europe
   - Middle East
   - East Asia before 1600
   - East Asia since 1600
   - Africa
   - Britain and the British Empire since 1460
   - Latin America
   - The United States (including Colonial America)
   - The United States (including Colonial America) to 1865
   - The United States since 1865
   - The History of Science and Technology

2. The department seeks to provide a core colloquium in every major concentration in which students normally enroll during the first year of graduate study.

3. Students are required to take two research seminars, at least one in the major concentration. Normally, research seminars are taken in the first and second years.

4. Each student, in consultation with the adviser, defines a secondary concentration. This concentration should represent a total of four graduate courses or their equivalents, and it may be fulfilled by working in a historical concentration or an interdisciplinary concentration. The historical concentrations include:
   a) One of the concentrations listed above (other than the student’s major concentration).
   b) One of the concentrations listed below, which falls largely outside the student’s major concentration:
      - The Ancient Greek World
      - The Roman World
      - Europe, 500-1000
      - Europe, 1000-1400
      - Europe, 1400-1600
      - Europe, 1600-1789
      - Europe, 1700-1871
      - Europe since 1848
      - England, 450-1460
      - Britain and the British Empire, 1460-1714
      - Britain and the British Empire since 1714
      - Russia to 1800
      - Russia since 1800
      - Eastern Europe to 1800
      - Eastern Europe since 1800
      - Jewish History
      - Middle East to 1800
      - Middle East since 1800
      - Africa
      - China before 1600
      - China since 1600
      - Japan before 1600
      - Japan since 1600
      - Latin America to 1825
      - Latin America since 1810
      - The United States (including Colonial America) to 1865
      - The United States since 1865
      - The History of Science and Technology

5. Each student, before conferral of the Ph.D., is required to satisfy the department’s teaching requirement.

6. There is no University or department foreign language requirement for the Ph.D. degree. A reading knowledge of one or more foreign languages is required in concentrations where appropriate. The faculty in the major concentration prescribes the necessary languages. A student required to take examinations in more than two foreign languages. Certification of competence in commonly taught languages (that is, French, German, Latin, Portuguese, Russian, and Spanish) for candidates seeking to fulfill the language requirement in this fashion is done by the appropriate language department of the University. Certification of competence in other languages is determined in a manner decided on by faculty in the major concentration. In either case, certification of language competence must be accomplished before a student takes the University oral examination.

7. The student is expected to take the University oral examination in the major concentration early in the third graduate year.

8. The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

JOINT PH.D. IN HISTORY AND HUMANITIES

The Department of History participates in the Graduate Program in Humanities leading to a joint Ph.D. degree in History and Humanities. See the “Interdisciplinary Studies in Humanities” section of this bulletin.

RESOURCES

The above section relates to formal requirements, but the success of a student’s graduate program depends in large part on the quality of the guidance which he or she receives from the faculty and on the library resources available. Prospective graduate applicants are advised to study closely the list of History faculty and the course work which this faculty offers. As to library resources, no detailed statement is possible in this bulletin, but areas in which library resources are unusually strong are described below.

The rich, and in some respects unique, collection of the Hoover Institution on the causes, conduct, and results of WWI and WW II are being augmented for the post-1945 period. The materials include government documents, newspaper and serial files, and organization and party publications (especially the British and German Socialist parties). There are also important manuscript collections, including unpublished records of the Paris Peace Conference of 1919 and the Herbert Hoover archives which contain the records of the Commission for Relief in Belgium, the American Relief Administration; the various technical commissions established at the close of WW I for reconstruction in Central and East-
FINANCIAL SUPPORT

 Students who are admitted with financial support are provided four more years of support through fellowship, teaching and research assistantships, and tuition grants. Applicants who have completed the A.M. degree from another institution may be eligible for three or four years of support. Applicants should indicate on the admissions application whether they wish to be considered for such support. No separate application for financial aid is required.

U.S. citizens and permanent residents who are interested in area language studies in East Asia, Latin America, Africa, and the republics of the former Soviet Union may request a Foreign Language and Area Studies (FLAS) fellowship application from:

FLAS Coordinator
(650) 723-0564
FLAS application deadline: mid-January

COURSES

See the Time Schedule for changes in course offerings each quarter, and check the web at http://www-portfolio.stanford.edu:6380/430 for updated information.

INTRODUCTORY UNDERGRADUATE

STANFORD INTRODUCTORY SEMINARS

Refer to the Time Schedule or contact the Stanford Introductory Studies office (123 Sweet Hall, telephone 650-723-4504) for applications and information.

12Q. Stanford Introductory Seminar: "The Mind Has No Sex"?—Preference to sophomores. In 1673, the French educator Pollain de la Barre declared, "The mind has no sex." The relations between male and female intellectuals from the Renaissance to the Enlightenment, the age of Galileo, Descartes, and Newton. The place of gender in the formation of modern science and philosophy. How, historically, have men and women participated in making knowledge? What does it mean to be a knowing individual?

3 units, Win (Findlen)


3 units (Findlen) not given 1999-2000

16N. Stanford Introductory Seminar: Science on Trial—The Crimes of Galileo—Preference to freshmen. In different periods, scientific knowledge has been contested by competing authorities with a claim to possess another truth. How do scientists respond to such assaults? How do we view these debates over time? The 1633 trial of the Italian mathematician Galileo is a point of departure to explore the relations between science, politics, faith, and reason. Students compare this episode with other scientific controversies in the past and the present.

3-4 units (Findlen) not given 1999-2000

19N. Stanford Introductory Seminar: Peter the Great—The Individual Shaping History, History Shaping the Individual—Preference to freshmen. Praised by his subjects for rescuing Russia from the alleged backwardness of the medieval past, Peter the Great became the subject of a powerful, yet contested, myth. Focusing on primary sources from the 17th to the 19th century (speeches, laws, travelers' accounts, literature, and art), emphasis is on the myth of the "Great Reformer," its makers and detractors, and its many variations. GER:3a (DR:7)

4 units, Win (Kollmann)

20Q. Stanford Introductory Seminar: Cultural Revolution in 18th-Century Russia—Preference to sophomores. The legacy of Peter the Great (1682-1725). Did he really transform Russia, as he is said to have done? If so, in what ways? The social and cultural changes in the wake of Peter's dynamic rule; and whether the Europeanization in 18th-century culture was more than skin-deep. Continuity and change in the rhetoric of power, mores and manners, aristocratic life, printing and literacy, opportunities for women, and social mobility.

3-5 units (Kollmann) not given 1999-2000

22N. Stanford Introductory Seminar: Ethnic Cleansing in 20th-Century Europe—Preference to freshmen. The major episodes of "ethnic cleansing" in 20th-century Europe: the Greek expulsion from the Ottoman Empire/Turkey and the Armenian genocide, Nazi genocidal policies, the expulsion of Germans from Poland and Bohemia, the deportation of the Crimean Tatars, and the case of Bosnia. GER:3a (DR:7)

4 units, Aut (Naimark)

27N. Stanford Introductory Seminar: The First World War as Experience and Memory—Preference to freshmen. What the war meant to European and American soldiers and civilians as they lived through it and remembered it. The experience of war in a variety of documents, films, novels, memoirs, and secondary sources.

3 units (Sheehan) not given 1999-2000

33Q. Stanford Introductory Seminar: Philosophical Machines—The History of Thinking Technology—Preference to sophomores. Technology and technologies, i.e., human-built devices that extend the powers of the human body in its interactions with nature and with other bodies, have been a provocation and a fascination for Western thought since its incipient moves in classical antiquity. The intensity with which philosophers have reacted to the technological innovations of their times suggest that, within Western culture, philosophy and technology seem to have shaped each other. The parallel analysis of historically specific technical devices and chronologically corresponding philosophical texts.

3-5 units (Gumbrecht, Lenoir) not given 1999-2000

34Q. Stanford Introductory Seminar: Virtuality—Preference to sophomores. New media technology from the printing press and photography to computer-mediated communication has transformed our experience of the "real": our conceptions of objectivity, agency, the self, the body. Using authors from Hobbes to Freud (17th-20th centuries), the focus is on the material media's role in changing epistemological formations. Visualizations in biomedicine, including new developments in "virtual surgery." Hands-on construction of virtual worlds. Readings on the new
hypermedia guide study of emerging practices of reading and rhetoric.

3SQ. Stanford Introductory Dialogue: 20th-Century History as Lived Experience—Preference to sophomores. Intersections between individual lives and the cataclysmic events of the 20th century, e.g., WW I and WW II, the Spanish Civil War, the Holocaust, and the Soviet takeover of Eastern Europe. Critical examination of memoirs, autobiographies, and fiction of 20th-century writers and politicians (Koestler, Brittain, Orwell, Remarque, Churchill, and Kundera) evaluates the uses of personal memory for the historian. What can individual accounts tell us about 20th-century history which a general narrative cannot? How are these accounts limited as historical sources? What are the politics of memory and how have they shaped the history of the 20th century?

2 units (M. L. Roberts) not given 1999-2000

36N. Stanford Introductory Seminar: Gay Autobiography—Preference to freshmen. The issues of gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Lounigas, Barbín, Cammermeyer, Gingrich, and Lorde. To what degree do these writers come to view their sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view the issue of identity? What kind of politics follow from these writers' experiences? GER:3a,4c (DR:7)

4 units, Spr (Robinson)

41N. Stanford Introductory Seminar: Fictions of Empire—Preference to freshmen. Readings of works of fiction; what the British Empire meant for the British themselves and for those who were within the Empire. Conrad's Heart of Darkness, Kipling's Kim, Forster's A Passage to India, Orwell's Burmese Days, and Porter's The Lion's Share, and works by Indian authors as they react to the experience of being part of the Empire. GER:3a (DR:7)

5 units, Win (Stansky)

42N. Stanford Introductory Seminar: The Invention of Liberty and the English Revolution—Preference to freshmen. Between 1640 and 1660, England experienced a civil war and an 11-year period in which it became a republic, ruled not by a hereditary king but by a lord protector. During this revolutionary period, English men and women talked and wrote about freedom and liberty, in terms of the individual and the state and in terms of religion and society. What these writings on what freedom might and should mean, writings which sketched for the first time in premodern Europe what democracy and a democratic republic might entail. GER:3a (DR:7)

4 units, Spr (Seaver)


5 units, Spr (Jackson)

48Q. Stanford Introductory Seminar: South Africa—Contested Transitions—Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. GER:3b (DR:9)

3 units, Win (Samoff)

50N. Stanford Introductory Seminar: The Black Atlantic—Preference to freshmen. The spread of African peoples and cultures since the beginning of the modern slave trade. This forced migration began a process in which millions of Africans traversed the Atlantic Ocean. Such journeys were marked by the fashioning and refashioning of diverse identities, rooted in Africa, and a shared experience of slavery and its legacy, which shaped the political, cultural, and social development of nations and peoples in the Americas, the Caribbean, and Europe. Focus is on issues of cultural exchange, cultural negotiation, and resistance. GER:4b (DR:3)

4 units (M. Thompson) not given 1999-2000

51N. Stanford Introductory Seminar: Abraham Lincoln—Myth and Reality—Preference to freshmen. What we know about Lincoln from documentary sources is compared with his image in American memory and mythology. Students read/discuss Lincoln's speeches and letters, a standard biography, essays on controversial aspects of his career, a study of how Lincoln has been remembered, and a recent novel based on his life. How history is made and remade by historians, artists, and interest groups within American society.

3 units (Fredrickson) not given 1999-2000

52N. Stanford Introductory Seminar: The Atomic Bomb in Policy and History—Preference to freshmen. Emphasizing declassified files from WW II and later interpretations, addresses the questions: Why did the U.S. drop A-bombs on Japanese cities in August 1945? Were there viable alternatives, and, if so, why were they not pursued? What did the use of the A-bombs mean then, and later? How have postwar interpreters explained and justified, or criticized, the A-bombings, and why? Various approaches from history, international relations, American studies, political science, and ethics address the underlying conceptions, the role of evidence, logic, models of explanation, ethical values, and cultural social influences in the continuing dialogue on the atomic bomb.

4 units (Bernstein) not given 1999-2000

53N. Stanford Introductory Seminar: Reflections on the American Condition—American History through Literature—Preference to freshmen. Classics of American literature, viewed as cultural and historical documents, cultivate critical skills in reading texts from various perspectives: aesthetic, biographical, social, and historical. Readings: Harriet Beecher Stowe, Uncle Tom's Cabin; short stories by Henry James and Edith Wharton; Richard Wright, Native Son; and David Guterson, Snow Falling on Cedars. GER:3a (DR:7)

5 units, Aut (Kennedy)

57Q. Stanford Introductory Seminar: Martin Luther King, Jr.—Interactive—Preference to sophomores. The MLK Papers Project website attracts users from all over the world to the project's unique documentary collections. Students adapt these materials to the needs of people from various educational backgrounds.

5 units (Carson) not given 1999-2000

85Q. Stanford Introductory Seminar: Jews and Muslims—Preference to sophomores. The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries. GER:3b,4a (DR:9 or 2)

5 units, Win (Rodrigue)

90Q. Stanford Introductory Seminar: Buddhist Political and Social Theory—Preference to sophomores. Contemporary Buddhist political theory and its historical and textual roots, emphasizing Tibetan, Thai, and Sri Lankan Buddhism. Topics: society and polity in Buddhist thought, Buddhist spiritual practice as social and political practice, sovereignty, the individual and society, Buddhist economic theory and practice, Buddhism and the state, Buddhist political and social theory in practice.
differences between Vajrayana (Tibetan) and Theravada (S.E. Asian) Buddhist social theory. GER:3b,4a (DR:9 or 2)

5 units (Mancall) not given 1999-2000

92N. Stanford Introductory Seminar: Killing Fields—Atrocity and Memory—Preference to freshmen. How do historians trace the act of memory? Two atrocities, Pol Pot's assault on his own people in Cambodia and the My Lai massacre of civilians in Vietnam, are explored as to how events are reported, assimilated, reproduced, and altered through the articifaces of memory and the narratives of history. Research is based on a wide variety of primary sources and on critical readings of invented and recollected events.

4 units (Kahn) not given 1999-2000

99Q. Stanford Introductory Seminar: Buddhist Biography and Autobiography—Preference to sophomores. Biography and autobiography reveal the “Buddhist world view;” explore the progress of the subject on the path to “enlightenment,” describe the methods used to achieve enlightenment, and provide evidence concerning the ways in which the Buddhist “self” relates to other “selves” and to society at large. Materials are primarily from Tibetan and Thai Buddhism.

5 units, Spr (Mancall)

INTRODUCTORY LECTURES

For students with little or no previous experience in college-level history, these courses survey a specific topic and introduce the methods of the discipline. All are meant to serve as foundations for more advanced course work within the department.

13. The Emergence of Modern Medicine—How did medicine emerge as a distinctive body of knowledge and as a profession in the age of Vesalius and Harvey? Why did physicians, rather than other medical practitioners, come to dominate medicine? The history of medicine from approximately 1000 to 1700. Topics: the history of the body, the religious and cultural significance of disease, development of hospitals, the rise of public health system. Compares medical knowledge and institutions in western Europe and Islam. GER:3a (DR:7)

5 units, Win (Findlen)

24A.B. Ten Days that Shook the World—(Enroll in Introduction to the Humanities 24A,B.)

24A. 5 units, Win (Buc)
24B. 5 units, Spr (Rodrigue)

26A.B. Democratic Society in Europe and America: Origins, Crises, Dilemmas—(Enroll in Introduction to the Humanities 26A,B.)

26A. 5 units, Win (Kennedy, Sheehan)
26B. 5 units, Spr (Kennedy, Sheehan)

28. The Second World War—(Formerly 128.) The diplomatic, military, and political history of the war in Europe and America. Themes: the crisis in the international state system following WW I, the origins of WW II, the nature of wartime leadership, the relationship between strategy and politics, the mobilization of societies for war, the character of combat, war and race, and the afterlife of the war in public and private memory.

5 units (Kennedy, Sheehan) not given 1999-2000

33A. The Rise of Scientific Medicine—The intellectual, social, and institutional dimensions of the rise of scientific medicine in the 19th and 20th centuries. How did medicine become “scientific?” What differences did science make to the practicing physician? Why did it displace other approaches to medicine? Focus is on medicine in Europe and the U.S., 1800 to the present. Topics: the development of experimental physiology, bacteriology, pharmacology, biomedical technology, nuclear medicine, biomedical imaging, computers in medicine, and prospects for bedside gene therapies; the effects of scientific developments in biomedical science and of technology on medical practice and therapy; the professionalization of medicine in comparative European and American contexts. GER:3b (DR:9)

5 units, Spr (Lenoir)

61. The Constitution and Race—The relation between the development of American constitutionalism and the politics and jurisprudence of slavery and race during the creation of the federal republic, the crisis of Civil War and Reconstruction, and the civil rights revolution of the mid-20th century. GER:4b (DR:3)

5 units (Rakove) not given 1999-2000

64. Introduction to Race and Ethnicity in the American Experience—(Formerly 164; same as American Studies 164.) How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation’s major minority populations. Focuses on the past two centuries. GER:3b,4b (DR:3 or 9)

5 units, Win (Castillo)

65. Introduction to Comparative Studies in Race and Ethnicity—Introduces how various disciplines approach the study of race and ethnicity; identifying important topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere, and exposing students to several History and other senior faculty affiliated with the Program in Comparative Studies in Race and Ethnicity. Key faculty provide weekly lectures augmented by discussion sections taught by CSRE Teaching Fellows. GER:3b (DR:9)

5 units, Spr (Camarillo, Fredrickson)

75. The United States and East Asia—Introduction to the history of political, social, military, and cultural interactions between the U.S. and the societies of E. Asia (China, Japan, Korea, Vietnam, and the Philippines) from the mid-19th century to the present. Major wars and diplomatic events, mutual perceptions, reciprocal consequences, and long-term trends generated by these events and the circumstances that brought them about. Structured as an American narrative with full voice to E. Asian perspectives.

5 units (Chang, Duus) not given 1999-2000

80. Culture, Politics, and Society in Latin America—Introduction to the political and social history of Latin America. Emphasis is on the interaction between institutional change, social structure, and political movements, emphasizing the environment and cultural values. GER:3b,4a (DR:2 or 9)

5 units, Win (Wirth)

87. Empires and Cultures in the Modern World—The formation of modern European empires and their expansion into Asia, Africa, and the Middle East. Topics: cultural encounters, military conquest, economic integration, the new imperialism, colonialism, nationalism, the mutual constitution of colonial power and forms of knowledge, and the culture and politics of the post-colonial world. Readings: historical texts, films, and novels. GER:4a (DR:2)

5 units, Spr (Lockyer)

88. Imagining Jewish Civilization—(Same as Religious Studies 29.) Interdisciplinary introduction to the various forms of Jewish self-expression, literature, religion, and history from the Biblical period to the present. Topics: power and powerlessness, conflicting notions of the divine, evil, beauty, community, gender, and learning through the ages. Guest lectures, films, readings of primary and secondary texts.

5 units (Eisen, Zipperstein) not given 1999-2000

92A. The Roots of Modern East Asia—China, Korea, and Japan in Early Modern Times—From the late Yuan to the Taiping Rebellion. Emphasis is on socio-economic, rather than political history, to expose students to a sophisticated society very different from their own. GER:3a,4a (DR:2 or 7)

5 units, Aut (Kahn)
58S. Sources and Methods Seminar: Americans All—The Cultural Politics of Gender and Race in Wartime America—WW II mobilization efforts presented women and some racial minorities with attractive social and economic opportunities, but what were the costs? What did it mean to unite anti-democratic forces abroad even as democracy’s promise remained unfulfilled at home? The effects of the war upon individuals and the role war played in facilitating or hindering incipient civil rights movements and oppositional subcultures.

5 units, Win (Mozes)

61S. Sources and Methods Seminar: America 1968—Race, Riots, and Rock n’ Roll—In 1968 the U.S. was in a state of turmoil as Vietnam, the murders of MLK and RFK, riots, and student and ethnic protests paralyzed the nation. America’s diverse body politic struggled to make sense of its own unraveling, with race, class, and culture shaping every action, reaction, and response. The politics, culture, and society through official reports, media, music, and movies.

5 units, Aut (Peralas)

65S. Sources and Methods Seminar: Hyphenated Americans? The Formation of Identity in 20th-Century California—What does it mean to be an American? How have African Americans, Japanese Americans, American Jews, and other “outsiders” in California framed their conception of American identity and belonging in the face of mainstream society’s resistance, even refusal, to embrace them? Primary sources (e.g., speeches, Hollywood films, novels, autobiographies, personal correspondence, and plays) show how people on the margins redefined the mainstream in their own terms.

5 units, Aut (S. Bernstein)

68S. Sources and Methods Seminar: Virgins, Fairies, and Nymphomaniacs—The Making of Sexual Identities in the United States—Were the Puritans sexually repressed? Was Walt Whitman really “gay?” What did it mean to be “queer” in the 1930s? The social construction of sexual categories and sexual identities in American history, with a focus on the 20th century. Primary sources include personal correspondence, court transcripts, Hollywood films, pulp fiction, Kinsey reports, medical journals, and original documents in the Stanford Archives.

5 units, Spr (Chavez)

72S. Sources and Methods Seminar: Flappers, Housewives, and Bra Burners—Images and Representations of Womanhood in 20th-Century America—How have images and representations of women changed over the 20th century in America? Prescriptions of womanhood and woman’s own representations of themselves through advertising, film literature, autobiography, and oral history. The differences in racial, ethnic, and class representations within each decade of the 20th century and the method by which prescription and lived experience converge and diverge.

5 units, Spr (Chavez)

74S. Sources and Methods Seminar: Filipina/o American Communities in California, 1900-1965—Filipina/o efforts to build ethnic rural and urban communities in Stockton, San Francisco, and Los Angeles amidst labor exploitation and anti-Filipina/o sentiment, and how the colonial relationship (1899-1946) between the U.S. and the Philippines shaped the lives of these immigrants. Topics: racialization, segregation, immigration, ethnicity, political activism, nationalist responses to U.S. rule, labor, the family, gender and the impact of war, depression in the global context of U.S.-Philippine relations.

5 units, Spr (Mabalon)

88S. Sources and Methods Seminar: Transformation of Jewish Identity in Eastern Europe, 1881-1939—The Jews of modern Eastern Europe offer a case for the study of questions raised by our contemporary preoccupation with ethnicity and multiculturalism: How do politics, culture, and language intersect? What are ethnicity, nationality, and national culture? Reset by massive social, political, and cultural changes, these men and women created a new Jewish politics, new varieties of Jewish culture, and competing visions of Jewish identity. Primary sources (political writings, literature, memoir, census data, art, film) focus on questions of historical method.

5 units, Win (Mozes)

99S. Sources and Methods Seminar: Re-Imagining Palestine—Although Palestine as a formal geopolitical entity ceased to exist after the 1948 war and the establishment of the State of Israel, the Palestinian Arabs did not. The diverse experiences and struggles of Palestinians who became stateless refugees throughout the world, and the small minority who remained in Israel. Which aspects of pre-1948 Palestinian social and cultural life continued at home and in the diaspora, and which were newly invented? How has Palestinian identity been shaped by exile, sweeping changes in the Arab world, and the movement for self-determination?

5 units, Spr (S. Robinson)

91S. Sources and Methods Seminar: Human Rights in China—U.S.-China relations in the post-Cold War era have largely been framed within narratives of human rights. An international human rights regime has come into being since WW II, but debates concerning cultural relativism vs. universalism are not settled. Is there a specifically Chinese approach to human rights? When have human rights been discussed in Chinese history? When and where have human rights been discussed with reference to Western concepts? Is there a difference between Western and Chinese views of human rights and, if so, what are the implications of this? Examples from the student democracy movement, Chinese prison system, political dissidents, and policies toward Tibet.

5 units, Win (Plum)

UNDERGRADUATE LECTURES

100 through 199 are lecture courses.

GENERAL

102A. The International System—The history and analysis of world politics and international relations from the dominance of empires and nation-states at the turn of the century until the present. The influence of communism, fascism, and anti-imperialism on the system, and the emergence of “society” as a factor in international relations. Questions of sovereignty vs. the “new world order.” GER:3a,4a (DR:2 or 7)

5 units, Win (Naimark, Simons)

EASTERN EUROPE AND RUSSIA

119. Aristocracies and Absolutism: Early Modern Eastern Europe, 1400-1800—The societies and culture of E. Europe (Belorussia, Bohe mia, Hungary, Poland, Ukraine) in the late medieval and early modern periods. The conflict of aristocratic parliamentary governments with absolutist states (Austria, Hungary, Prussia, Russia). E. Europe’s development is contrasted to the Russian historical experience.

5 units (Kollmann) not given 1999-2000

120A. Early Modern Russia, 1400-1762—Chronicles in the context of international trade and geopolitics. The expansion of Russia from its 14th-century origins to its achievement of a multiethnic empire stretching from Poland to Siberia, the Far East, and the Black Sea by the 18th century. Governance and society in conditions of autocracy: institutions of rule, social hierarchy, interethnic relations in empire, tension between the center and periphery, serfdom and agrarian economy, social values and gender roles, popular religiosity, Russian Orthodox as institution and as arbiter of high culture, 18th-century immersion in European culture and attendant social tensions. Interdisciplinary: guest lectures on art and literature. Eras of rapid change and social mobilization (Ivan IV,
Peter I, Catherine II) are placed in the long-term context. GER:3b (DR:9)
5 units, Spr (Kollmann)

120B. Imperial Russia, 1762-1917—State, society, empire, and the international relations of Imperial Russia (18th-19th centuries to 1917)
Alternate years with 120D. GER:3a (DR:7)
5 units, Win (Emmons)

120C. 20th-Century Russian and Soviet History—Survey and analysis of Russia in the 20th century, focusing on Soviet policy from its revolutionary advent in 1917 to its dramatic collapse in 1991. GER:3a (DR:7)
5 units, Aut (Patenaude)

120D. Intellectual and Cultural History of Imperial Russia—Companion to 120B. The development of Russian intellectual and cultural life under the impact of Western influences, from the reign of Peter the Great to the end of the Empire. Focus is on primary texts and cultural products. Recommended: 120B.
5 units (Emmons) not given 1999-2000

121. Russian Jewish History, 1772-1917—The social, economic, cultural, and political trends in Russian Jewish life from the Polish partitions until the 1917 Revolution: popular and elite cultures, changing family and social patterns, government attitudes toward Jews, perceptions of Jews in Russian culture, Jewish political cultures, and political radicalism. Emphasis is on regional differences and their impact on the character of Jewish life in the areas of Belorussia, Lithuania, Ukraine, etc.
5 units (Zipperstein) not given 1999-2000

125. 20th-Century Eastern Europe—Major historical trends in 20th-century E. European history. Empires and national movements. The creation of independent Eastern Europe after WW I; social movements and the emergence of dictatorships and fascism in the inter-war period. WW II, Stalinism, and destalinization in contemporary E. Europe.
5 units (Naimark) not given 1999-2000

MEDIEVAL AND EARLY MODERN EUROPE

100A. Europe: Late Antiquity to 1500—Themes of group identity, power, and religion, surveying the transformations of European society and power-structures from Augustus to Machiavelli. How did groups fashion and refashion themselves through contact with other groups, the pressures of politics, and the utilization of sacred norms? How did religious influences societies and how were religions transformed by societies? GER:3a (DR:7)
5 units (Buic) not given 1999-2000

100B. Machiavellian Moments: Europe's History, 1492-1793—Survey of the intellectual and social currents from the voyages of Columbus to the American Revolution. Readings: Shakespeare, Locke, Wollstonecraft, Rousseau, and Jefferson. GER:3a (DR:7)
5 units, Win (Lougee Chappell)

105A. Introduction to Medieval Culture—(Same as English 165A. Medieval Studies 165.) Introduction to the development of medieval culture through religious, philosophical, literary, artistic, social, and political sources, with emphasis on the interrelationships among them. GER:3a (DR:7 or 8)
5 units, Win (Brown, K. Miller)

110. Storming Heaven: Christianity in Conflict in Early Modern Europe—What happens when a culture holds that right religion is absolutely necessary for salvation, yet disagrees about its content? A multi-perspectival view of divergent Christian traditions from the early 16th to the mid-17th centuries, with parallels to religious "hot spots" in our own world. Topics: the character of the late medieval Church, humanism and Catholic reform, Luther and the early evangelical movement, the rise and spread of Anabaptism, Calvin and the exportation of Calvinism, the Council of Trent and Counter-Reformation, the Wars of Religion in France and the Netherlands, and the process of confessionization.
5 units (Gregory) not given 1999-2000

MODERN EUROPE

100C. Introduction to Modern Europe—European history since the French Revolution has been a persistent attempt to come to terms with the promise and perils of the great revolutions of the 18th century. Readings: von Gentz, Adams, Marx, Fanon, Freud, de Beauvoir. GER:3a (DR:7)
5 units, Spr (Sheehan)

130. From Enlightenment to Revolution: France in the 17th and 18th Centuries
5 units (Baker) not given 1999-2000

130B. France from 1750 to the Present—France has long been viewed as the epitone of civilized values and cultural distinction; but it has also been associated with chronic political instability, violent revolution, and anarchistic artistic rebellion. The diverse and contradictory features of one of world’s great powers, starting in the 18th century in which France produced Voltaire, Rousseau, and the Enlightenment, and Robespierre, and to the present. Use of literature, art, and film.
5 units, Spr (Jones)

136A. European Thought and Culture in the 19th Century—Major European thinkers and intellectual movements from the Enlightenment to Modernism. Readings: Matthew Arnold, Jane Austen, Karl Marx, John Stuart Mill, Friedrich Nietzsche, Emile Zola, etc. GER:3a (DR:7 or 8)
5 units, Win (Robinson)

136B. European Thought and Culture in the 20th Century—Important European thinkers and intellectual movements of the 20th century, from Freud to Foucault.
5 units (Robinson) not given 1999-2000

137. The Holocaust—The emergence of modern racism and radical antisemitism. The Nazi rise to power and the Jews. Anti-semitic legislation in the 1930s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.
5 units (Rodrique) not given 1999-2000

HISTORY OF SCIENCE AND TECHNOLOGY

133. The Darwinian Revolution—(Same as 333.) The conceptual developments leading to establishment of the major unifying paradigm of biological science, the theory of evolution by natural selection. Biological thought before Darwin (1800 to 1836). The voyage of the Beagle and the formation of Darwin’s thought in terms of its broader intellectual and social context. The Origin of Species. Descent of Man. The difficulties the theory had to overcome and their resolution in the union of evolutionary biology and population genetics in the 1930s and ‘40s.
4 units (Lenoir) not given 1999-2000

133B. The Sociology of Scientific Knowledge—Classical problems in the sociology of knowledge in the writings of Marx, Durkheim, and Mannheim. Recent works in the social construction of scientific knowledge, emphasizing the historical sociology of experimental science and lab practice. Case studies and the anthropological approaches in the works of Mary Douglas, Pierre Bourdieu, and others are used to explore a theory of practice and a critique of historically situated practical reason as the foundation of the sociology of scientific knowledge.
4 units (Lenoir) not given 1999-2000

139. The Scientific Revolution—Recent studies and related primary materials (in translation) reassess the claims made for the "scientific revolution." Studies of early modern science have broadened our unde-
standing of the period, from work on museums and gentlemanly trust to the sciences of non-European cultures.

5 units (Seaver) not given 1999-2000

BRITAIN

141. Yorkist and Tudor England—The Making of a Modern State—The transition from the late medieval realm to the Renaissance monarchy, Henry VIII, the English Reformation, and the new conservatism of the Elizabethan regime.

5 units (Seaver) not given 1999-2000

142. Revolutionary England, 1603-1689—Analysis of the conditions that led to the first of the modern revolutions, the collapse of the Stuart monarchy, the beheading of the king, the first and only English experiment with a republic, the attempt of the Restoration to recreate a stable royal absolutism, and its final defeat in the “Glorious Revolution” of 1688-89. Radical ideas emerging in the heat of revolution.

5 units (Seaver) not given 1999-2000

143. Shakespeare’s England, 1558-1640—Introduction to a period of early modern English history when England was still a minor power and when Elizabeth Tudor and then her Stuart cousins tried to exploit the new powers acquired by the monarchy under Henry VIII, before the society was torn apart by civil war. This society produced three of its greatest dramatists, perhaps its greatest philosopher of science, and an unrivaled outpouring of poetry. It would be reductionist to argue that social, political, and economic developments “explain” this period of literary outpouring. It would be reductionist to argue that social, political, and economic developments “explain” this period of literary production, but the social, political, and religious world in which it took place is sketched.

5 units (Seaver) not given 1999-2000

144. Britain, 1688-1832—(Same as 244.) Survey/colloquium. Alternate meetings provide a broad knowledge of British society in its political, social, intellectual, and cultural aspects, and considers one text in depth (a historical study, novel, etc.) for what it may say about Britain from the Glorious Revolution of 1688 to the Great Reform Act of 1832.

5 units (Stansky) not given 1999-2000

145C. Modern Britain—(Same as 245C.) Survey/colloquium. Alternate meetings provide a sense of British history in the 19th and 20th centuries in its political, social, intellectual, and cultural aspects and considers one text in depth (a historical study, novel, etc.) for what it may tell us, in the broadest and most particular senses, about the recent history of Britain. GER:3a (DR:7)

5 units, Spr (Stansky)

AFRICA

147A. African History in Novels and Film—The principal episodes in African history have been captured in novels and, to a lesser extent, in film. What happens to history and historical understanding as they undergo transformation in imaginative literature and film. Does the African novel fairly represent history? Is film only an imperfect vision of African past events? GER:3a,4a (DR:2 or 7)

5 units, Aut (Jackson)

147B. The Idea of Africa among African Americans—No group within the Black diaspora has developed more notions, sometimes competing, of Africa than African Americans since the late 18th century. The crucial moments in that envisioning of Africa, from the free Black identifications of the 1770s-1840s to Marcus Garvey’s 1920s homeland ideologies and the 1990s Mandela fever. GER:4b (DR:3)

5 units (Jackson) not given 1999-2000

148. Introduction to African History—African history from the discovery of early humans in E. Africa to the 1990s. Geared to students who want to master the basics of Africa’s past while engaging more advanced analysis. Films, novels, autobiographies, slides, readings. GER:4a (DR:2)

5 units (Jackson) not given 1999-2000

148C. Africa in the 20th Century—The challenges facing Africans from when the continent fell under colonial rule until independence. Lectures are organized around case studies of colonialization and its impact on African men and women drawn from West, Central, and Southern Africa. Discussions on novels, plays, polemics, and autobiographies written by Africans. GER:4b (DR:2)

5 units, Spr (Lane)

THE UNITED STATES

115. Technology and Culture in 19th-Century America—The social and cultural aspects of technological change from the American Revolution through WW I. Emphasis is on technologies of production and consumption (armory practice, department stores); of temporal and spatial transformation (telegraphic time signals, railroads), simulation and reproduction (photography, phonograph), and communication and control (telephone, scientific management). GER:3b (DR:9)

4-5 units, Win (Corn)

150A. African-American History to the 20th Century—Surveys African-American history through the Civil War. Slavery in Africa, the development of slavery in the Western Hemisphere, and the Atlantic slave trade. The evolution of slavery as an institution in America and the development of slave culture. The free black population and the emergence of abolitionism, growing regional tensions and war, and emancipation and its immediate effects. GER:3a,4b (DR:3 or 7)

5 units, Aut (M. Thompson)

150B. Introduction to African-American History: The Modern Black Freedom Struggle—(Formerly 157.) The 20th-century civil rights movements and political/racial thought. Using recent historical scholarship and audio-visual materials, lectures examine the racial advancement strategies of such leaders as Booker T. Washington, W. E. B. DuBois, Mary M. Bethune, Ella Baker, Martin Luther King, Jr., Malcolm X, and Jesse Jackson. GER:3b,4b (DR:3 or 9)

5 units, Spr (Carson)

152. American Spaces: An Introduction to Material Culture and the Built Environment—(Same as American Studies 152.) American history through the evidence of things, e.g., spaces, buildings, and landscapes of the “built environment.” How to “read” such artifacts using methods and theories from anthropology, cultural geography, history, and other disciplines. GER:3b (DR:9)

5 units, Spr (Corn)

158. History of Education in the United States—(Same as Education 201.) Analysis of selected turning points in education in relation to religion, political socialization, race relations, gender, immigration, and urbanization. Limited enrollment.

3 units, Aut (Tyack, Williamson)

158B. American Education and Public Policy—(Same as Education 105.) Treats policy issues in education, drawing on history and political science. Who influences schooling and how? How have American schools responded to human diversity? What consequences does schooling have? What are the prospects for reform in public education? Lectures and small group discussions.

4 units (Kirst, Tyack) not given 1999-2000

159. Introduction to Asian American History—The historical experience of people of Asian ancestry in the U.S. Immigration, labor, community formation, family, culture and identity, and contemporary social and political controversies. Readings: interpretative texts, primary material, and historical fiction. Lectures/discussion. GER:4b (DR:3)

4-5 units (Chang) not given 1999-2000

161. Phorographers and Photography in the American West—Photographic representations of the West (its people, problems, and landscape environment) from 1850 to the present and from E. Muybridge to A. Adams. The interaction between the larger history of the American
West and the history of western photography, including the rise of socially-conscious photography in the 1930s up to the present works of documentary photographers.

5 units, Spr (Street)

165A, B, C. United States History from the Revolution to the Present—
General sequence emphasizing political, social, and institutional history. Provides a broad foundation in U.S. history on which to base further work in history, literature, economics, political science, religious studies, art history, etc. Three parts form an integrated whole; any portion may be taken independently. Recommended as a prerequisite for advanced work in American history.

165A. Colonial and Revolutionary America—Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution. GER:3b (DR:9)

5 units, Aut (Rakove)

165B. 19th-Century America—The history of the U.S. in the 19th century, emphasizing the causes and consequences of the Civil War. Topics: Jacksonianism and the market revolution, slavery and the old south, sectional conflict, the rise and fall of Reconstruction, late 19th-century society and politics, and the crisis of the 1890s. GER:3b,4b (DR:3 or 9)

5 units, Win (Matthews)

165C. The United States in the 20th Century—Major political, economic, social, and diplomatic developments in the U.S. since the end of the 19th century. Themes: debates over the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 1950s and ‘60s); the changing status of women (since WWII); shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy (in WW I, WW II, and the Cold War).

GER:3b,4b (DR:3 or 9)

5 units, Spr (Kennedy)

172A. The United States since 1945—Analyzes foreign policy and politics, dealing with social themes and intellectual history. GER:3b (DR:9)

4-5 units, Win (Bernstein)

173B. U.S. Women's History, 1820-1980—The transformation of Victorian womanhood in the late 19th century, including the workforce participation of immigrant and black women and the educational and professional opportunities for middle-class white women, the impact of wars and depression on 20th-century women's lives, and the rebirth of feminism.

5 units (Freedman) not given 1999-2000

173C. Introduction to Feminist Studies—(Same as Feminist Studies 101.) How gender inequality is created and perpetuated, and when feminist theory and movements emerge to respond to gender inequality. Topics: theories of inequality; history of feminism; international and multi-cultural perspectives on feminism; women's work, health, and sexuality; creativity, spirituality, and movements for social change.

GER:3b,4c (DR:9)

5-6 units, Aut (Freedman)

LATIN AMERICA

176. Colonial Latin America—Introduction to the indigenous societies which evolved in America until 1492. Detailed survey of the Spanish and Portuguese colonial empires established in America to 1825. The social and economic evolution of the various regions of America; the nature of the multi-ethnic and multi-racial societies which were created by the Iberians from the 16th to the 18th centuries. The French and British Caribbean colonies.

5 units (Klein) not given 1999-2000

177. Modern Latin America—Latin America since the early 19th century, concentrating primarily on Mexico, Brazil, Argentina, and Cuba. Emphasis is on Latin America’s role in the world economy and the effect that this has had on economic growth, social structure, and politics.

GER:3b,4a (DR:2 or 9)

5 units, Spr (Haber)

180. 20th-Century Brazil—Brazil, a continent-sized nation and multi-ethnic society, is at a crossroad: how to achieve economic growth with social and regional equity in an era of trading blocs. Brazilian efforts to come to terms with its long colonial history based on export agriculture, slavery, and extractive industries, while developing an urban-based, industrial society. Brazil’s rise as a middle range economic power and the development of a dynamic national culture.

GER:3b,4a (DR:2 or 9)

5 units, Spr (Wirth)

JEWISH HISTORY

184. Jews in the 20th-Century United States—

GER:3b,4a (DR:2 or 9)

5 units, Spr (Haber)

188B,C. Jewish History from the Medieval Period to the Present—

GER:3b,4a (DR:2 or 9)

5 units, Win (Matthes)

JEWISH HISTORY

184. Jews in the 20th-Century United States—

GER:3b,4b (DR:3 or 9)

5 units, Win (Matthes)

188B,C. Jewish History from the Medieval Period to the Present—

GER:3b,4b (DR:3 or 9)

5 units, Win (Matthes)

188B,C. Jewish History from the Medieval Period to the Present—

GER:3b,4b (DR:3 or 9)

5 units, Win (Matthes)

188C. Jews in the Modern World—Jewish history in the modern period. Possible themes: the fundamental restructuring of all aspects of Jewish existence under the impact of the Enlightenment and legal emancipation at the end of the 18th century in Western Europe, the transformation of Jewish life in Eastern Europe under the authoritarian Russian regime, the experience of colonialism in the Sephardi world, and the range of new ideologies (Reform Judaism and various Jewish nationalisms), the persistence and renewal of anti-semitism, the destruction of European Jewry under the Nazis, the rise of new Jewish centers in the U.S., and the emergence of the State of Israel.

GER:3a (DR:7)

5 units, Aut (Zipperstein)

MIDDLE EAST

185. Introduction to Islamic Civilization—Introduction to the societies and cultures in which Islam has been the dominant religious tradition, focusing on the Middle East. Topics: the faith of Islam; the career of the prophet Muhammad; Islamic political theory; Islamic law, philosophy, and science; relations among Islam, Christianity, and Judaism; modern currents in Islam.

GER:4a (DR:2)

5 units (Beinin) not given 1999-2000

187. Palestine, Zionism, and the Arab-Israeli Conflict—The Arab-Israeli conflict from the beginnings of Zionist settlement in Palestine in 1882 to the present. Topics: the emergence of modern political Zionism, Arab nationalism and Palestinian nationalism, the Palestinian Mandate establishment of the state of Israel, the Arab-Israeli wars, the Palestine Liberation Organization, U.S. policy toward the territories, the Palestinian Intifada, and the Oslo accords. Readings from a range of viewpoints, vigorous discussion is encouraged.

5 units (Beinin) not given 1999-2000
187B. The Middle East in the 20th Century—The history of the Middle East since WW I, focusing on the eastern Arab world, Egypt, the Fertile Crescent, and the Arabian Peninsula (The Mashrigh) with some attention to Turkey, Iran, and Israel. GER:4a (DR:2)
5 units (Beinin) not given 1999-2000

187C. Women in the Modern Middle East—Women’s role in the modern Middle East. Topics: work, religious expression, politics, and family life. Format: one film showing per week with associated lecture and discussion. GER:4c (DR:1)
5 units (Beinin) not given 1999-2000

188C. Jews in the Modern World—GER:3a (DR:7)
5 units, Aut (Zipperstein)

189A. Israel: 1880 to the Present—The beginnings of the Zionist Movement, the establishment of the State of Israel, and the development of Israeli society, culture, and politics. Analysis of the ideologies and institutionalization of the Zionist movement and Jewish nationalism in its various forms; Ottoman and Mandate Palestine and the growth of the Jewish settlement there, including social experimentation, relationships with the Palestinians and their responses to Zionism; the revolt against the British. Israel since independence; its institutions, international relations, and relations with Jewish communities outside of Israel. GER:4a (DR:2)
5 units (Mancall) not given 1999-2000

189B. Ottoman Empire—From the 14th through the 19th century. The Balkans and the Middle East under Ottoman rule. Systems of governance and economy of the Ottoman Levant. The onset of weakness and decline in the 17th century; European Imperialism in the Middle East; westernizing reforms in the 19th century; the Balkan Wars, WW I, and the collapse of the Ottoman Empire. GER:3b,4a (DR:2 or 9)
5 units, Aut (Rodrique)

SOUTH ASIA

5 units, Aut (Mancall, Gupta)

190A. Introduction to the History of Buddhism—Survey of the history of Buddhism, focusing primarily on Central, South, and S.E. Asia. The historical Buddha. The development, evolution and spread of Buddhist institutions and Buddhist practices. Political, social, and economic aspects. Buddhism and the state. Buddhist law and social thought. Modern and contemporary Buddhist social movements. The spread of Buddhism in the West.
5 units (Mancall) not given 1999-2000

EAST ASIA

192A. Chinese History to the 14th Century—From Peking Man to Kublai Khan. Emphasis is on social, religious, and intellectual developments from the Earliest Times through the Mongol dynasty. GER:3a,4a (DR:2 or 7)
5 units, Win (Neskar)

192B. Chinese History from the Mongols to Early Modern Times—From the late Yuan to the Taiping Rebellion. Emphasis is on socio-economic rather than the political history to expose students to a sophisticated society very different than their own. Recommended: 192A. GER:4a (DR:2)
5 units (Kahn) not given 1999-2000

192C. Modern and Contemporary Chinese History—China’s development from the peace and prosperity of the late 18th century, the wars and imperialist incursions of the 19th century, and the struggle in the 20th century to create a modern nation-state and regain a position of wealth and power in an often-hostile world. The crushing of the pro-democracy movement at Tiananmen in 1989 and its consequences. Chinese materials in translation (novels, autobiographies, newspaper accounts, reports, and films) explore how individuals experienced the major political, cultural, social, and economic transformations of the past two centuries. Recommended: 92A,B, 192A,B, or Political Science 115. GER:4a (DR:2)
5 units, Spr (R. Thompson)

194A. Japan from Earliest Times to 1560—The prehistoric origins of the people and culture, and emergence of the first polity, Chinese influences, the flowering of the native culture, samurai and feudal government.
5 units (Mass) not given 1999-2000

194B. Late Medieval and Early Modern Japan—From the Warring States Period to the establishment and rise of the last Shogunal house, the Tokugawa. The social, religious, and political contours of the age.
5 units (Staff) not given 1999-2000

194C. 19th-Century Japan
5 units (Staff) not given 1999-2000

194D. The Rise of Modern Japan—Japanese history from 1840 to the present. Topics: the Meiji Restoration and its background, building a modern state, industrialization of the economy, the emergence of an imperialist power, the reorientation of postwar Japan, and the “economic miracle.” Socio-economic change and political developments. GER:3b,4a (DR:2 or 9)
5 units, Spr (Duus)

UNDERGRADUATE COLLOQUIA AND RESEARCH SEMINARS

Colloquia consist of reading and discussion on specific historical themes. Short papers, reports, historiographical essays, and a final exam may be required. In all cases, colloquia are designed to examine issues of historical interpretation. Oral presentations are encouraged.

Undergraduate research seminars provide students with opportunities to conduct research using primary documents, engage in historiographical debate, or to interpret major historical events. Seminars may be offered for one or two quarters and they may be combined with a colloquium. In all cases, students write preliminary drafts of their research findings, present oral reports, and revise their papers.

Courses 200 through 299 are primarily for juniors and seniors majoring in history. Admission is by consent of the instructor.

200A,B,C. Senior Research I, II, and III
1-5 units (Staff)

200H. Junior Honors Colloquium
3 units, Spr (Gregory)

200M. Undergraduate Directed Research: Martin Luther King, Jr. Papers Project
units by arrangement (Carson)

200W. Undergraduate Directed Reading
units by arrangement (Staff)

200X. Undergraduate Directed Research and Writing
units by arrangement (Staff)

GENERAL

201B. Undergraduate Colloquium: Great Ideological Movements of the 20th Century—Socialism and the Islamic Revival—(Same as
testing of historical hypotheses and the use of quantitative proof in this historical research: preparation of data and its processing to the statistical techniques used in this field and as applied to specific research issues as quantitative methods in historical research, providing students with the latest Analysis for Historians—(Same as 305B.) Introduces the use of quantifies and other sources. The changing contexts of women's lives and the (Same as 305A.) Autobiography—(Same as 305A.) Autobiography in Women's History—(Same as 305A.) Autobiographies and other sources. The changing contexts of women's lives and the way women's actions have shaped and responded to those contexts. GER:4c: (DR:1) (WIM)

205A. Undergraduate Colloquium: Private Lives, Public Stories—Autobiography in Women's History—(Same as 305A.) Autobiographies and other sources. The changing contexts of women's lives and the way women's actions have shaped and responded to those contexts. GER:4c: (DR:1) (WIM)

5 units (Simons)

202. Undergraduate Colloquium: Introduction to Problems of Historical Interpretation and Explanation—(Same as 302A.) Focus is on problems of historical narrativity: the relationship between the past and stories about the past, history and the novel; other epistemological issues. 5 units, Spr (Simons)

205B. Undergraduate Colloquium: Introduction to Quantitative Analysis for Historians—(Same as 305B.) Introduces the use of quantitative methods in historical research, providing students with the latest techniques used in this field and as applied to specific research issues as seen in current historical debates about mobility, discrimination, participation, and stratification. Surveys all the major aspects of quantitative historical research: preparation of data and its processing to the statistical procedures needed to examine theoretical issues. The formation and testing of historical hypotheses and the use of quantitative proof in this validation procedure.

5 units, Win (Klein)

INTERDISCIPLINARY GATEWAY COLLOQUIA

206. Undergraduate Colloquium: The Logic of History—(Same as 306.) Introduction to the literature for students in history and the social sciences. How do historians advance and sustain arguments? What is evidence and how is it treated? What are the rules of argumentation that underlie different types of history, and how do these differ from those found in the social sciences? In the writing of history, what constitutes a truth claim? Readings/discussion of the literatures on case study methods, the philosophy of history and social science, and actual historical case studies. (WIM)

5 units, Aut (Haber)

206A. Undergraduate Colloquium: History, Literature, and Arts in the French Revolution—A "gateway" to the History (Literature and the Arts) major, but not restricted to students in that option. The relationship among politics, language, art, music, and literature, using the French Revolution as a laboratory. Aim is to open up humanistic approaches to history, looking at ways in which historical events are culturally constituted, cultural forms interpreted historically, and historical writing shaped by literary tropes.

5 units, Aut (Baker)

206P. Undergraduate Colloquium: Many Histories of Science—The Scientific Revolution—(Same as 306P, History and Philosophy of Science 171.) A "gateway" to the History (and Science) major, but not restricted to students in that option. What sort of tools do historians use to understand and interpret science? How did science emerge as a distinctive kind of knowledge? Introduction to the history of science as a field of study, using the Scientific Revolution of the 16th and 17th centuries, the age of Copernicus, Galileo, Kepler, and Newton, as a case study in the historical interpretation of science.

5 units, Aut (Findlen)

EASTERN EUROPE AND RUSSIA

217. Undergraduate Colloquium: Men, Women, and Power in Early Modern Russia, 1500-1800—(Same as 317.) Social values, gender relations, and social change in an era of rapid change; challenges to established norms by new constructions of deviance (witchcraft; religious reform, and revolt) and by new standards of civility; encounters with non-Russians and the construction of national consciousness. Social values as political ethos: patrimonial autocracy and the reality of female rulers in the late 17th and 18th century.

5 units (Kollmann) not given 1999-2000

219S. Undergraduate Research Seminar: The Soviet Civilization—(Same as 419.) Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Readings of secondary and primary sources and writing of a research paper or a historiographical essay.

5 units (Weiner) not given 1999-2000

220. Soviet Historiography—(Same as 330.)

5 units (Weiner) not given 1999-2000

221C. Undergraduate Colloquium: Historiography of the Soviet Union—(Same as 321C.) Introduces the major schools of interpretation of the Soviet phenomenon through works representative of a specific school, in chronological order, from the first major interpretation of the Soviet polity by Trotsky to the current postmodernist theories.

5 units (Weiner) not given 1999-2000

221S. Undergraduate Research Seminar: Wartime and Postwar Poland—(Same as 421.) The problems of German and Soviet occupation, Polish resistance during the war, dilemmas of Polish politics, the end of the war and beginning of peace. The relationship between social changes and political movements. The complex nationality issues involving Germans, Jews, Poles, Russians, and Ukrainians.

5 units (Naimark) not given 1999-2000

222A. Undergraduate Colloquium: Myths and Identities in Modern Ukraine—(Same as 322A.) The evolution and interaction between various national identities of stateless Ukrainian populations throughout the century until Ukrainian statehood in 1991. Focus is on the core of the Ukrainian population; the Soviet Union; and Ukrainian populations in Poland, Czechoslovakia, Romania, and Hungary. Ethnic, regional, and political visions of national identities, the emergence of mass political movements, the rise of radical ideologies and regimes, the experience of II WW II and the unification of Ukrainian land and people, and the struggle for definitive national myths to the present.

5 units (Weiner) not given 1999-2000

222C. Undergraduate Colloquium: Nationbuilding in Eastern Europe—(Same as 322C.)

5 units, Win (Suppan)

222D. Undergraduate Colloquium: National Conflict in Eastern Europe—(Same as 322D.)

5 units, Spr (Suppan)

223. Undergraduate Colloquium: Honor, the Law, and Modernity in Early Modern Europe—(Same as 323.) How individuals constructed their sense of honor in Europe (including Russia) from medieval timesw
the 18th century, and how they defended honor through law and litigation, extra-legal sanctions (feuds, duels), and ritual (charivari). The rise of the duel as a turning point in Europe towards modern concepts of honor and civility, social hierarchy, and legal practice.

5 units, Aut (Kollmann)

224. Undergraduate Colloquium: Stalinism in Eastern Europe—
(Same as 324.) The origins and history of Stalinism in Eastern Europe. The ways European countries confronted the Stalinist past. Readings on historical and literary representations of Stalinist theory and practice. (WIM)
5 units, Spr (Naimark)

225. Undergraduate Colloquium: The Russian Revolutionary Tradition—
(Same as 325.) The history and myths behind the Russian Revolution.
5 units (Emmons) not given 1999-2000

226. Undergraduate Colloquium: Modernity, Revolution, and Totalitarianism—
(Same as 326.) Analysis of modern revolutionary and totalitarian politics based on readings of monographs on the medieval, Reformation, French Revolutionary, and the Great War eras which deal with relevant themes. Topics: the essence of modern ideology, the concept of the body national, state terror, charismatic leadership, gender assignments, private and public spheres, and identities.
5 units (Weiner) not given 1999-2000

207. Undergraduate Colloquium: Jews, Christians, and Muslims—
Medieval Spain—From the Islamic conquest of 711 A.D. to the Christian expulsion of the Jews in 1492. Forms of confrontation (theological debate to systemic violence) and forms of confluence (conversion to cultural overlap), and hostile indifference between Jews, Christians, and Muslims. What were the undercurrents of aggression that gave rise to persecution of the “other” in medieval Spain? What were the elements of commonality between groups that gave rise to great intellectual advancements? The dynamics of the three religions elsewhere in the medieval Mediterranean.
5 units (K. Miller) not given 1999-2000

208. Undergraduate Colloquium: The Conversion of Europe—
The formation of Christian Europe is examined through the conversion experiences (actual and remembered) of a number of historical figures and communities. The riddle of the first Christian emperor, Constantine; the Christianization of Germanic society, Scandinavia; and the issue of conversions to more spiritual ways of life within the Christian faith.
5 units (Buc) not given 1999-2000

209A. Undergraduate Colloquium: Law, Society, and Identity in Christianity and Islam, 500-1500—
(Same as 309A.) Introduction to Mediterranean society and the interplay of law, morality, and social customs in the Middle Ages. Sources of law, forms of legal reasoning and procedure (courts to informal dispute settlements), coercive mechanisms for enforcing rules, and religious obligations in Christian and Islamic communities. Spain and Egypt are used as case studies. How do groups use law to build communities? When does law create order and when does it reproduce exploitative relations? What is the relation between law and gender?
5 units, Win (K. Miller)

209B. Undergraduate Colloquium: Crusaders, Pilgrims, and Merchants—
The Mediterranean World, 700-1600—
(Same as 309B.) Medieval Mediterranean travelers, their motivations (religious, military, economic, scholarly) and how they perceived the cultures they encountered. Readings: a Muslim scholar’s travels, letters of Jewish merchants to their families, the report of a 10th-century Christian ambassador to Constantinople, and a 20th-century novel that reconstructs the peregrinations of a 12th-century Indian slave based on medieval Jewish sources from Egypt.
5 units, Spr (K. Miller)

210A. Undergraduate Colloquium: The Language of Politics in the Middle Ages—
(Same as 310A.) The different methods through which political theory was articulated and communicated and a culture of politics created: language proper and its grammar (as in biblical exegesis and other mediums), gestures (and the theory of gestuality), royal proclamations, rituals (peace-making and conflict-resolution, royal funerals, advents, and coronations), and iconography. (WIM)
5 units, Spr (Buc)

211. Undergraduate Colloquium: Body, Gender, and Society in Medieval Europe—
(Same as 311.) Secondary sources (historical, literary, theological, and anthropological studies). Issues: transformations in representations of the body, gender, sexuality, and in women’s place in society (or social representation) in Western Europe between the 3rd and 14th century. Were these processes related with one another and with social changes? Analytically straddles the realm between codification of spiritual powers and control (or manipulation) of the body in society, from the cult of relics to asceticism. GER:4c (DR:1)
5 units (Buc) not given 1999-2000

213A. Undergraduate Colloquium: New Worlds, Imaginary Worlds—
(Same as 313A.) Why does the idea of “utopia” first emerge in the Renaissance and Reformation? What does it mean to imagine a society? During the 16th and 17th centuries, Europeans developed greater knowledge of other parts of the globe (the Americas, Asia) and began to explore questions of nature and society in new ways, looking more critically at their own society and others. Topics: travel, knowledge, and experience; changing definitions of humanity; reason and imagination; order and deviance in the age of Columbus, More, Galileo, and Kepler.
5 units, Spr (Findlen)

213B. Undergraduate Colloquium: Heretics, Prostitutes, and Merchants—
Venice and its Empire—
(Same as 313B.) What was life like on the edge of the Mediterranean in a city with contacts that stretched from the Ottoman Empire to the Americas? During the Renaissance, Venice was one of the most ethnically and culturally diverse regions of Europe, with a history of religious and political dissent and a flourishing artistic tradition. Topics: commerce, politics, and society; gender, sexuality, and family; religious minorities (Jews, moriscos, heretics); knowledge and culture.
5 units (Findlen) not given 1999-2000

213C. Undergraduate Colloquium: Power, Art, and Knowledge in Renaissance Italy—
(Same as 313C.) What were the defining features of the society that gave us the idea and art of the Renaissance? The world of Leonardo, Machiavelli, and Michelangelo. The interdisciplinarity of history, politics, art, and literature in the 15th and 16th centuries. The relationship between the Renaissance and the Reformation. (WIM)
5 units, Win (Findlen)

214A. Undergraduate Colloquium: Universities in Medieval Europe—
(Same as 314A.)
5 units, Spr (Tackau)

215. Undergraduate Colloquium: Religion and Society in Early Modern Europe—
Introduction to recent research on Christianity in early modern Europe, supplemented with primary sources. The dialectical relationship by which religion influenced other domains of human life, and was in turn influenced by them. Possible topics: religion in relationship to gender and family life, the Reformation in urban context, printing and literacy, oral and visual communication, individual and collective devotion, confession, and refugees and religious
minorities. Readings are multinational and multiconfessional to acquaint students with the range and diversity of the phenomenon.

5 units (Gregory) not given 1999-2000

216. Undergraduate Colloquium: When Worlds Collide—The Trial of Galileo—In 1633, the Italian mathematician Galileo was tried and condemned for his advocacy of a sun-centered cosmology. The Catholic Church did not publicly admit that Galileo was right until 1989. What does this tell us about the relationship between science and religion? Why has the “Galileo affair” continued to be a discussed episode in Italian history and the history of science? Examines documents from Galileo’s trial and related literature on Renaissance Italy. Students critique historians’ interpretations of this event.

5 units (Findlen) not given 1999-2000

MODERN EUROPE

227. Undergraduate Colloquium: War and Peace in the 20th Century—(Same as 327.) The diplomatic and military crises from the origins of WWI to the collapse of Yugoslavia. Readings include historical analyses and original documents.

5 units (Sheehan) not given 1999-2000


5 units (Kennedy, Sheehan) not given 1999-2000

232A. Undergraduate Colloquium: Shopping—A History—European consumer culture from its inception in the 18th century to its increasing dominance of all aspects of life in the 20th century. Why have commodities come to play such an important part in our culture? How was the creation of the department store a watershed event in modern history? What are the politics of consumerism, from the bread riots of the French Revolution to the fashions of the 1920s? Emphasis is on the relation between gender and commodity culture, particularly the image of woman as family consumer and “kleptomaniac.”

5 units (M. L. Roberts) not given 1999-2000

232B. Undergraduate Colloquium: Attention Shoppers—A History of Consumerism in Modern Europe—Consumerism, its institutions, politics, and critics in Europe from the 18th to the early 20th centuries. How commodities have become central to Western culture and individual identity and why a consumer economy has distressed generations of social critics. Emphasis is on the role of commodities in the imagined differentiation of social classes, genders, and political actors.

5 units, Aut (Brown)


5 units (Robinson) not given 1999-2000

238B. Undergraduate Colloquium: Marx, Darwin, and Freud—Read and discuss the seminal works of the three most influential European thinkers of the modern era. Marx, Darwin, and Freud are the creators of powerful and distinctive intellectual systems (theories of society, nature, and the self) that invite comparison in terms of their structure and of their broad impact on life and thought.

5 units (Robinson) not given 1999-2000

238S. Undergraduate Research Seminar: Europe 1880-1918—The Fin de Siècle and the Great War—The period from 1880-1914 represents a transition from an optimistic, naive age to one that knew moral relativism, total war, and material comfort and great genius. Through art, fiction, autobiography, psychology, and cultural history, how the “age of innocence” ended and the 20th century began.

5 units (M. L. Roberts) not given 1999-2000

HISTORY OF SCIENCE AND TECHNOLOGY

206P. Undergraduate Colloquium: Many Histories of Science—The Scientific Revolution—(Same as 306P.)

5 units, Aut (Findlen)

262S. Undergraduate Research Seminar: Science and High Technology in the Silicon Valley, 1930-1980—(Same as 462.) The technological, political, economic, and spatial dimensions of the rise of Silicon Valley from the 1930s to the early 1980s. How did Silicon Valley arise? What sustained its growth? How did it function? How did it evolve? Archival research and oral history. Focus is on radionuclides, microwave devices, semiconductors, and computers; economies of skills; university-industry relations; political dissent and the counterculture; and technology policies of the Cold War era. Comparison with Roux 128. (WIM)

5 units, Spr (Lenoir)

274A. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in Late 20th-Century America—(Same as 374A.) The influence of new medical technologies (organ transplantation, endoscopic surgery, genetic engineering, computer-aided tomography, medical imaging) on the American imagination from WW II to the 1990s.

5 units, Win (Lenoir)

274B. Undergraduate Colloquium: Managing Technological Change—A History—(Same as 374B.) In modern times, engineers, scientists, and managers have become increasingly at ease in coping with the design, development, and deployment of messy, complex technical systems and have developed a variety of managerial techniques and organizational forms. Participants consider case studies and interview persons who have managed projects and created systems.

4-5 units, Win (Hughes)

BRITAIN

240. Undergraduate Colloquium: Shakespeare’s London—The Social and Cultural Consequences of Growth—Between 1500 and 1700 London grew from a late medieval town of 50-60,000 to a metropolis of more than 500,000, the largest city in Western Europe. The problems such unprecedented growth generated, ranging from Crown attempts to limit and control growth to the city magistrates’ measures to meet the needs of the growing number of the poor and sick. The official image the city presented in its Lord Mayor’s shows and the image of urban life presented in the new popular theater.

5 units, Aut (Seaver)

241S. Undergraduate Research Seminar: From Reformation to Revolution in Early Modern England—Sources for England from 16th-century Protestant Reformation to the civil wars and revolution in the mid-17th century are unusually rich. The types of records (private diaries and letters to the official proclamations, and state papers) deline the question that shapes the investigation. Critiques of a draft of the research paper.

5 units (Seaver) not given 1999-2000

242S. Undergraduate Research Seminar: Exploring Modern Britain through Documents and Images Held at Stanford—Students choose a British text, artifact, or picture from the Stanford collections for a preselected list and discover British society by writing about it.

5 units (Stansky) not given 1999-2000

244. Undergraduate Colloquium: Britain, 1688-1832—(Same as 144.)

5 units (Stansky) not given 1999-2000

245C. Undergraduate Colloquium: Modern Britain—(Same as 145C)

5 units, Spr (Stansky)
AFRICA

246D. Undergraduate Colloquium: The Social History of Southern Africa—The political transformation of Southern Africa in the last ten years has redefined the terrain of historical writing and opened new spaces for historical inquiry within Southern African trade studies. The works of a new generation of social historians in such areas as the history of the household, environmental history, urban history, identity and ethnicity, disease and medicine, and witchcraft. Emphasis is on the postcolonial context of Southern Africa in which this research and writing takes place.
5 units, Aut (Lane)

246S. Undergraduate Research Seminar: Popular Culture in Africa—(Same as 446.) African culture rarely appears in historical research. The classics in this field; case-studies such as the role of the griot, women as diviners and seers, Euro-African dress and fashion, the image of Europeans in Africa, highlife music in Ghana, emblems in the Mau Mau rebellion, etc.
5 units (Jackson) not given 1999-2000

247. Undergraduate Colloquium: Greater East Africa and its Historical Writing—(Same as 347.) Greater E. Africa contains Kenya, Tanzania, Uganda, Ethiopia, parts of Zaire, and Mozambique. From this area has come a dynamic historical literature (especially about women, the colonial period, and the purpose of history).
5 units, Spr (Jackson)

5 units (R. Roberts) not given 1999-2000

247B. Undergraduate Colloquium: Health and Society in Africa—The history of disease, therapeutic and diagnostic systems, and the definition of health in precolonial, colonial, and postcolonial Africa. The social and political histories of specific epidemics, including sleeping sickness, influenza, TB, mental illness, and AIDS. The colonial contexts of epidemics and the social consequences of disease.
5 units (R. Roberts) not given 1999-2000

247C. Undergraduate Colloquium: Africa and African Americans since World War II—(Same as 347C.) The most intense, profound, and contradictory dialogue by African Americans on Africa has occurred since WW II, an event that unleashed new political forces in Black communities worldwide. The dialogue and the impact events in Africa (e.g., the 1950s-'60s surge of African nationalism, and the ascendancy of Nelson Mandela) on Black American consciousness.
5 units, Win (Jackson)

247S. Undergraduate Research Seminar: The Great Mau Mau Rebellion in 1950s Kenya—(Same as 447.) The Mau Mau rebellion in 1950s Kenya was significant and controversial. Within the last decade, literature has emerged to sort out the rebellion: the novels, film, autobiographies, historical writing, and popular culture artifacts. (WIM)
5 units, Win (Jackson)

248A. Undergraduate Colloquium: The End of Slavery in Africa and the Americas—(Same as 348A.) Comparative social history of the end of slavery in the Caribbean, the American South, and Africa. Interpretations of the social transformations. Topics: motivations for abolition of slavery, meanings of freedom in different societies, and processes of adaptation to new political economies of work.
5 units (R. Roberts) not given 1999-2000

248D. Undergraduate Colloquium: Law and Colonialism in Africa—(Same as 348D.) Law in colonial Africa provides an opportunity to examine the meanings of social, cultural, and economic change in the anthropological, legal, and historical approaches. Court cases are a new frontier for the social history of Africa. Topics: meanings of conflicts over marriage, divorce, inheritance, property, and authority.
5 units (R. Roberts) not given 1999-2000

248S. Undergraduate Research Seminar: Colonial States and Societies in Africa—(Same as 448A.) Students examine the encounter between African societies and European colonialism in the colony or region of their choice. Approaches to the colonial state; tours of primary source collections in the Hoover Institution and Green Libraries. Students present their original research findings and may continue research for a second quarter.
5 units (R. Roberts) not given 1999-2000

249A. Undergraduate Colloquium: The Issue of Greatness in Black History—(Same as 349A.) A major tension in the writing of Black history is between the public demand for greatness, achievements, monuments, and firsts, and the academic historian's skepticism about this approach. Why greatness is thought essential in Black mass history and how academic historians have reacted to this pressure.
5 units (Jackson) not given 1999-2000

249B. Undergraduate Colloquium: Black Visual Arts and Black History—(Same as 349B.) The subject matter of the Black past has been used repeatedly in the Black visual arts in this century. From the 1920s-'30s works of Aaron Douglass, Jacob Lawrence, and Lois Mailou Jones to the 1990s works represented in the avant-garde Paris-based Revue Noire, Black visual artists have wrestled with the problem of how to show the Black past. Case studies of artists from African-America, Africa, and the Caribbean. Original research by students is encouraged in this unexamined field.
5 units (Jackson) not given 1999-2000

THE UNITED STATES

250. Undergraduate Colloquium: American Popular Culture—The development and evolution of popular culture in the U.S. The 19th-century emergence of blackface minstrelsy and popular entertainments such as domestic fiction (authored primarily by women), vaudeville and musical theater, dime novels, early film, and jazz. Emphasis is on race, class, and gender analyses.
5 units (M. Thompson) not given 1999-2000

250B. Undergraduate Colloquium: Constitutional Interpretation in History and Theory—Disputes about how to interpret the Constitution have figured prominently in American politics since 1787. The key episodes in the history, politics, and theory of constitutional interpretation from the founding debates of the 1780s to the ongoing controversy over "originalism" and other contemporary theories.
5 units (Rakove) not given 1999-2000

250C. Undergraduate Colloquium: Thomas Jefferson and his World—The multiple facts of Jefferson's life; his views of politics and society, constitutions and revolutions, nation and state, Old World and New, slavery and race; his place in the national memory; and the problem of passing moral judgments on historical actors. Extensive readings in primary and secondary sources.
5 units, Spr (Rakove)

251A.B. Undergraduate Colloquium: Poverty and Homelessness in America—Students participate in an internship with the Emergency Housing Consortium, the primary agency providing shelter for homeless people in Santa Clara and San Mateo counties, while learning about homelessness and poverty through required readings/discussions. Pre-requisite: interview with the instructor.
8 units (Camarillo) not given 1999-2000

252. Undergraduate Colloquium: Decision-Making in International Crises—The A-bomb, the Korean War, and the Cuban Missile Crisis—(Same as 352.) For advanced undergraduates and graduate
students. Integrates primary documents and secondary literature to understand the three sets of events.

5 units, Aut (Bernstein)

252S. Undergraduate Research Seminar: Museums and History—How museums and historic sites have interpreted the past. The history of museums, the relationship of academic scholarship to popular exhibition, the politics of public memory, and the effect of museum display on the meaning of objects. Required field trips.

5 units (Corn) not given 1999-2000

253. Undergraduate Colloquium: Topics in African American History—The Great Migration—Focus is on the massive movement of African Americans from the rural south to the urban north from Reconstruction through WW I. The motivations for and consequences of this migration. Topics: urbanization, immigration, class dynamics within the African American community, gender roles, race progress and leadership, color consciousness, and the emergence of African American urban culture.

5 units (M. Thompson) not given 1999-2000

254. Undergraduate Colloquium: Nature—The natural and the social are very hard to disentangle. When Americans have written about nature, they have revealed much about what they think about society. Considers the shifting ways in which Americans have constructed nature and "nature's nation" by examining some classic American texts from Thomas Jefferson’s Notes on the State of Virginia through Rachel Carson’s Silent Spring. How ideas about the social order, the economy, racial relations, etc., are often embedded in discussions of the natural world.

5 units (White) not given 1999-2000

254S. Undergraduate Research Seminar: U.S. Women’s History—For History or Feminist Studies majors only. Students learn bibliographic, research, and writing skills through the study of 20th-century women’s reform efforts, utilizing primary sources available in Green Library and culminating in a substantial research paper. Prerequisite: at least one U.S. history course, consent of instructor. Recommended: 173B.

5 units (Freedman) not given 1999-2000

255A. Undergraduate Colloquium: Culture and Ideologies of Race—(Same as 355A.) How culture is used to create, reify, and subvert categories of race in the U.S. The processes of cultural exchange and contestation which forge and dismantle racialized identities. Topics: the uses of memory and nostalgia, the introduction of new cultural technologies, and gender and class as categories which define and are defined by race.

5 units, Win (M. Thompson)

256. Undergraduate Colloquium: Topics in Mexican American History—(Same as 356.) Topics from the 19th and 20th-century immigration from Mexico, the Americanization of Mexican society in the Southwest, the Mexican working class, intraethnic conflict, the Chicano movement of the 1960s, the making of barrios, the role of Mexican American women, etc. Focus is on the 20th century. GER:4b (DR:3)

5 units, Win (Camarillo)

257. Undergraduate Colloquium: Immigrants and Racial Minorities in American Cities—Comparative Perspectives—(Same as 357.) The urbanization of major ethnic immigrant and racial minority groups in American cities during the 20th century. Historical case studies of different groups, and social science theories and historical interpretations. The urban histories of Euro-Americans, African Americans, Mexican Americans, Asian Americans, and Native Americans in comparative perspective.

5 units (Castillo) not given 1999-2000

258. Undergraduate Colloquium: Modern America in Historical Perspective—The historical roots of several issues in contemporary American society: changing patterns of income distribution, the legacy of the "Great Society" and Reagan-era policies, the evolution of political parties, the changing situation of women, race relations, and immigration. Recommended: background in 20th-century American history.

5 units (Kennedy) not given 1999-2000

259. Undergraduate Colloquium: Race and Ethnicity in the United States and South Africa—(Same as 359.) The comparative history of black-white relations in the U.S. and S. Africa. Topics: white race ideologic patterns of segregation, Pan-Africanism and the Garvey Movement, nonviolent protest, and Black Power/Black consciousness. Prerequisite: 157 or 164, or equivalent.

5 units (Fredrickson) not given 1999-2000

259S. Undergraduate Research Seminar: The United States and the Vietnam War

5 units (Chang) not given 1999-2000

260A. Undergraduate Colloquium: Perspectives on American Identity—(Same as American Studies 200.) Analysis of the changing interpretations of American identity and "Americanness."

5 units, Aut (J. Corn)

261. Undergraduate Colloquium: Nuclear Weapons and International Relations—Theories and History—(Same as 361.) Case studies involving nuclear weapons and related international relations theory.

5 units (Bernstein, Holloway) not given 1999-2000

262S. Undergraduate Research Seminar: Science and Technology in Silicon Valley, 1930-1980—(Same as 462.) See “History of Science and Technology” above.

5 units, Spr (Lenoir)

263A. Undergraduate Colloquium: The Automobile Industry in 20th-Century America—One of the nation’s major industries is examined from the perspective of its products, workers, and wide-ranging influences. Topics: origins and consequences of the industry’s geographical concentration in Michigan; evolution of assembly line work and other forms of automotive labor; influence of automobiles on the built and natural environments; cars and government regulation; and recent challenges to the industry stemming from technological change, foreign competition, and environmentalism.

5 units (Corn) not given 1999-2000

263B. Undergraduate Colloquium: The Making of the Atlantic World, 1600-1960—(Same as 363B.) The political, economic, and cultural linkages among Europe, Africa, and the Americas as they were fashioned and reconstructed through slavery and the slave trade, slave emancipations and post-emancipation labor regimes, colonial and anti-colonial social struggles, and 20th-century liberation movements. The assumption that large issues of political ideology or domination and social subordination or mobilization are linked to matters of daily life and lived experience; it is only with attention to the local and the particular that these concepts are understood.

5 units, Win (Saville)

264S. Undergraduate Research Seminar: Martin Luther King, Jr. and the Modern Civil Rights Movement—Supervised research projects use the resources of the King Papers Project at Stanford.

5 units (Carson) not given 1999-2000

265. Undergraduate Colloquium: New Research in Asian American History—(Same as 365.) Asian American studies is a rapidly developing field, with new narrative material and methodologies. Newly published studies in history and related disciplines. Discussion of texts and exploration of possible research work. Recommended: previous exposure to Asian American studies.

5 units (Chang) not given 1999-2000
265A. Undergraduate Colloquium: The History of Sexuality in the United States—(Same as 365A.) For graduate students and senior History or Feminist Studies majors. Readings on the social construction of sexuality, primarily U.S., in the 19th and 20th centuries. Topics: the histories of contraception and abortion, prostitution, homosexuality, race and sexuality, and the social and political movements shaping sexual values and practices.
5 units (Freedman) not given 1999-2000

267. Undergraduate Colloquium: Yesterday's Tomorrows—Technology and the "Future" in History—The changing American expectations regarding the development and consequences of science and technology in the future. Topics: the emergence of a culture of prognostication in the late 19th century (Edward Bellamy, H. G. Wells); the turn-of-the-century reception of new communications technologies; 1930s world's fairs and Depression "futures;" the 1960s, "technology assessment," and anti-technology ("the future isn't what it used to be").
5 units (Corn) not given 1999-2000

269. Undergraduate Colloquium: The African-American Community Organizing Tradition—(Same as 369.) Because the political rights of African-Americans have often been restricted, black people have developed innovative ways of mobilizing their collective power to achieve group advancement. The history of modern African-American grassroots movements and the organizing techniques that have enabled people without many resources to liberate themselves. Focus is on the Student Nonviolent Coordinating Committee (SNCC), the Southern Christian Leadership Conference (SCLC), the Black Panther Party (BPP), etc.
5 units (Carson) not given 1999-2000

270. Undergraduate Colloquium: North American Wests—The modern American West is a recent historical creation dependent on the emergence of the nation states of Canada, the U.S., and Mexico. It is the product of processes of migration, state formation, new technologies, capital flows, and environmental changes still at work in N. America. The emergence of the American West in regional terms vis a vis the East, and in relation to Mexico, Canada, Indian nations, and the larger world of the Pacific Rim.
5 units (White) not given 1999-2000

272A. Undergraduate Colloquium: War and Society, 1941-68—Briefly considers WW II. The focus is on the early Cold War and the Vietnam War: dissent and the impact of the "national-defense system" on major domestic institutions, and their relationships to American culture. Readings: John Dower, Paul Fussell, George Kennan, Dwight Macdonald, Robert McNamara, bringing together different approaches from International Relations and American Studies.
5 units, Spr (Bernstein)

273A. Undergraduate Colloquium: Childhood in Modern American History—The experience of children, ideas about childhood, and policy toward children from the early 19th to the late 20th century. Variations in childhood experience based on differences of race, class, ethnicity, gender, and geographic region. How has American society defined its responsibility toward children? How has it treated children defined as social problems or those who are dependent on public care?
5 units, Win (Horn)

274A. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in Late 20th-Century America—(Same as 374A.) See "History of Science and Technology" above.
4-5 units, Win (Lenoir)

LATIN AMERICA

276. Undergraduate Colloquium: The Creation of North America—(Same as 376.) Responding to rapid changes in the world economy, Canada, the U.S., and Mexico are developing common interests in a shared regional space. This convergence is transforming relations between three sovereign states, each with its distinct political system, national history, cultures, and identities. The historical origins of the convergence, from the clash of European empires and native societies, to the development of viable nation states in Canada and Mexico as influenced by the American Civil War and the intersecting of frontiers and railroads, and the effects of WWII through the movement of peoples and development of complex identities today.
5 units (Wirth) not given 1999-2000

277. Undergraduate Colloquium: History and Public Policy—The Political Economy of Economic Growth—(Same as 377.) How have different countries in the Americas created different systems to regulate economic development? What effects have these regulatory systems had on the course of growth? What are the political reasons that explain why different countries have regulated economic activity in different ways? These interrelated questions are addressed through the study of regulation and its impact in three countries in the Western Hemisphere: Brazil, Mexico, and the U.S., drawing on the literatures of law and economics, development economics, positive political economy, and economic history.
5 units (Haber) not given 1999-2000

278. Undergraduate Colloquium: Historical Aspects of Underdevelopment in Latin America—The methods and approaches of economic history. Emphasis is on the critical analysis of scholarly studies of issues in Latin American economic growth addressed by economic historians, including the creation of national transport systems, the growth of industry, the economics of slavery, and the long-term effects of export oriented growth.
5 units, Win (Haber)

5 units (Staff) not given 1999-2000

281A. Undergraduate Colloquium: Environmental History of the Americas—(Same as 381A.) Environmental history is approached topically, using examples from N. and S. America to survey and evaluate the current state of research.
5 units, Spr (Wirth)

282. Undergraduate Colloquium: The Agrarian Origins of Underdevelopment in Latin America—(Same as 382.) Introduction to the study of Latin American agrarian economic history. The relationship between the productive organization of agriculture and long run economic growth, focusing on Mexico during the 18th, 19th, and 20th centuries. Works by development economists, social historians, and economic historians.
5 units (Haber) not given 1999-2000

283. Undergraduate Colloquium: The Process of Industrialization—Europe, the United States, and Latin America—(Same as 383.) Introduction to comparative economic history for graduate students. The literature on the transition to industrial societies during the 19th and 20th centuries in a variety of national contexts. Readings from the institutionalist, cliometric, and Marxist schools of economic history.
5 units (Haber) not given 1999-2000

283A. Undergraduate Colloquium: Slavery and Race Relations in the Americas—(Same as 383A.) The comparative economic and social history of Latin American and N. American slavery, 16th-19th centuries.
5 units (Klein) not given 1999-2000

JEWISH HISTORY

285B. Undergraduate Colloquium: The Bible ("Old Testament")—Focus is on the Hebrew Bible, in English translation, from the perspec-
utive of the social sciences, as a document of social, political, institution-
al, economic, and cultural history. The society and mentality of the peo-
ple of the Bible is discussed through the examination of selected books
and passages.

5 units, Win (Mancall)

287A. Undergraduate Colloquium: Modern Jewish Identity—(Same
as 387A.)
5 units (Rodrique) not given 1999-2000

289B. Undergraduate Colloquium: Zionism and its Critics—(Same
as 389B.) The major texts produced by the Zionist movement, emphasizing
its early years between the 1880s and the 1917 Balfour Declaration.
One of a range of forces in Jewish politics, Zionism was subjected to
sustained scrutiny by orthodox Jews, liberals, socialists, etc. The move-
ment and the criticisms engendered by it, within and beyond the Jewish
world, especially in prestate Palestine.

5 units (Zipperstein) not given 1999-2000

MIDDLE EAST

285A. Undergraduate Colloquium: Problems in Israeli History—
The National Identity and Political Culture of the Israeli State—
Focus is on ideology, institutions, and politics. Themes: Zionism, non-
Zionism, and anti-Zionism; religion and secularism; multi-ethnicism;
socialism; symbols; law.
5 units (Mancall) not given 1999-2000

286. Undergraduate Colloquium: Economic and Social History of
the Modern Middle East—(Same as 386.) The integration of the
Middle East into the world capitalist market on a subordinate basis and
the impact on economic development, class formation, and politics.
Alternative theoretical perspectives on the rise and expansion of the
international capitalist market are combined with possible case studies of
Egypt, Iraq, and Palestine.

5 units (Beinin) not given 1999-2000

287S. Undergraduate Research Seminar: Topics in the Modern
History of Egypt, Palestine, and Israel—(Same as 487.) Student-
selected research topics with guided historiographical reading and dis-
cussions as an introduction.

5 units (Beinin) not given 1999-2000

288. Undergraduate Colloquium: Palestine and the Arab-Israeli
Conflict—(Same as 388.) The Palestine-Zionist conflict 1882 to the
present through reading and comparing representative expressions of
competing historical interpretations. U.S. policy towards the conflict
since 1948.

5 units (Beinin) not given 1999-2000

289A. Undergraduate Colloquium: The Ottoman Empire—(Same
as 389A.) The rise of the Ottoman Empire from the 14th to 16th centuries.
The Balkans and the Middle East under Ottoman rule. Systems of
governance and the economy of the Ottoman Levant. The onset of
weakness and decline after the 17th century. European imperialism in the
Middle East. Ottoman westernizing reforms in the 19th century. Rise of
nationalism. The Balkan Wars, WW I, and the collapse of the Ottoman
Empire.

5 units (Rodrique) not given 1999-2000

EAST ASIA

290A. Undergraduate Colloquium: History of Chinese Overseas—
Readings on the comparative experiences of ethnic Chinese in S.E. Asia,
Oceania, and the Americas; migration as a means of understanding world
history in the past two centuries. Topics: nationalism and the rise of na-
tion-states, diaspora and transnationalism as theoretical tools, variations
in ethnic identity formation, and patterns of community evolution.

5 units, Win (Hsu)

291A. Undergraduate Colloquium: The Chinese Revolution—Key
passages in China's revolutionary struggle, beginning with Sun Yat-sen
and the 1911 Revolution and ending with the pro-democracy movement
and events at Tiananmen in 1989. The May 4th Movement, Chiang Ka-
shek's National Revolution of 1925-27, Mao Zedong's peasant-based
Communist revolution, and the Cultural Revolution are explored from
social, cultural, and political perspectives. First-person accounts, e.g.,
Edgar Snow's Red Star Over China, primary documents, classic and
revisionist scholarly works, Chinese literature in translation, and films,
e.g., Yellow Earth and Farewell, My Concubine.

5 units, Aut (R. Thompson)

292. Undergraduate Colloquium: Postwar Japan—(Same as 392)
Discussion of various aspects of Japanese social history since 1945: the
postwar emperor system, economic growth and urbanization, middle-
class culture, new religions, citizens' movements, the transformation of
village life, the search for national identity, and popular media.

5 units (Duus) not given 1999-2000

292A. Undergraduate Colloquium: Japanese Lives—Autobiogra-
phy and History—(Same as 392A.) The consciousness of self and
history in modern Japan as reflected in autobiographical and semi-
autobiographical literature. Works by Kurosawa Akira, Kaneko Fumiko,
Arai Hakuseki, Fukuzawa Yukichi, Mishima Yukio, etc.

5 units (Duus) not given 1999-2000

292B. Undergraduate Colloquium: Aspects of Chinese Economic
History from the High Middle Ages to Modern Times—Premise:
Economic information changes in meaning as history moves into differ-
ent social formations. Where the ancient imperial state left its agrarian
imprint on land formations and ownership patterns, a thousand years of
growth and the development of commerce, the emergence of complex
systems of land ownership and tenancy, the appearance in late imperial
and early modern times of demographic problems, questions of agrarian
stagnation, rural commercialization, and the beginnings of an industrial
economy.

5 units (Kahn) not given 1999-2000

292S. Undergraduate Research Seminar: China in the Western
Imagination, 16th-20th Century—500 years of the reinvention of
China in the Western mind. Through the use of Jesuit correspondence,
diplomatic reminiscence, missionary memoirs, modern journalism, trav-
ellers' accounts, and military logs, students construct a research project
which explores subject (the viewer) and object (the viewed) in the early
modern history of China.

5 units (Kahn) not given 1999-2000

294B. Undergraduate Colloquium: Chinese Medicine—Interdisci-
plinary Studies—(Same as 394B.) Interdisciplinary approach (drawing
on cultural history, anthropology, gender studies, and philosophy) to the
study of Chinese medicine in its intellectual, social, and cultural context.
Readings: primary sources in Chinese medicine, current research, criti-
cal theory, and studies of Western medicine. Emerging trends in the field.

5 units (Harris) not given 1999-2000

295S. Undergraduate Research Seminar: Creating Modern Chi-
na—From Empire to Nation in the Age of Imperialism—Sixty years
of transformation. A voluminous documentary record in Western lan-
guages is part of the legacy of the "opening" of the countryside in 1860
to missionaries and "treaty ports" inhabited by diplomats and business-
men. Students use diplomatic records, missionary correspondence and
reports, travel accounts, newspapers, memoirs, Chinese material in
translation, and private collections of papers to write research papers on,
e.g., the Taiping Rebellion; the cultural, social, economic, and political
impact of the West; the Boxer Uprising, various reform movements; the
1911 Revolution; and China's descent into warlordism and the simulta-
neous beginning of a cultural revolution in the years leading up to 1919.
Prerequisite: consent of instructor.

5 units, Win (R. Thompson)
296. Undergraduate Colloquium: Ordinary Lives—The Social History of Early Modern China—Explores ways of studying people who were not prominent in the conventional spheres of authority or high culture. Topics: migrations, disease, production and consumption, gender and family, popular culture and entertainments, the politics of banditry, etc., during Ming-Qing (16th-19th centuries). Prerequisite: consent of instructor. GER:4a (DR:2)

5 units (Kahn) not given 1999-2000

298. Undergraduate Colloquium: Imperialism, Colonialism, and National Identity in Modern Japan—(Same as 398.) The linkages between state building, economic change, territorial expansion, and national consciousness in late 19th- and early 20th-century Japan. Topics: the construction of race, the alien and the barbarian; the nature of the modern Japanese state; the economic roots of territorial expansion; styles and schemes of colonial domination and management; debates on Japan's relationships with Asia, the West, and its colonial subjects.

5 units (Duas) not given 1999-2000

299. Undergraduate Colloquium: Japan in the Age of Courtiers and Warriors, 1180-1333—(Same as 399.) Government and society during the period of Japan’s transition from its classical to its medieval phase. Topics: law, justice, family, inheritance, war, religion, and the economy through the analysis of primary documents, chronicles, and sources in translation.

5 units, Spr (Mass)

300. History Wired—Overview, theoretical and applied, of electronic media as they relate to the various disciplines of historical research and teaching.

3 units (Lougee Chappell, Lenoir) not given 1999-2000

300A. Undergraduate Colloquium: Vision of Utopia—Travelers to China, 9th-20th Century

5 units (Kahn) not given 1999-2000

300B. Undergraduate Colloquium: Japan in the Age of Courtiers and Warriors, 1180-1333—(Same as 399.) Government and society during the period of Japan’s transition from its classical to its medieval phase. Topics: law, justice, family, inheritance, war, religion, and the economy through the analysis of primary documents, chronicles, and sources in translation.

5 units, Spr (Mass)

301. Graduate Colloquium: Historiography of American Education—(Same as Education 301.) Analysis of the literature of American education history for students who wish to do further work in the field. Weekly discussions, plus an opportunity to pursue specialized topics in small group tutorial sessions. Limited enrollment. Prerequisite: consent of instructor.

3-4 units, Aut (Tyack)

301A. Graduate Colloquium: Early Greece

4-5 units (Morris) not given 1999-2000

301B. Graduate Colloquium: 20th-Century Turkey, Iran, and Pakistan—(Same as 201B.)

5 units, Spr (Simons)

302A. Graduate Colloquium: Introduction to Problems of Historical Interpretation and Explanation—(Same as 202.)

4-5 units, Spr (Emmons)

304. Approaches to History—Required of all first-year History Ph.D. students.

1-3 units, Aut (Duas)


4-5 units, Aut (Lenoir)

305. Graduate Workshop in Teaching—Introduction to teaching, lecturing, and curriculum development.

1 unit, Spr (R. Roberts)

305A. Graduate Colloquium: Private Lives, Public Stories—Autobiography in Women's History—(Same as 205A.)

4-5 units, Aut (Lougee Chappell)

305B. Graduate Colloquium: Introduction to Quantitative Analysis for Historians—(Same as 205B.)

4-5 units, Win (Klein)

306. Graduate Colloquium: The Logic of History—(Same as 206.)

4-5 units, Aut (Haber)

306A. Graduate Colloquium: The Modern Tradition—Capitalism, Imperialism, and their Critics—The tradition of social theory beginning with Marx’s concept of capitalism and Lenin’s theory of imperialism is elaborated by examining works arguing that gender and racial hierarchies are constitutive of capitalism. The dimensions of ideological and cultural domination, using the writings of Marx, Gramsci, and representatives of the cultural studies and subaltern studies schools including Start Hall, Gyan Prakash, Edward Said, and Paul Gilroy. The debate over postmodernism/late capitalism, and theory and strategy after the Gulf War.

4-5 units (Reinin) not given 1999-2000

306B. Design and Methodology for International Field Research

1 unit, Win (Kollmann)

306C. History Wired—Overview, theoretical and applied, of electronic media as they relate to the various disciplines of historical research and teaching.

3 units (Lougee Chappell, Lenoir) not given 1999-2000

306P. Many Histories of Science: The Scientific Revolution—(Same as 206P.)

4-5 units, Aut (Findlen)

307. Graduate Colloquium: Men, Women, and Power in Early Modern Russia, 1500-1800—(Same as 217.)

4-5 units (Kollmann) not given 1999-2000

308. Graduate Colloquium: The Modern Tradition—Capitalism, Imperialism, and their Critics—The tradition of social theory beginning with Marx’s concept of capitalism and Lenin’s theory of imperialism is elaborated by examining works arguing that gender and racial hierarchies are constitutive of capitalism. The dimensions of ideological and cultural domination, using the writings of Marx, Gramsci, and representatives of the cultural studies and subaltern studies schools including Start Hall, Gyan Prakash, Edward Said, and Paul Gilroy. The debate over postmodernism/late capitalism, and theory and strategy after the Gulf War.

4-5 units (Reinin) not given 1999-2000

317. Graduate Colloquium: Men, Women, and Power in Early Modern Russia, 1500-1800—(Same as 217.)

4-5 units (Kollmann) not given 1999-2000

320. Graduate Colloquium: Topics in Early Modern Russian History

4-5 units (Kollmann) not given 1999-2000

320A. Graduate Colloquium: Topics in Early Modern Russian History

4-5 units (Kollmann) not given 1999-2000

320B. Graduate Colloquium: Topics in Imperial Russian History

4-5 units (Emmons) not given 1999-2000

320C. Graduate Colloquium: Topics in 20th-Century Russian and Soviet History

4-5 units (Weiner) not given 1999-2000

321A. Graduate Colloquium: Topics in Early Modern Russian Historiography

4-5 units, Spr (Kollmann)

321B. Graduate Colloquium: Topics in Modern Russian Historiography

4-5 units (Emmons) not given 1999-2000

321C. Graduate Colloquium: Historiography of the Soviet Union—(Same as 221C.)

4-5 units (Weiner) not given 1999-2000

322. Historical Research in Russia, 17th-20th Centuries: Sources, Archives, Paleography

5 units, Spr (Kamenskii)
322A. Graduate Colloquium: Myths and Identities in Modern Ukraine—(Same as 222A.)
4-5 units (Weiner) not given 1999-2000

322C. Graduate Colloquium: Nationbuilding in Eastern Europe—(Same as 222C.)
5 units, Win (Suppan)

322D. Graduate Colloquium: National Conflict in Eastern Europe—(Same as 222D.)
5 units, Spr (Suppan)

323. Graduate Colloquium: Honor, the Law, and Modernity in Early Modern Europe—(Same as 223.)
4-5 units, Aut (Kollmann)

324. Graduate Colloquium: Stalinism in Eastern Europe—(Same as 224.)
4-5 units, Spr (Naimark)

325. Graduate Colloquium: The Russian Revolutionary Tradition—(Same as 225.)
4-5 units (Emmons) not given 1999-2000

325B. Graduate Core Colloquium: 20th-century Russia
4-5 units, Aut (Patenaude)

326. Graduate Colloquium: Modernity, Revolution, and Totalitarianism—(Same as 226.)
4-5 units (Weiner) not given 1999-2000

MEDIEVAL AND EARLY MODERN EUROPE

307B. Graduate Core Colloquium in Medieval European History
4-5 units, Aut (K. Miller)

309A. Graduate Colloquium: Law, Society, and Identity in Christianity and Islam, 500-1500—(Same as 209A.)
4-5 units, Win (K. Miller)

309B. Graduate Colloquium: Crusaders, Pilgrims, and Merchants—The Mediterranean World, 700-1600—(Same as 209B.)
4-5 units, Spr (K. Miller)

310A. Graduate Colloquium: The Language of Politics in the Middle Ages—(Same as 210A.)
4-5 units, Spr (Buc)

311. Graduate Colloquium: Body, Gender, and Society in Medieval Europe—(Same as 211.)
4-5 units (Buc) not given 1999-2000

313A. Graduate Colloquium: New Worlds, Imaginary Worlds—(Same as 213A.)
4-5 units, Spr (Findlen)

313B. Graduate Colloquium: Heretics, Prostitutes, and Merchants—Venice and its Empire—(Same as 213B.)
4-5 units (Findlen) not given 1999-2000

313C. Graduate Colloquium: Power, Art, and Knowledge in Renaissance Italy—(Same as 213C.)
4-5 units, Win (Findlen)

314A. Graduate Colloquium: Universities in Medieval Europe—(Same as 214A.)
5 units, Spr (Tachau)

315A. Graduate Colloquium: Topics in Reformation History
4-5 units (Gregory) not given 1999-2000

316A. Graduate Core Colloquium: Europe in the 15th and 16th Centuries
4-5 units (Gregory) not given 1999-2000

316B. Graduate Core Colloquium: Europe in the 17th and 18th Centuries
4-5 units, Aut (Baker)

HISTORY OF SCIENCE AND TECHNOLOGY

306P. Many Histories of Science: The Scientific Revolution—(Same as 206P.)
4-5 units, Aut (Findlen)

313F. Graduate Core Colloquium on Modern Europe: Women and Gender
4-5 units (M. L. Roberts) not given 1999-2000

313G. Graduate Core Colloquium on Modern Europe
4-5 units, Win (Naimark)

322. Graduate Colloquium: Culture and Politics in Modern France—(Same as 222.)
4-5 units (M. L. Roberts) not given 1999-2000

AFRICA

347. Graduate Colloquium: Greater East Africa and its Historical Writing—(Same as 247.)
4-5 units, Spr (Jackson)
347B. Graduate Core Colloquium in African History: The Colonial Period  
4-5 units (R. Roberts) not given 1999-2000

347C. Graduate Colloquium: Africa and African Americans since World War II—(Same as 247C.)  
4-5 units, Aut (Jackson)

348A. Graduate Colloquium: The End of Slavery in Africa and the Americas—(Same as 248A.)  
4-5 units (R. Roberts) not given 1999-2000

348B. Graduate Colloquium: Law and Colonialism in Africa—(Same as 248B.)  
4-5 units (R. Roberts) not given 1999-2000

349. Graduate Core Colloquium: Precolonial Africa  
4-5 units, Spr (R. Roberts)

349A. Graduate Colloquium: The Issue of Greatness in Black History—(Same as 249A.)  
4-5 units (Jackson) not given 1999-2000

349B. Graduate Colloquium: Black Visual Arts and Black History—(Same as 249B.)  
4-5 units (Jackson) not given 1999-2000

THE UNITED STATES

351A,B,C,D,E,F. Graduate Core Colloquium in American History 24-30 units

351A. Graduate Core Colloquium in American History—Part I  
4-5 units, Aut (Rakove)

351B. Graduate Core Colloquium in American History—Part II  
4-5 units, Aut (M. Thompson)

351C. Graduate Core Colloquium in American History—Part III  
4-5 units, Win (Staff)

351D. Graduate Core Colloquium in American History—Part IV  
4-5 units, Win (Freedman)

351E. Graduate Core Colloquium in American History—Part V  
4-5 units, Spr (Carson)

351F. Graduate Core Colloquium in American History—Part VI  
4-5 units, Spr (Bernstein)

352. Graduate Colloquium: Decision-Making in International Crises—The A-Bomb, the Korean War, and the Cuban Missile Crisis—(Same as 252.)  
4-5 units, Aut (Bernstein)

355A. Graduate Colloquium: Culture and Ideologies of Race—(Same as 255A.)  
4-5 units, Win (M. Thompson)

356. Graduate Colloquium: Topics in Mexican American History—(Same as 256.)  
4-5 units, Win (Camarillo)

357. Graduate Colloquium: Immigrants and Racial Minorities in American Cities—Comparative Perspectives—(Same as 257.)  
4-5 units (Castillo) not given 1999-2000

359. Graduate Colloquium: Race and Ethnicity in the United States and South Africa—(Same as 259.)  
4-5 units (Fredrickson) not given 1999-2000

361. Graduate Colloquium: Nuclear Weapons and International Relations—Theories and History—(Same as 261.)  
4-5 units (Bernstein, Holloway) not given 1999-2000

363B. Graduate Colloquium: The Making of the Atlantic World, 1600-1960—(Same as 263B.)  
5 units, Win (Saville)

365. Graduate Colloquium: New Research in Asian American History—(Same as 265.)  
4-5 units (Chang) not given 1999-2000

365A. Graduate Colloquium: The History of Sexuality in the United States—(Same as 265A.)  
4-5 units (Freedman) not given 1999-2000

369. Graduate Colloquium: The African-American Community Organizing Tradition—(Same as 269.)  
4-5 units (Carson) not given 1999-2000

372. Graduate Colloquium: Creating the American Republic  
4-5 units, Win (Rakove)

LATIN AMERICA

376. Graduate Colloquium: The Creation of North America—(Same as 276.)  
4-5 units (Wirth) not given 1999-2000

377. Graduate Colloquium: History and Public Policy—The Political Economy of Economic Growth—(Same as 277.)  
4-5 units (Haber) not given 1999-2000

381A. Graduate Colloquium: Environmental History of the Americas—(Same as 281A.)  
4-5 units, Spr (Wirth)

382. Graduate Colloquium: The Agrarian Origins of Underdevelopment in Latin America—(Same as 282.)  
4-5 units (Haber) not given 1999-2000

383. Graduate Colloquium: The Process of Industrialization—Europe, the United States, and Latin America—(Same as 283.)  
4-5 units (Haber) not given 1999-2000

383A. Graduate Colloquium: Slavery and Race Relations in the Americas—(Same as 283A.)  
4-5 units (Klein) not given 1999-2000

JEWISH HISTORY

384A. Graduate Core Colloquium in Jewish History, 17th-19th Centuries  
4-5 units, Aut (Rodrigue)

384B. Graduate Core Colloquium in Jewish History, 20th Century  
4-5 units, Win (Zipperstein)

387A. Graduate Colloquium: Modern Jewish Identity—(Same as 287A.)  
4-5 units (Rodrigue) not given 1999-2000

MIDDLE EAST

386. Graduate Colloquium: Economic and Social History of the Modern Middle East—(Same as 286.)  
4-5 units (Beinin) not given 1999-2000

388. Graduate Colloquium: Palestine and the Arab-Israeli Conflict—(Same as 288.)  
4-5 units (Beinin) not given 1999-2000

389A. Graduate Colloquium: The Ottoman Empire—(Same as 289A.)  
4-5 units (Rodrigue) not given 1999-2000
389B. Graduate Colloquium: Zionism and its Critics—(Same as 289B.)
4-5 units (Zipperstein) not given 1999-2000

EAST ASIA
390A. Graduate Colloquium: Topics in Middle-Period Chinese History
4-5 units (Neskar) not given 1999-2000

390B. Graduate Colloquium: Topics in Late Traditional Chinese History
4-5 units, Win (Kahn)

390C. Graduate Colloquium: Topics in Modern Chinese History
4-5 units, Spr (R. Thompson)

392. Graduate Colloquium: Postwar Japan—(Same as 292.)
4-5 units (Duus) not given 1999-2000

392A. Graduate Colloquium: Japanese Lives—Autobiography and History—(Same as 292A.)
4-5 units (Duus) not given 1999-2000

395A. Graduate Colloquium: Early and Medieval Japan
4-5 units, Win (Mass)

395B. Graduate Colloquium: Late Medieval and Early Modern Japan, 1560-1800
4-5 units (Staff) not given 1999-2000

395C. Graduate Colloquium: Modern Japan
4-5 units, Aut (Duus)

398. Graduate Colloquium: Imperialism, Colonialism, and National Identity in Modern Japan—(Same as 298.)
4-5 units (Duus) not given 1999-2000

399. Graduate Colloquium: Japan in the Age of Courtiers and Warriors, 1180-1333—(Same as 299.)
4-5 units, Spr (Mass)

ADVANCED GRADUATE
- Courses numbered 400 to 499 are intended primarily for second- and third-year graduate students, but other qualified students may be admitted by consent of instructor.

400X. Graduate Research
units by arrangement (Staff)

CLASSICS
401C. Graduate Seminar: Early Greece—Prerequisite: 301C.
4-5 units (Morris) not given 1999-2000

EASTERN EUROPE AND RUSSIA
419. Graduate Research Seminar: The Soviet Civilization—(Same as 219S.)
4-5 units (Weiner) not given 1999-2000

420B. Graduate Seminar: Modern Russia
8-10 units (Emmons) not given 1999-2000

433. Graduate Seminar: Modern Eastern Europe
4-5 units (Naimark) not given 1999-2000

MEDIEVAL AND EARLY MODERN EUROPE
411A. Graduate Seminar: Medieval History, Part 1
4-5 units, Win (Buc)

411B. Graduate Seminar: Medieval History, Part 2
4-5 units, Spr (Buc)

413. Graduate Seminar: Early Modern Europe
8-10 units, Spr (Findlen)

MODERN EUROPE
430. Graduate Seminar: The French Revolution
4-5 units (Baker) not given 1999-2000

433A,B. Graduate Seminar: European History
8-10 units, Aut, Win (Sheehan)

437. Graduate Seminar: Modern European Cultural and Intellectual History
4-5 units (Robinson) not given 1999-2000

437A. Graduate Seminar: Modern European History
8-10 units (Robinson) not given 1999-2000

438. Graduate Seminar: The European Enlightenment—(Same as 338)
8-10 units (Staff) not given 1999-2000

HISTORY OF SCIENCE AND TECHNOLOGY
462. Graduate Seminar: Science and High Technology in the Silicon Valley, 1930-1980—(Same as 262S.)
4-5 units, Spr (Lenoir)

BRITAIN
442A,B. Graduate Seminar: Research, Paleography and Archives of Early Modern England
8-10 units, Aut, Win (Seaver)

445. Graduate Seminar: Modern Britain
4-5 units, Win (Stansky)

AFRICA
446. Graduate Seminar: Popular Culture in Africa—(Same as 246S.)
4-5 units (Jackson) not given 1999-2000

4-5 units, Win (Jackson)

448A. Graduate Seminar: Colonial States and Societies in Africa—(Same as 248S.)
8-10 units (Roberts) not given 1999-2000

THE UNITED STATES
451. Graduate Seminar: 20th-Century America
8-10 units (Bernstein) not given 1999-2000

454. Graduate Seminar: Culture and Ideology in American History
4-5 units (Fredrickson) not given 1999-2000

456A,B. Graduate Seminar: United States in the 20th Century
8-10 units (Kennedy) not given 1999-2000

457. Graduate Seminar: The United States
4-5 units, Spr (Thompson)

473A,B. Graduate Seminar: U.S. Women's Family and Sexual History
8-10 units, Win, Spr (Freedman)

474. Graduate Seminar: Race, Ethnicity, and Class in 20th-Century America
8-10 units (Camarillo) not given 1999-2000
476. Graduate Seminar on Brazil
4-5 units (Wirth) not given 1999-2000

477. Graduate Seminar: Economic and Social History of Colonial Latin America—Open to non-Latin Americanists working on research projects that utilize quantitative data. Acquaints students with social science approaches to Latin American history.
4-5 units (Haber) not given 1999-2000

478. Graduate Seminar: Economic and Social History of Latin America—Open to non-Latin Americanists working on research projects that utilize quantitative data. Acquaints students with social science approaches to Latin American history.
4-5 units (Haber) not given 1999-2000

482. Graduate Seminar: Historical Approaches to Social Science
4-5 units, Spr (Haber)

JEWISH HISTORY

485A. Graduate Research Seminar in Modern Jewish History
4-5 units, Spr (Zipperstein)

MIDDLE EAST

487. Graduate Seminar: Topics in the Modern History of Egypt, Palestine, and Israel—(Same as 287S.)
4-5 units (Beinin) not given 1999-2000

EAST ASIA

493. Graduate Seminar: Late Imperial China
4-5 units, Spr (Neskar)

498. Graduate Seminar: Japanese Historical Texts
4-5 units, Win (Mass)

AFFILIATED DEPARTMENT OFFERINGS

AMERICAN STUDIES

151. The Transformation of American Thought and Culture, 1865 to the Present
5 units, Win (Gillam)

214. The American 1960s: Thought, Protest, and Culture
5 units, Aut (Gillam)

CLASSICS

10N. Stanford Introductory Seminar: Bimillennium, High and Low Life in Rome 2000 Years Ago
3-4 units, Aut (Treggiari)

101. History of Greece
4-5 units, Aut (Scheidel)

102. Roman History I: The Republic
4-5 units, Win (Scheidel)

103. Roman History II: The Empire
4-5 units, Spr (Treggiari)

105. History and Culture of Egypt
4-5 units, Spr (Manning)

ECONOMICS

115. European Economic History
5 units, Win (Greif)

116. American Economic History
5 units, Aut (Wright)

226. Problems in American Economic History
5 units, Aut (Wright)

227. European Economic History
5 units, Win (Greif)

OVERSEAS STUDIES

These courses are approved for the History major and taught overseas at the campus indicated. Students should discuss with their major advisors which courses would best meet individual needs. Descriptions are in the “Overseas Studies” section of this bulletin or at the Overseas Studies office, 126 Sweet Hall.

BERLIN

117V. The Industrial Revolution and its Impact on Art, Architecture, and Theory
5 units, Aut (Neckenig)

120V. Industry, Technology and Culture, 1780-1945
4 units, Win (Neckenig)

229V. Architecture and the City, 1871-1990: Berlin as a Nucleus of Modernity—(Same as Overseas Studies 143U.)
4 units, Spr (Neckenig)

FLORENCE

106V. Italy: From an Agrarian to a Post-Industrial Society
4 units, Aut (Mammarella)

215V. The Scientific Revolution: From the Renaissance to the 18th Century
4-5 units, Win (La Vergata)

MOSCOW

225V. Aspects of Soviet Political History
4 units, Aut (Emmons)

226V. History of Moscow through its Architecture
4 units, Aut (Emmons)

OXFORD

102V. Ancient Roman Society—(Same as Overseas Studies 185.)
5 units, Win (Treggiari)

139V. The European City: 1860-2000
4-5 units, Spr (Tyack)

141V. European Imperialism and the Third World, 1870-1970
5 units, Spr (Darwin)

143V. Horace, Kipling, and Imperialism: Songs and Law—(Same as Overseas Studies 186.)
5 units, Win (Treggiari)

224V. Art and Society in Britain—(Same as Overseas Studies 221Y.)
5 units, Win (Tyack)

PARIS

130V. Paris: 1200-2000
4 units, Win (Bender)

131V. The Holocaust in France and Beyond
5 units, Aut (A. Felstiner, M. Felstiner)

132V. The Memory of a Nation: The Birth of Museums in France
4 units, Aut (Georgel)
PROGRAM IN HISTORY AND PHILOSOPHY OF SCIENCE

Chair: Timothy Lenoir
Committee-in-Charge: Barton Bernstein (History), Joe Corn (History), Paul David (Economics), Paula Findlen (History), Peter Godfrey-Smith (Philosophy), Yair Guttmann (Philosophy), Timothy Lenoir (History)

Professors: Barton Bernstein, David Holloway, Timothy Lenoir
Associate Professors: Paula Findlen, Peter Godfrey-Smith
Assistant Professors: Yair Guttmann, Reviel Netz
Senior Lecturer: Joseph Corn
Visiting Professors: Thomas Hughes, Norbert Paul-Humbolt Fellow
Affiliated Faculty: Hans Ulrich Gumbrecht (Comparative Literature), C. Francis Everitt (Hansen Lab), Alex Pang (Science, Technology, and Society), Michael Rior (SLAC), Charles A. Taylor (Mechanical Engineering, Surgery)

Fellow: Laura Bruno
Other Affiliation: Henry Lowood (Stanford University Libraries), Michael Rior (SLAC)

The Program in History and Philosophy of Science is an interdisciplinary, non-degree program focusing on the historical and contemporary aspects of science. At its regular monthly colloquium, invited speakers from anthropology, history, medicine, philosophy, sociology, the economics of science and technology, and the sciences address topics of broad concern to science and technology studies. The program works closely with the University Libraries' Special Collections in the History of Science and cooperates with other departments and programs in the administration of undergraduate and graduate majors. Its undergraduate and graduate courses span the period from antiquity to the late 20th century. These courses can accommodate students with varying backgrounds in the natural sciences, humanities, and social sciences.

At the undergraduate level, students who wish to pursue studies in the history and philosophy of science and technology should major in the departments of History or Human Biology, with a concentration in history of science, or in the Department of Philosophy which offers a specific degree in History and Philosophy of Science. A concentration in the anthropology of science can be arranged through the Department of Anthropological Sciences. Alternatively, students may consult with a member of the Committee-in-Charge to construct an individually designed major. This major must conform to the requirements for Individually Designed Majors (see the "Individually Designed Majors" section of this bulletin). Graduate students who wish to combine studies in the history and philosophy of science and technology with majors in anthropology, history, or philosophy should consult those departments.

COURSES

60. Introduction to the History and Philosophy of Science—(Same as Philosophy 60.) Survey of 20th-century views on the nature of scientific knowledge. Logical positivism and Popper; the problem of induction; Kuhn, Feyerabend and radical philosophies of science; subsequent attempts to rebuild moderate empiricist and realist positions; case study in the history of biology. GER:3a (DR:8)

5 units, Aut (Godfrey-Smith)

113. Undergraduate Colloquium: New Worlds, Imaginary Worlds—(Enroll in History 213A/313A.)

5 units, Spr (Findlen)

115. The Emergence of Modern Medicine—(Enroll in History 13.)

5 units, Win (Findlen)


3-4 units (Findlen) not given 1999-2000

121. Technology and Culture in 19th-Century America—(Enroll in History 115.)

4-5 units, Win (Corn)

137. The Greek Invention of Harmony and Proportion—(Enroll in Classics 137.)

4 units, not given 1999-2000


138A. Ancient Period

4 units, not given 1999-2000

138B. Cosmology: Middle Ages and the Renaissance

4 units, not given 1999-2000

138C. Modern Period: Newton to Einstein

4 units, not given 1999-2000

139. Medicine in Ancient Greece and Rome—(Enroll in Classics 139)

4 units, Aut (Netz)

140. Topics in the History of Mathematics: From Antiquity to the 17th Century—The origins and development of concepts and techniques in their social and philosophical context. Emphasis is on ancient Greek geometry, its adoption of the idea of proof and interaction with early philosophy, its application in optics and mechanics, its significance and limitations.

4 units, not given 1999-2000

142. Information Revolutions: Technology and Forms of Knowledge—(Enroll in Science, Technology, and Society 140.)

3 units, Aut (Pang)

145/245. The Scientific Revolution—(Enroll in History 139/339; graduate students register for 339.)

5 units, Staff not given 1999-2000

147/247. Undergraduate Research Seminar: Science and High-Technology in Silicon Valley, 1930-1980—(Enroll in History 262S.) The technological, political, economic, and spatial dimensions of the rise of Silicon Valley, 1930s-80s. How did Silicon Valley arise? What sustained its growth? How did it function? How did it evolve? Archival research and oral history. Focus is on radiotubes, microwave devices, semiconductors, and computers; economies of skills; university-industry relations; political dissent and the counter-culture; and the technoscientific policies of the Cold War state. Comparison with Route 128.

5 units, Spr (Lenoir)

152. The Darwinian Revolution—(Enroll in History 133.) The conceptual developments leading to establishment of the major unifying paradigm of biological science, the theory of evolution by natural selection. Biological thought before Darwin (1800-1836). The voyage of the Beagle and the formation of Darwin's thought in its broader intellectual and social context. The Origin of Species: Descent of Man. The difficulties the theory had to overcome and their resolution in the union of evolutionary biology and population genetics in the 1930s and 40s.

4 units (Lenoir) not given 1999-2000


4-5 units, Win (Lenoir)
154. The Rise of Scientific Medicine—(Enroll in History 33A.) The intellectual, social, and institutional dimensions of the rise of scientific medicine in the 19th and 20th centuries. How did medicine become "scientific"? What differences did science make to the practicing physician? Why did it displace other approaches to medicine? Focus is on medicine in Europe and the U.S., 1800-present. Topics: the development of experimental physiology, bacteriology, pharmacology, biomedical technology, nuclear medicine, biomedical imaging, computers in medicine, and prospects for bedside gene therapies; the effects of scientific developments in biomedical science and technology on medical practice and therapy; the professionalization of medicine in comparative European and American contexts.

5 units, Spr (Lenoir)

158Q. Stanford Introductory Seminar: Virtuality—(Enroll in History 34Q.) Preference to sophomores. New media technology from the printing press and photography to computer-mediated communication have transformed our experience of the "real": our conceptions of objectivity, agency, the self, and the body. Using authors from Hobbes to Freud, 17th to the 20th centuries, the focus is on the material media's role in changing epistemological formations. Visualizations in biomedicine, including new developments in "virtual surgery." Hands-on construction of virtual worlds. Readings on the new hypermedia guide study of emerging practices of reading and rhetoric.

5 units (Lenoir) not given 1999-2000

168. History of 20th-Century Physics—Describes, analyzes, and interprets the major scientific changes characteristic of the 20th century. Introduction to the ideas of relativity, the influence of quantum theory, and alternating scientific fashions from atomic, nuclear, and particle physics, including the impact on cosmology, semiconductors, and superconductivity. Emphasis is on corresponding cultural changes in areas such as sociology and philosophy, and on the changing role of physics in the 20th century.

3-5 units (Riordan) not given 1999-2000

171/271. Undergraduate/Graduate Colloquium: Many Histories of Science—The Scientific Revolution—(Enroll in History 206B/306B.)

5 units, Aut (Findlen)

199. Directed Reading

1-5 units (Staff)

204A/304A. Undergraduate Colloquium: Critical Studies—Science, Language, and Culture—(Enroll in History 204A/304A.)

4-5 units, Aut (Lenoir)

206. History Wired—(Enroll in History 306C.) Overview, theoretical and applied, of electronic media as they relate to the various disciplines of historical research and teaching.

3 units (Chappell, Lenoir, Lougee) not given 1999-2000

233. Feminist Theories of Science and Technology—Feminist theories and studies of science, technology, and medicine, especially as they intersect with cultural studies of science and technology. Focus is on feminist epistemologies, and questions whether, and how, they challenge and shift the lens of current practices in science and technology. How gender is constructed by and constructs the technosciences.

5 units, Spr (Staff)

274B/374B. Undergraduate/Graduate Colloquium: Managing Technological Change—A History—(Enroll in History 274B/374B.)

4-5 units, Win (Hughes)

294B. Undergraduate/Graduate Colloquium: Chinese Medicine—Interdisciplinary Studies—(Enroll in History 294B.)

5 units (Hart) not given 1999-2000

299. Graduate Individual Work

1-5 units (Staff)

AFFILIATED DEPARTMENT OFFERINGS

CLASSICS

18N. Stanford Introductory Seminar: All is a Number

3-4 units, Win (Netz)

GERMAN STUDIES

175/175A. Modernization, Technology, and Culture in Germany, 1900 to 1945

4 units, Spr (Lowood)

HISTORY

152. American Spaces: An Introduction to Material Culture and the Built Environment

5 units, Spr (Corn)

451. Graduate Seminar: 20th-Century America

8-10 units (Berstein) not given 1999-2000

PHILOSOPHY

164/264. Central Topics in the Philosophy of Science: Scientific Explanation

4 units, Win (Strevens)

165/265. Philosophy of Physics

4 units, Spr (Gutman)

167A/267A. Philosophy of Biology

4 units, Win (Godfrey-Smith)

167B/267B. Philosophy, Biology, and Behavior

4 units, Spr (Godfrey-Smith)

242A. Philosophy of Science Seminar

3 units, Win (Gutman, Suppes)

242B. Philosophy of Science Seminar: The Evolution of Complex Systems

3 units, Win (Strevens)

200. Senior Colloquium

2-4 units, Win (Pang)

PROGRAM IN HUMAN BIOLOGY

Emeriti: (Professors) Paul Bascom (Education), Sanford Dornbusch (Sociology), Albert H. Hastorf (Psychology), Luigi Cavalli-Sforza (Genetics)

Director: Russell D. Fernald

Assistant Director: Shirley Feldman

Professors: J. Myron Atkin (Education), Clifford Barnett (Anthropoligical Sciences), William Dement (Psychiatry), Carl Djerassi (Chemistry), William H. Durham (Anthropological Sciences, Human Biology), Marcus Feldman (Biological Sciences), Russell D. Fernald (Psychology, Human Biology), H. Craig Heller (Biological Sciences), Herant Katchadourian (Biological Science), Donald Kennedy (Biological Sciences), Richard Klein (Anthropological Sciences), Timothy Lenoir (History), Iris Litt (Pediatrics), Michael Marmor (Ophthalmology), Robert Sapolsky (Biological Sciences), Arthur B. Wolf (Anthropological Sciences)

Associate Professors: John E. Atwood (Medicine), Christos Constantiou (Urology), Anne Fernald (Psychology), James Fox (Anthropological Sciences), Peter Godfrey-Smith (Philosophy), Ramachandra Guha (Anthropological Sciences), Margo Horn (History), Gordon
Matheson (Medicine), Daria Mochly-Rosen (Molecular Pharmacology, Human Biology), Ellen Porzig (Developmental Biology, Human Biology, Molecular Pharmacology), Robert Reich (Political Science), John Rick (Anthropological Sciences), Robert Siegel (Microbiology and Immunology)

Assistant Professors: Amato J. Giaccia (Radiation Oncology), Abby King (Medicine, Health Research Policy), Joanna Mountain (Anthropological Sciences)

Associate Professor (Teaching): Carol Boggs

Other Teaching Faculty: William Abrams, Donald Barr, Baruch Blumberg, Barry Braun, Gail Butterfield, Malcolm Cohen, Anne Ehrlich, S. Shirley Feldman, Anne Friedlander, Laura Garden, Hill Gates, Michael Green, William B. Hurlbut, Alan Launer, Philip Lee, Anne Maggioncalda, Armin Rosencranz, Merritt Ruhlen, Marjorie Shuer, Tomoko Wakabayashi, Chris Wilson

Student Advisers: Nina Chinosornvatana, Brook Fries, Nkem Ogbechie, Kameelah Phillips, Ramin Shadman, Apa Sohoni

The Program in Human Biology is an interdepartmental, undergraduate major. It provides an interdisciplinary perspective on the relationship between the biological and social aspects of humanity's origin, development, and prospects.

The program has three goals:

1. To provide a broad and rigorous introduction to the biological and behavioral sciences and their interrelationships.
2. To relate these sciences to the problems raised by the relationships of human beings to one another and to their environment.
3. To help each student achieve a high level of understanding by focusing on one aspect of the biological and behavioral sciences, and its application.

The Human Biology curriculum draws on faculty from diverse University departments and schools. To complete the requirements for the major, students must take courses from the offerings of the program and from the listings of other University departments. The program culminates in an A.B. in Human Biology.

Human Biology majors are well prepared for advanced training in professional schools (for example, education, law, medicine, public policy) and graduate programs in the behavioral, natural, and social sciences, depending on their choice of upper-division courses. Undergraduates in Human Biology often enter coterminous master's degree programs in a number of other University departments.

Additional information about the major may be obtained from the program's offices or the web site at www.stanford.edu/dept/humbio.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The A.B. in Human Biology (HB) requires a minimum of 87 units in the major divided between four levels of courses:

1. Fundamental Program: at least 38 units, to include
   - Human Biology Core 30 units
   - Statistics 4-5 units
   - Internship (HB 197) 4 units
   The Human Biology Core refers to HB 2A and 2B, 3A and 3B, and 4A and 4B. See "Required Courses" below for more information.
   - Human Biology 4B fulfills the policy requirement of the major.
   Other courses which satisfy the policy requirement may be obtained from the program office. A course used to fulfill the program's policy requirement may not be used in the student's foundation or area of concentration or as one of the three required upper-division courses.
   - Statistics may be selected from: Statistics 60 or 190, Psychology 10, Economics 80, or Biological Sciences 141.
   - The core and a statistics course must be taken for a grade by majors.
   - The internship requirement, an independent field experience project, is graded satisfactory/no credit only.

2. Foundation Courses: 20-unit minimum. Total units vary, depending on the focus of study selected by the student for the area of concentration. They may include practicums, labs, and introductory-level courses from across the University. A maximum of 10 pre-medium (from the chemistry, physics, and calculus series, and biology in courses) and 4 research units are allowed.

3. Area of Concentration: a minimum of five courses totaling at least 20 units. This in-depth area of study enables the student to focus on a educational and post-baccalaureate goals. Courses must be numbered 100 or above. Three or more departments must be represented in the concentration. Each course must be taken for a minimum of 3 units. Final approval of the concentration rests with the student advisers as faculty adviser. All area of concentration courses must be taken for grade. Examples of possible areas of concentration are available in the Human Biology Student Handbook.

4. Upper-Division Courses: students must take three Human Biology upper-division courses numbered 100 to 189. Students are expected to enroll in courses outside of the area of concentration for breadth. Lab courses cannot be used to fulfill the upper-division requirements.
   - One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. All non-laboratory advanced courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement, including those that say "enroll in" another department.

A prospective major must consult with the student advisers to obtain detailed information about the program and guidance in the development of an individual course of study. At the time the major is declared, the student must submit a brief written statement of academic and long-term goals and a proposed roster of courses satisfying the requirements for the major. The proposal is reviewed by the student advisers who then identify an appropriate faculty adviser. Final approval of the proposed course of study rests with the faculty adviser. There are three upper-division tracks offered within the program: Health Policy (coordinated by Donald Barr), Human Health and Performance (coordinated by Gal Butterfield and Gordon Matheson), and Environmental Policy (coordinated by Armin Rosencranz). Students with interests in these programs should contact the appropriate coordinator.

Students who plan to pursue graduate work should be aware of the admission requirements of the schools to which they intend to apply. Early planning is advisable to guarantee completion of major and graduate school requirements.

MINORS

A minor in Human Biology is intended to provide an introductory background to the relationship between the biological and social aspects of humanity's origin, development, and prospects. Many of the major problems facing human civilization today involve both biological and social aspects. Scientific approaches to these problems are essential, but they must be broadly conceived, integrating what we know of the biological with an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology will have a strong background in the integration between the biological and social aspects of humans.

To minor in Human Biology, students must take the core curriculum (Human Biology 2A, 2B, 3A, 3B, 4A, and 4B) and one additional upper-division course (for example, any course offering by Human Biology with a number over 100, including courses cross-listed with other departments or programs). These must be taken for a letter grade of "C-" or better. Courses that count towards the fulfillment of major requirements may not be counted towards the minor. The area of study enables students to work closely with faculty on an individual research project culminating in an honors thesis. Students may begin honors research after a number of starting points including: topics introduced in the core...
upper-division courses; independent interests stemming from an internship experience; or collaborating with faculty from the natural, social, or behavioral sciences. Students may apply to the honors program once they have completed the Human Biology core, have an overall Stanford grade point average (GPA) of 3.0, and meet other requirements detailed in the honors handbook. Interested students should consult resources in the Human Biology office including the Human Biology Honors Handbook, the honors program application available from the student services office, and appointments during office hours with the Human Biology honors chair.

Specific courses of interest to honors students include: 190 (Honors Seminar for Sophomores), 191 (Honors Seminar for Juniors), 192 (Honors Seminar for Seniors), 193 (Research in Human Biology), and 194 (Honors). Most honors projects involve a total of 10 to 15 units of course work in HB 193 and 194.

Admission to the honors program is by application, normally in the junior year (and no later than November 1 of the senior year). Students planning to conduct honors research are encouraged to attend the Honors Seminar for Juniors (191) and to begin research or preparation during their junior year. An Honors College is held for a select number of senior honor students just prior to Autumn Quarter each year. For applications, contact the program office. The honors thesis is normally completed by the middle of Spring Quarter of the senior year. Each honors student then presents a brief summary of honors research at the Human Biology Honors Symposium in May.

**COURSES**

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

The faculty and staff of Human Biology prepare a student handbook, available in the Student Adviser’s office in Building 80, which provides a detailed description of the Human Biology major and outlines possible areas of concentration. Because the handbook is published over the summer, it reflects the most up-to-date information for the academic year, and is the definitive guide for all Human Biology majors.

**REQUIRED CORE**

Required Core sequences (2A and 2B, 3A and 3B, and 4A and 4B) introduce the biological and social sciences, and most importantly, relationships between the two. Classes meet throughout the academic year. Students must register concurrently for the A and B series and take the core in sequence. Students should initiate the core in Autumn Quarter of the sophomore year. Any deviation from the core sequence must first be approved by the program chair through a petition process. Freshmen are not permitted to enroll. Majors must take core courses for a letter grade.

2A.B. Genetics, Evolution, and Ecology: Culture, Evolution, and Society

2A. Genetics, Evolution, and Ecology—Introduction to the basic principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, population dynamics, and community ecology, emphasizing the genetics of the evolutionary process and applications to human populations. GER:2a (DR:5)

5 units, Aut (Boggs, Durham)

2B. Culture, Evolution, and Society—Introduction to the evolutionary study of human diversity. Hominid evolution, the origins of social complexity, social theory, and the emergence of the modern world system, emphasizing the concept of culture and its influence on human differences. GER:3b (DR:9)

5 units, Aut (Klein, Wolf)

3A.B. Cell Biology and Developmental Biology: Biology and Culture in Human Development

3A. Cell and Developmental Biology—The basic principles of the biology of cells: principles of human developmental biology, bio-

3 units, Win (Dement)

chemistry of energetics and metabolism, nature of membranes and organelles, hormone action and signal transduction in normal and disease states (diabetes, cancer, autoimmune diseases), drug discovery, immunology, and drug addiction. GER:2a (DR:5)

5 units, Win (Mochly-Rosen, Porzig)

3B. Biology and Culture in Human Development—Introduction to research and theory on early human development. How psychobiological factors shape the developing child, and how cultural practices shape the environments of childhood and influence human cognitions, emotions, moral judgments, relationships, and social behavior from birth through adolescence. GER:3b (DR:9)

5 units, Win (A. Fernald)

4A.B. The Human Organism: The Human Predicament

4A. The Human Organism—Organ system physiology, beginning with the basic principles of neurobiology and endocrinology, and the functions of body organs. The mechanisms of control, regulation, and integration of organ systems function. GER:2a (DR:5)

5 units, Spr (R. Fernald, Heller)

4B. The Human Predicament—The relation of the biological sciences to public policy in resource management and conservation practices, the regulation of environmental and health risks, agricultural production, the delivery of health services, the protection of biodiversity, and global climate change. Assigned policy challenges in lectures and section meetings. Reading on actual cases. GER:3b (DR:9) (WIM)

5 units, Spr (Kennedy)

**ADDITIONAL INTRODUCTORY OFFERINGS**

25.35.4S. Bioethical Issues in Human Biology—Perspectives on moral, ethical, and religious issues associated with advances in the biological sciences and their impact on human life. Guest speakers with discussion format.

1-2 units, Aut, Win, Spr (Hurlbut)

3X. Practicum in Young Child and Family Development—Practicum experience at Children’s Health Council for 3.5 hours/week. Must be taken concurrently or subsequent to 3B. Enrollment limited to 35. (AU)

1 unit (Staff)

3Y. Practicum in Young Child and Family Development—Practicum experience at Bing Nursery School for 3.5 hours/week. Must be taken concurrently or subsequent to 3B. (AU)

1 unit, Spr (A. Fernald, Hartiman)


5 units, Win (Klein)


4 units, Spr (Katchadourian)

11. Sleep and Dreams—Multimedia lecture/survey format provides a background of current information and research on how sleep affects our daily life. Topics: physiology of non-REM and REM sleep, daytime sleepiness and performance, circadian rhythms, dreaming (i.e., content, psychophysiological correlates, lucidity, etc.), sleep disorders (insomnia, narcolepsy, sleep apnea, sleepwalking), jet lag, sleeping pills, sleep and mental illness, sleep deprivation, developmental and phylogenetic aspects, sleep and memory, etc.

3 units, Win (Dement)

12. The Nature of Health—The concept of health from a sociologic perspective. Ways to define and measure health, and how social factors
13. The Emergence of Modern Medicine—(Enroll in History 13.)
5 units, Win (Findlen)

16. Introduction to Anthropological Genetics—(Enroll in Anthropological Sciences 8.)
5 units, Win (Mountain)

60. Colloquium on Population Studies—(Enroll in Biological Sciences 146.)
1 unit, Win (M. Feldman)

61. Introduction to the History and Philosophy of Science—(Enroll in Philosophy 60.)
5 units, Aut (Godfrey-Smith)

SCHOOL OF HUMANITIES AND SCIENCES

STANFORD INTRODUCTORY SEMINARS

90Q. Stanford Introductory Seminar: Contemporary Issues in Human Experimentation—Preference to sophomores. Issues in using humans for experimentation in medical research. The principles of protection of subjects, process of obtaining informed consent, organization of protocols, evaluation of experimental design, and scientific merit. Ethical/legal issues involving human subjects in terms of confidentiality, recruitment, and conflict of interest. Legislation addressing inadequate numbers of women and minorities in research projects. Focus is on research with the cognitively impaired, prisoners, and barriers to obtaining informed consent in issues of age, language, and factors that may affect the ability to give truly informed consent.
3 units, Aut (Constantinou)

91Q. Stanford Introductory Seminar: Studies of Animal Behavior—Preference to sophomores. Animal behavior offers insights about evolutionary adaptations. The origins of the study of animal behavior and its development to the present. Discussion of original research papers. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.
3 units, Win (R. Fernald)

100Q. Stanford Introductory Seminar: Critical Insights in Sports Medicine—Preference to sophomores. Issues within sports medicine. Topics are decided at the beginning of the quarter, based on consensus: sports injuries, treatment, and return to play guidelines; exercise testing of aerobic capacity (conducted in the laboratory); ethical considerations in sports (the interface between winning, pressure to return, and health); the body image, media and societal pressures; career opportunities; observation of orthopedic surgery; ergogenic aids and sports supplements; exercise and its relationship to health and wellness at all ages. Guests speakers include physicians, sports scientists, athletes, and coaches. Physiology lab assignment.
3 units, Win (Matheson)

ADVANCED

Open to non-majors with the proper prerequisites. Human Biology majors have preference when enrollment is restricted. All classes listed here fulfill the Human Biology upper-division requirement, including those that say "enroll in" another department.

102B. Children, Youth, and the Law—Analysis of the legal "rights" of children and adolescents in America and how those rights are defined, protected, and enforced through the legal process within the context of the developmental needs of children and youth and competing societal interests. Topics: the origins and definitions of children's rights; adoption; custody; the juvenile justice system (abused, neglected, and dependent children, status offenders such as runaways and truants and minors accused of crimes); education; health care; protection from harm and child welfare; due process; and privacy, freedom of expression, and exercise of First Amendment rights. Interactive, using hypotheticals for discussion and analysis. Companion to 102A, and alternates every other year; students may take one, or both.
4 units, Win (Abrams)

103. Women, Fertility, and Work: The Biology/Culture Debate about Gender—Seminar on women's efforts to bear and rear young children while contributing to familial and community production. How women and men share and balance these aspects of social reproduction in diverse societies. Theoretical and practical approaches to the connection between biology and culture are tested, emphasizing interactional effects. The limits of theories of the cultural construction of femaleness, connection between gender and political economy, and how these culture's differently envision individual and collective responsibilities in women's work and childcare.
5 units (Gates) not given 1999-2000

104. Aging: From Biology to Social Policy—(Enroll in Anthropological Sciences 171.)
5 units, Spr (Barnett)

107. Astrobiology and Space Exploration—Evolution is cast against space and time, focusing on the emergence of life, intelligence, and civilization on Earth and, possibly, elsewhere. The phenomenon of human space exploration and the biological, psychological, sociological, and ultimately, philosophical issues that emerge. Integrates information from astrophysics, biochemistry, chemistry, evolutionary biology, geology, paleontology, psychology, sociology, and philosophy. Taught by scientists from NASA Ames Research Center. Enrollment limited to 30. Prerequisites: one year college-level mathematics, physics, chemistry, biology, or psychology.
3 units, Spr (Cohen)

108. Advanced Seminar on Bilingualism and Second Language Acquisition—Theoretical issues and research pertaining to bilingual acquisition of the two languages and second-language acquisition in children and adults. Urgent practical issues relating to the growing number of children in the U.S. educated in their second language. Emphasis is on childhood bilingualism and on socio-cultural factors relating to language acquisition. The controversies surrounding bilingualism and second language acquisition. Informed opinions concerning the current debate on bilingual education in the U.S.
3 units, Spr (Wakabayashi)

109. Human Behavioral Biology—(Enroll in Biological Sciences 151, 250.)
6 units, Spr (Sapolsky)

110. Vertebrate Biology—The evolution, form, function, and behavior of the vertebrates, from primitive fishes to birds and mammals, including humans. Prerequisite: Biological Sciences or Human Biology core.
3-4 units (Porzig) not given 1999-2000

110L. Vertebrate Biology Lab—Comparative anatomy structure of vertebrates, with emphasis on osteology. Representatives of each of seven vertebrate classes are available in lab. Review labs and field trip Prerequisites: current or previous enrollment in 110.
3 units (Porzig) not given 1999-2000

111. Human Physiology—(Enroll in Biological Sciences 112/212.)
4 units, Win (Heller, Harris) alternate years, not given 2000-01

112. Hormones and Behavior—(Enroll in Anthropological Science 132.)
5 units, Aut (Maggiozcalda)
113. The Biology and Evolution of Language—(Enroll in Anthropological Sciences 5.)
4-5 units, Aut (Fox)

115A. Humans and Viruses—(Same as Microbiology and Immunology 115A.) Overview of human virology. Topics illustrate how viruses interact with the human body, and the social sciences, focusing on emerging infections, viral classification, transmission and prevention, vaccination and treatment, eradication of disease, viral pathogenesis, mechanisms of virally-induced cancer, and viral evolution. Topics: molecular biology of genetic shift and drift in influenza virus, cellular tropism of HIV, developmental biology of virally-induced birth defects, clinical aspects of infantile diarrhea, social aspects of the common cold, policy issues of blood antibody tests, factors in pathogenesis and transmission of prions. Prerequisites: Human Biology core or consent of instructor. 4 or 6 units, Win (Siegel)

115B. Seminar: The Vaccine Revolution—(Same as Microbiology and Immunology 115B.) Advanced seminar. The human aspects of viral disease, focusing on recent discoveries, especially in the area of vaccine development and emerging infections. Journal club format: students select articles from primary scientific literature, write formal summaries, and synthesize it into a literature review on a specific topic. Emphasis is on the development of critical reading, analysis, experimental design, and interpretation of data. Students give four oral presentations and lead discussions based on their scientific journal reading. Enrollment limited to 10. Prerequisite: 115A. 5 units, Spr (Siegel)

116. Eye and Implications of Vision—The basic physiology of vision and how visual capabilities influence human endeavors. Topics: mechanisms of vision, vision in animals, illusions, visual physiology of art, the eye in history and literature, vision in sports. Lectures/seminar format with student participation, oral presentations, and a written thesis. Prerequisites: interest in mechanisms of vision and the humanities. 3 units (Marmor) not given 1999-2000

117. Policy and Research in Science Education—Controversial topics in science education (e.g., teaching of evolution, national standards and tests), gender bias, text selection, recruiting and retaining qualified teachers, goals of science teaching for different populations). The substance and style of formulating policy for science education in the U.S., now and in the recent past. Issues for local, state, and federal authorities; appropriate government roles in the selection of content, improvement of teaching, and research. Primary, secondary, and undergraduate programs; and the use of museums and media in programs to improve science education. International comparisons where appropriate. Enrollment limited to 20. 4 units, Spr (Atkin)

118. Human Diversity: A Linguistic Perspective—The diversity and distribution of human language and its implications for the origin and evolution of the human species. The origin of existing languages and the people who speak them. Where did the languages that we currently see in the world come from and how can this diversity be used to study human history? Evidence from related fields (archaeology and human genet-ics). Topics: the origin of the Indo-European languages, the peopling of the Americas, and the evidence that all human languages share a common origin. GER:4s (DR:2)
3 units, Spr (Ruhlen)

119. Conservation Biology—Introduction to the science of preserving biological diversity, its principles, policy, and application. Topics: the biology of small populations, extinction, minimum viable population analysis, habitat fragmentation, reserve design and management, the Endangered Species Act, and conflict mediation. Case studies and local field trips illustrate topics. Prerequisite: 2A, Biological Sciences 33 or 51, or consent of instructor. 3-4 units, Win (Boggs, Launer)

120. Human Nutrition—Nutrient flow and interactions within the human body. Emphasis is on the pathways by which nutrients are processed, stored, remodeled, and oxidized to provide energy and functional components. How diet and physical activity affect human health and disease at the physiological/biochemical levels. Do athletes have greater nutritional needs? Is fat a toxic substance or an essential nutrient? Do high insulin levels cause obesity? What happens if you don’t meet the recommended dietary allowances? Is leptin the anti-obesity “drug”? What are humans designed to eat? Prerequisite: Human Biology core or consent of instructor. GER:2a (DR:5)
4 units, Aut (Braun)

121. Ethical Issues in the Neurosciences—Multidisciplinary approach to the ethical questions raised by recent advances in the neurosciences. How these advances relate to medical therapy, social policy, and broader considerations of human nature (consciousness, free will, personal identity, and moral responsibility). Discussion format with leading research scientists, legal experts, philosophers, and theologians. Topics: neurogenetics, fetal brain tissue therapy, medicalization of criminal behavior, cosmetic psychopharmacology, and the neurobiological basis of love, sexuality, and gender. Enrollment limited to 15. Prerequisites: Human Biology core, Biological Sciences core, or consent of the instructor. 4-5 units, Spr (Hurlbut)

122. International Health Policy: Comparative National Health Care Systems—(Enroll in International Relations 129.)
3 units, Win (Lee)

124. Neural Basis of Sleep and Circadian Rhythms—(Enroll in Biological Sciences 249.)
4 units (Heller, Edgar) alternate years, given 2000-01

125. Environmental Policy and Law—The role of government and citizens in formulating, implementing, and enforcing environmental policy. Using case studies, background readings, law cases, and statutes, seminar investigates the formal and informal political mechanisms involved in controlling pollution and protecting the environment. Topics: the respective roles of courts, legislatures, executive agencies, and nongovernmental organizations in shaping U.S. environmental policy. The pros and cons of regulatory and economic approaches to pollution control; environmental politics and ethics; air and water pollution; environmental justice; toxic substances and risk assessment; economics and trade; hazardous wastes. 5 units, Spr (Rosencranz)

126. Adolescent Development—Adolescence from sociological, psychological, and psychiatric perspectives. Topics: physical, physiological, and cognitive development; identity; peer group; parent/child relations; impact of school; vocational development; and problem outcomes (eating disorders, violence, and teen pregnancy). Prerequisite: 3B or Psychology 1. or consent of instructor. 4 units, Win (S. Feldman)

127. Research Seminar on Adolescence—For juniors preparing to undertake Honors research in their senior year. Small groups jointly design, conduct, analyze, and write up a piece of original research. Teaches research-related skills including how to design a survey, enter data on a computer, and data analysis. Enrollment limited to 12. Pre- or corequisite: 126, Psychology 10 or equivalent, or consent of instructor. 4 units, Win (S. Feldman)

128. The Human Gamete and Pre-Embryo—Writing based seminar. The cultural, biological, medical, and social aspects of human gameto-genesis and the earliest stages of human development. Topics: assisted reproductive technologies (including in vitro fertilization), historical and cultural perspectives on male and female gametes, pre-implantation genetic testing and the critical analysis of current biological and medical
research on gametogenesis. Enrollment limited to 12. Prerequisites: Human Biology core or consent of instructor.

3 units, Aut (Porzig)

129A. Controversies in Nutrition—Seminar on human nutrition. Exposure to statistics and experimental design. Oral presentations on subjects of students’ choice, emphasizing critical reading of original scientific research. Summary paper. Prerequisites: 120, consent of instructor.

3 units, Win (Butterfield)

129B. Controversies in Sports Nutrition—In-depth investigation of controversial issues in sports nutrition. Lectures, student presentations on controversial issues. Students evaluate original scientific literature and read material pertinent to each controversy to participate knowledgeably in the discussion. Prerequisites: 120 and 159, or consent of instructor.

3 units (Butterfield) not given 1999-2000

130. Adam 2000: Images of Human Life in the Age of Biomedical Technology—Interdisciplinary approach to the social, moral, and aesthetic values which guide the use of biomedical technology. How advances in biology are reshaping our relationship with nature, attitudes toward the body, and ideas about the meaning and purpose of human life. Topics: the use of medical technology to alter appearance and enhance performance, fetal tissue transplantation, biotherapy for criminal behavior, treatment of aging as a disease, and alteration of the body for space travel. Lecture/discussion format with guests from the scientific and religious communities. Limited enrollment. Prerequisites: Human Biology or Biological Sciences core, or consent of instructor.

4 units, Win (Hurlbut)

131. Natural Resources Policy—Focus is on federal public land and natural resources policy; mining, timber, and grazing law and policy; the legal aspects of forest, range, park, wilderness, wetlands, and wildlife management; recreation and preservation; and related issues. The role of the courts, administrative discretion, the Endangered Species Act, and the tension between protecting resources and respecting property rights. Students research one aspect of law and policy governing the management of natural resources.

5 units, Win (Rosencrantz)

132. Seminar on Problem Behavior in Adolescence—Lecture/seminar. Aspects of adolescent problem behavior, including risk, and protective factors, treatments, and intervention programs designed to ameliorate or prevent these problems. Externalizing behaviors (violence, delinquency, drug abuse, risk taking), internalizing problems (depression, eating disorders, suicide), and sexuality-related problems (teen pregnancy, date violence, STDs/HIV). Enrollment limited to 20. Prerequisite: 126 or consent of instructor.

3 units, Spr (S. Feldman)

133. Nutrition through the Lifespan—Changes in physiology throughout the lifespan and their influence on the nutritional needs of the individual. Topics: pregnancy, lactation, infancy, childhood, adolescence, young and mature adulthood, and old age. The importance of nutrition and exercise in maintenance of good health. Nutrition-related areas of concern, such as high risk pregnancy, disordered eating, and nutritional aspects of heart disease, diabetes, hypertension, and cancer. Case studies illustrate the major points.

4 units (Butterfield) not given 1999-2000

133A. Sports Nutrition—The nutrient needs of physically active individuals for optimum performance and maintenance of health. Energy needs and the consequences of not meeting them; specific carbohydrate, protein, and fat needs; key vitamin and mineral requirements for optimal performance and health maintenance; possible sex differences in nutrient handling and needs; ergogenic aids and fad diets for athletes. Focus is on optimizing performance and long-term health through wise food choices.

4 units, Spr (Butterfield)

134. Ecological Anthropology—(Same as Anthropological Sciences 164.) The relationships between human social systems and their environments. How do environments influence the nature and form of human social systems found within them? How do human social systems influence the properties and dynamics of their environments? How can we best conceptualize and understand human social systems, environments, and the links between them? Case studies of human societies in the Arctic, Amazon, E. Africa, the Alps, and Papua New Guinea.

5 units, Spr (Durham, Chernley)

135. Global Environmental Policy and Law—(Enroll in International Relations 135.)

5 units (Rosencranz)


4 units, Win (Wilson)

138. Theories in Demography—(Enroll in Anthropological Sciences 158.)

4 units, Win (Wilson)

139. Primate Societies—(Enroll in Anthropological Sciences 131B; GER.2A)

5 units, Spr (Maggioncalda)

140. Biopsychosocial Aspects of Sports—Seminar on the world of sport and athletic competition; multi-disciplinary approach. Topics: athletic injury, retirement, competitive and performance stress, coach-athlete dynamics, life as an elite athlete, child development and sport drug abuse, doping control, eating disorders, post-traumatic stress disorder, and boundary violation, and the cognitive-behavioral aspects of performance enhancement and peak experience. Writing and research intensive. Understanding the elements of original design is expected as a paper/project, with elements of original field research. Limited enrollment. Prerequisite: Psychology 10 or equivalent.

4 units (Shuer) not given 1999-2000

141. Race, Poverty, and the Environment—Seminar on environmental conditions and disproportionate environmental impacts in poor and minority communities in the U.S., correlating race, ethnicity, and income to exposure to environmental and public health hazards. Case studies of migrant workers and Native American subsistence fishers.

5 units, Spr (Rosencranz)

142A. The Impact of AIDS—Focuses on HIV, particularly disease pathology and the spread of the virus, providing a solid foundation for understanding the impact of HIV on biology, medicine, and society. Biology, clinical features, cultural aspects, and intervention/prevention. Provides tools for thinking of ways to stop the transmission of HIV emphasizing education and health policy. The cultural aspects of HIV
142. Alternative Spring Break: AIDS and HIV in San Francisco
1 unit, Win (Siegel)

144. Guilt: Multidisciplinary Perspectives—The experience of guilt and shame from the perspective of the individual. The development of the sense of guilt in childhood; behaviors commonly associated with guilt; its role in interpersonal relationships; communal interactions; its psychopathology, and cross-cultural and gender differences. Conceptions of guilt and shame from the perspectives of major religious and philosophical traditions, and recent interpretations from evolutionary psychology. Prerequisite: majors in Human Biology, Religious Studies; joint majors in Religious Studies and Philosophy; or consent of instructor.
4 units, Win (Katchadourian)

5 units, Aut (Reich)

146. Perspectives on Sustainable Development in Latin America—(Enroll in Latin American Studies 195.)
5 units, Win (Rosset)

147. The Road to Buenos Aires: Controlling Climate Change in the 21st Century—The science, economics, and environmental diplomacy of global climate change. Topics: the science of climate change, climate change and global environmental law; global economic approaches to carbon abatement, taxes and tradable permits; joint implementation, consensus and division in the European Union; gaining the support of China, other developing countries, and U.S. corporations; alternative energy and energy efficiencies for less carbon-intensive electric power and transport. Enrollment limited to 12 seniors.
3 units (Schneider, Rosencranz) given 2000-01

148. Environmental Policy—Important environmental issues of today and the future, how to deal with them politically, and how to resolve conflicts between environmental concerns and other social needs. Focuses on the U.S.; international perspective when appropriate. Definition and description of the environment and environmental impact, the history of human impact on the environment, causes of increased human impact, the history of environmental protection, decision making and resolution of issues, future environmental issues. Enrollment limited to 15 Human Biology seniors. Prerequisites: Human Biology core, or consent of instructor.
3 units (A. Ehrlich) not given 1999-2000

150. Gender-Specific Perspectives on Birth Control—In most societies, human fertility control responsibility rests predominantly with women. Is this desirable and realistic, or should changes be instituted? Groups of four to five students of diverse backgrounds and different professional interests (medicine, law, economics, religion, sociology, political science) develop a series of position papers dealing with new birth control procedures suitable for populations of different cultural and socioeconomic backgrounds with gender-specific considerations. Part I: lectures, selecting population groups and multi-disciplinary task forces, and individual discussions with each task force. Part II: library and field work, writing task force reports, and oral presentations. Limited to 20 seniors; juniors considered in exceptional circumstances. GER:4c (DR:†)
6 units (Djerassi) not given 1999-2000

151. The Rise of Scientific Medicine—(Enroll in History 33A.)
5 units, Spr (Lenoir)

152. Environmental Policies and Institutions in Developing Countries—Examines the tension between environmental protection and economic growth in eight developing countries: Egypt, Russia (Siberia), China, India, Indonesia, Nigeria, Mexico, and Ecuador. Each student is responsible for an environmental profile of a chosen developing country. Prerequisite: 135 or consent of instructor.
5 units (Rosencranz) given 2000-01

154. Biosocial Aspects of Cancer—Recent advances in the biology, diagnosis, and treatment of cancer. The social and economic ramifications of being diagnosed and treated for cancer. What are the present options for cancer treatment and what new technologies may change these options in the future? New diagnostic techniques for the early detection of cancer. The use of predictive assays to determine the most effective treatment modality—chemotherapy, radiotherapy, surgery, hyperthermia, immunotherapy, etc.
4 units, Spr (Giacca)

155. Exercise Physiology—Overview of human exercise physiology, with an emphasis on metabolism and cardiopulmonary function during exercise. Topics: energetics; calorimetry; carbohydrate, lipid, and protein metabolism; the endocrine system; determinants of fuel utilization, metabolic training adaptations; ventilatory and cardiac response to exercise; skeletal muscle structure and the integration of movement; training principles; the impact of the environment, gender, and aging on performance; measurement of exercise capacity; and enhancement of human performance. Prerequisite: Human Biology core or consent of instructor.
4 units, Aut (Friedlander)

156. Human Development—The biological, medical, and social aspects of normal and abnormal human development. Topics: in vitro fertilization and embryo transfer; gene and cell therapy; gametogenesis; pattern formation in the nervous system and limb development; gene activity in early development; cell recognition at fertilization; swimming and grand multiple pregnancies; prematurity, in utero effects of teratogens; sex determination and differentiation; growth control; gigantism and dwarfism; neural tube defects; cardiac morphogenesis; progress in the developmental biology of humans. Limited enrollment. Prerequisites: Human Biology or Biological Sciences core, or consent of instructor.
3-4 units, Spr (Porszig)

159. Sports Medicine—(Same as Medicine 260.) For medical students and upper-division Human Biology undergraduates. Overview of sports medicine and sports science topics. The themes of sports, exercise, health, and medicine are integrated throughout the entire human performance continuum, from the use of exercise as a form of therapy to the injuries and illnesses that result from sports and exercise. Content in the basic and applied sciences is from physiology, nutrition, psychology, and biomechanics. Medical topics in the problems exacerbated or caused by exercise and sport; maximizing performance in elite athletes; and population-based issues such as exercise and its relationship to health, women’s issues, drugs in sport, and exercise and aging. Prerequisite: medical school enrollment or upper-division Human Biology standing or consent of instructor.
4 units (Matheson) not given 1999-2000

160. Health Care in America—Overview of the health care system in the U.S., examining several key organizations and institutions that shape health policy and health care delivery. By understanding the forces that affect health and health care, students assess more critically options for health care reform.
3 units, Aut (Barr)

160A. Seminar in American Health Policy—Key issues surrounding health care reform, and the policy-making process as it pertains to health care. Student presentations of assigned readings are followed by discussion. Prerequisites: 160 and consent of instructor.
3 units, Spr (Barr, Lee)
160B. Senior Honors Colloquium in Health Policy—Open to seniors admitted to the honors program, by consent of instructor. Assists students doing honors research pertaining to health policy. Weekly discussion centers around students' presentations of honors projects, the policy issues involved, and the structure of the proposed research. Prerequisite: consent of instructor.
1 unit, Aut, Win, Spr (Barr, Lee)

160W. Seminar in Federal Health and Environment Programs/Agencies—Priority enrollment for students going to Stanford in Washington, Winter Quarter. Introduces health policy making in Washington, D.C., with an emphasis on understanding the agencies within the federal government responsible for developing and carrying out health policy. Weekly lectures/discussions. Enrollment limited to 25.
3 units, Aut (Lee)

161. Darwin, Evolution, and Galapagos—(Same as Anthropological Sciences 137.) Seminar on Darwinian theory as applied to the evolution of flora and fauna on the Galapagos Islands. Darwin's observations in Galapagos, and their role in the formulation of his theory of evolution; recent research in Galapagos and its implications for our understanding of evolution today. The impact of human activity in Galapagos and emerging conservation issues. Lectures, discussions, and optional field trip to Galapagos (at extra expense, limited capacity). Enrollment limited to 40.
5 units, Win (Durham)

162. Primate Evolution—(Enroll in Anthropological Sciences 131A.)
5 units, Win (Maggioncalda)

163. South Asia: Environment, Development, and Security—(Enroll in International Relations 137.)
5 units, Aut (Rosenzweig)

164. Ecology and Equity—(Enroll in Anthropological Sciences 168.)
5 units, Win (Guha)

165. Human Ecology of the Amazon—(Enroll in Anthropological Sciences 165.)
5 units, Win (Lu)

166. Methods in Primatology—(Enroll in Anthropological Sciences 131C.)
3-5 units (Maggioncalda) not given 1999-2000

167. International Health—Introduction to concepts of health and wellness and the major descriptors and determinants of health status, international organizations and control programs, specific disease-related problems within particular population groups from an epidemiologic viewpoint, examples of health care delivery methods, analysis of efforts to improve health through examination of specific programs and projects currently underway and previously implemented. Emphasis is on the cultural, economic, and political context in which all questions/issues in international health exist. Prerequisites: Human Biology core or consent of instructor.
3 units (Staff)

168. Medical Anthropology—(Enroll in Anthropological Sciences 170.)
5 units, Aut (Barnett)

170. Social Policy for Sustainable Resource Use—(Enroll in Anthropological Sciences 167.)
5 units, Win (Irvine)

171. Undergraduate Colloquium: Childhood in Modern American History—(Enroll in History 273A.)
5 units, Win (Horn)

172. Indigenous Forest Management
5 units (Irvine) not given 1999-2000

173. Medical Ethics—(Enroll in Philosophy 78.)
4 units, Aut (Jaworska)

175. Virtual Vertebrae—Computer simulations of the biomechanics of aquatic locomotion in vertebrates such as fishes and cetaceans. Development and testing of educational software on the anatomy, physiology, and biomechanics of swimming vertebrates. Possible organisms: lungfish, eels, lamprey, tuna, sharks, rays, turtles, penguins, dolphins. Estimation and resolution of the biomechanical forces affecting lift, thrust, and drag. Computer lab-based weekly meetings. Enrollment limited to 10. Prerequisites: 110, consent of instructor.
3 units (Porzig)

179. Advanced Neurosciences Laboratory—(Enroll in Biological Sciences 209.)
4 units, Win (Heller, Grahn)

180. Beginning Osteology—(Enroll in Anthropological Sciences 133A.)
Introduction to the study of the human skeletal system. Biology of bone growth and development, structure and function. Identification of the different bones in the human skeletal system. Methods for assessing age, sex, and the biological affinity of bones from archaeological and palaeontological contexts. GER:2a (DR:5)
5 units, Aut (Maggioncalda)

181. Evolutionary Anthropology—Upper-division/graduate seminar focused on the concept of evolution as used in anthropology. Evolutionary theory in biological anthropology, as applied to hominid evolution and human population genetics. Evolutionary approaches to culture and social organization, including social evolution, sociobiology, and evolutionary culture theory. Enrollment limited to 20.
5 units (Durham) not given 1999-2000

182. Urban Environmental Policy—(Enroll in Urban Studies 182.)
4 units, Win (Hall, Kibel)

183. Hunter-Gatherers in Archaeological Perspective—(Enroll in Anthropological Sciences 141.)
5 units (Rick) not given 1999-2000

184. The Darwinian Revolution—(Enroll in History 133.)
4 units (Lenoir) not given 1999-2000

186. Evolutionary Medicine—(Enroll in Anthropological Sciences 172.)
5 units, Spr (Cronin)

189. Philosophy of Biology—(Enroll in Philosophy 167A.)
4 units, Win (Godfrey-Smith)

HONORS, INTERNSHIP, AND SPECIAL PROJECTS

190. Honors Seminar for Sophomores—Introduction to the process of doing honors research and writing the final thesis. Guest speakers discuss various aspects of honors research. Students attend at least one of the Honors Symposium presentations in May. Prerequisite: consent of instructor. (AU)
1 unit, Spr (R. Fernald)

191. Honors Seminar for Juniors—Open to juniors considering honors work in Human Biology. Weekly survey of faculty research areas. Writing honors proposals, research grant applications, and Human Subjects Committee approval. Speakers include honors students, faculty, and statistical and writing consultants. (AU)
1 unit, Win (Staff)
192. Honors Seminar for Seniors—Modifying honors proposals and honors theses. Speakers include honors students, faculty, and statistical and writing consultants. Prerequisite: admission to the honors program; may be taken by juniors or seniors advanced in their honors work. (AU) 1 unit, Aut (Porzig, Feldman)

193. Research in Human Biology—Independent research conducted under faculty supervision, taken junior or senior year, normally (but not necessarily) in pursuit of an honors project. May be taken more than once quarter for credit.
1-5 units

194. Honors—Completion of the honors project. First component: the honors thesis, a final paper providing evidence of rigorous research, fully referenced, and written in an accepted scientific style. Second component: participation in the honors symposium, including a 10-minute oral presentation followed by a brief question and answer session. Prerequisites: 193, a draft of the honors thesis, and acceptance into the honors program.
1-10 units (Staff)

197. Internship in Human Biology—Limited to and required of Human Biology majors. Combines course work with a supervised field, community, or lab experience of student’s own choosing. Must be arranged in advance and initiated at least three quarters prior to graduation.
4 units (Staff)

197S. Service-Learning Internship in Community Health—(Fulfills the Human Biology internship requirement.) Provides 100 hours of work in service capacity with a non-profit, community health agency. Students are required to go through an orientation to their community and participate in organized reflection activities throughout their experience. Prerequisite: consent of instructor and admittance into the Human Biology Service-Learning Program.
4 units (Barr)

199. Directed Reading/Special Projects—Independent study open to Human Biology majors and non-majors. Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the academic council. Non-majors and/or students who have not declared must obtain a sponsor only from the Human Biology associated faculty. Students must complete application in student services office.
1-4 units (Staff)

200. Teaching of Human Biology—For upper-division undergraduate and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course.
1-5 units (Staff)

OVERSEAS STUDIES

Descriptions of these courses are in the “Overseas Studies” section of this bulletin or at the Overseas Studies office, 126 Sweet Hall. Students overseas are encouraged to participate in a wide range of internships and independent research as well.

166H. Man-Environment Interactions: Case Studies from Central Chile—Santiago.
5 units, Aut (Hajek)

125X. Environmental Policy in Europe—(Same as Overseas Studies 122P.) Berlin.
4-5 units, Spr (Jakobeit)

4 units, Win (Giraud)

4 units, Win (Mille)

INTERDISCIPLINARY STUDIES IN HUMANITIES

Emeritus: (Professors) Kurt Mueller-Vollmer, Lawrence V. Ryan
Acting Chair: Paul Robinson
Teaching and Program Coordinator: Helen Brooks

Steering Committee: (Chair) Paul Robinson (History); Helen Brooks (English, Interdisciplinary Studies in Humanities), Gregory Freidin (Slavic Languages and Literatures), Rusch Rehm (Drama), Arthur Strum (German Studies), Zack (Graduate Program in Humanities Student Representative)

Interdisciplinary Studies in Humanities includes:
1. Honors Program in Humanities
2. Interdisciplinary Major in Humanities
a) Option I: Interdisciplinary Major
b) Option II: Interdisciplinary Major for students preparing for careers in the health sciences (premedical, predental, etc.)
3. Graduate Program in Humanities
a) Master of Arts
b) Joint Ph.D.
4. American Studies (see the “American Studies” section of this bulletin.)
5. Medieval Studies (see the “Medieval Studies” section of this bulletin.)

UNDERGRADUATE PROGRAMS

See also the “Honors Program” below.

BACHELOR OF ARTS

THE MAJOR IN INTERDISCIPLINARY STUDIES IN THE HUMANITIES

This undergraduate major is designed for students with a strong commitment to interdisciplinary study in the various humanities. A student may choose to pursue the A.B. degree in Humanities through one of two concentration options: (I) the standard student designed thematic concentration, or (II) the concentration designed for students who also plan to complete the established “premedical” curriculum for careers in the health sciences.

Unlike the empirical disciplines in natural and social sciences, the humanities focus on the formation of ideas through language. The goal of the program is to acquaint students with the differences of disciplinary methods as well as their intersections, where meaning, history and communication are produced. Students interested in Interdisciplinary Studies in Humanities have the opportunity to arrange their courses by thematic subject matter, by genre, or by nationality. At the same time, advanced interdisciplinary seminars provide a rigorous context in which to develop the skills for in-depth study about how culture, history, art, and philosophy intersect.

All majors submit a study plan, accompanied by a “statement of purpose” which outlines the rationale for a concentration. Students who wish major in Humanities should receive approval of their concentrations before the end of the junior year.

OPTION I

Students may devise concentrations in modern thought and literature that incorporate modern literature, cultural history, and critical theory, or in other period specific areas such as early modern studies or medieval studies. Students may also devise concentrations such as cultural, film or performance studies; politics and literature; or popular culture.

Generally the program must include at least twelve courses over and above the requirements of the honors program for a minimum of 60 units. Each of the twelve courses is designated to fall within one of the following three categories: literary/cultural study, historical study, or philosophical study.
1. Six courses in one of the three areas above (30 units)
2. Three courses in each of the other two areas above (30 units)
3. The core colloquium (2 units)
4. Three Humanities Core Seminars (15 units)
5. An essay proposal (2 units)
6. A senior honors essay (10 units)
7. Proficiency in a foreign language

If additional courses are needed to make up the 60 unit minimum, the student may take those courses in any of the three categories. Each program of study must be signed by a Stanford faculty member who has agreed to act as the student’s academic advisor; the proposed program must then be approved by the chair. Changes in the study plan must be approved by the student’s advisor and must be kept on file in the program office.

Competence in reading a foreign language is required of all Humanities majors who choose to design a thematic concentration, and must be certified by appropriate course work or equivalent. Competence is generally considered to be acquired after the completion of five quarters of college-level study, but may also be certified by other means. Consult the student handbook for such recommendations.

The A.B. degree conferred in Humanities. Students choose a concentration title that reflects the focus of their study and this is noted on the transcript after degree conferred.

OPTION II

The Interdisciplinary Major in Humanities offers an option for students who are preparing to attend medical school, but who wish to focus their studies in the humanities. This concentration gives students a coherent way to organize interdisciplinary interests by theme, nationality, or period. In addition, students choosing this option take all the courses usually required by medical schools (two years organic and inorganic chemistry with labs, one year physics, one year biology with labs, one or two courses to provide proficiency in quantitative skills as determined by a premed adviser), as well as course work in various humanities disciplines along with the Humanities Honors Program (69 units) distributed as follows:

1. Four courses in the student’s chosen area of concentration (national culture, philosophy, historical period, film, gender, genre, theme). Generally these four courses address different aspects of literature, history, and philosophy (20 units)
2. Three courses in medical ethics, history or philosophy of science, ethics, science and literature or science and the arts (15 units)
3. One course in the arts (5 units)
4. The Core Colloquium (2 units)
5. Three Humanities Core Seminars (15 units)
6. An essay proposal (2 units)
7. A senior honors essay (10 units)

When selecting courses, a student choosing this option is expected to define the focus in a brief "statement of purpose" approved by the chair.

For either option, the A.B. degree conferred in Humanities. Students choose a concentration title that reflects the focus of their study and this is noted on the transcript after degree conferred.

HONORS PROGRAM

The Honors Program in Humanities aims to heighten a sense of the relations among various humanistic disciplines, and to study issues in intellectual and cultural history through aesthetic, literary, historical, social, and ethical values.

ADMISSION

As an extradepartmental honors program, the Humanities Honors Program is open to any qualified undergraduate at Stanford, regardless of major. Interested freshmen and sophomores may obtain information from the program office. Students should register for the program at the earliest opportunity, preferably Spring Quarter of the freshman year.

Students must meet the following entrance requirements before being admitted to the program:

1. Completion of all at least two quarters of the Area One requirement, except in the case of transfer students, who will be granted exception.
2. A grade point average (GPA) of at least 3.3 (B+) in all course work in the humanities. Such course work includes any Area One sequence, and all Writing and Critical Thinking sections; all courses in the departments of Art and Art History, Drama, and Music (except studio or performance courses); all courses in the departments of Asian, Slavic, French and Italian, German Studies, Comparative Literature, Philosophy, and Religious Studies; and all courses in the programs in Feminist Studies and Modern Thought and Literature.

REQUIREMENTS

1. Completion of 100, Core Colloquium: Humanities, 2 units, preferably in the sophomore year.
2. Two different seminars in the series 190-198: 10 units, sophomore or junior year. Both seminars must be completed by the end of the tenth quarter of undergraduate study in order for students to remain members in good standing.
3. A third seminar, either chosen from the 190-198 series, or from the list of affiliated seminars available from the program office.
4. Unless students have strong intellectual reasons for doing otherwise, they must fulfill their World Cultures (GER Area 4a) and American Cultures (GER Area 4b) requirements from courses offered in humanities disciplines.
5. In order to develop the requisite knowledge and methodological background to write a Humanities honors essay, students must take, during their sophomore and junior years, the required Humanities honors courses and additional humanities courses in disciplines of their interest.
6. Enrollment in 200A, one unit each, Autumn and Winter Quarters of the junior year.
7. An honors essay on a topic approved by the Steering Committee (usually 5 units Autumn Quarter and 5 units Winter Quarter, senior year).
8. A minimum GPA of 3.3 (B+) in all courses taken for the Honors Program, as well as an overall minimum GPA of 3.0 (B) in all coursework in order to remain in the program.

GRADUATE PROGRAMS

University requirements for the A.M. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

MASTER OF ARTS

Application is made through the Interdisciplinary Studies in Humanities office. (Application forms are available from Graduate Admission Registrar's Office, Old Union, Stanford University, Stanford CA 94305-3005, or on the web.) The A.M. program in Humanities is ideally completed as a half-time, two-year program, but under some circumstances it may be completed in one year as a full-time program. The department does not offer financial aid for the master's program. Qualified undergraduates at Stanford may petition to complete the A.M. program coterminally with their bachelor's degrees. The deadline for applying to the A.M. program is March 1 for both outside and coterminal applications.

REQUIREMENTS

1. Reading knowledge of at least one foreign language, to be completed prior to admission to the A.M. program.
2. Complete the five Interdisciplinary Studies in Humanities seminars (311-315).
3. Complete four graduate-level courses in an approved "established discipline," to be determined in consultation with the chair. One of these must be a graduate-level research seminar for which a research paper is required (this paper must be filed in the department). Under "Statement of Purpose" on the application form, the candidate must...
The Graduate Program in Humanities (GPH) provides graduate students in different disciplines an opportunity to broaden their knowledge of intellectual and cultural history by focusing on texts and ideas which have been central to all humanistic disciplines from classical Greece to the present. The program’s seminars usually focus on specific topics or issues in the context of historical, literary, philosophical, and other disciplinary and theoretical orientations. The program provides a unique opportunity to study highly influential texts with a view to their relevance to the student’s own disciplinary field.

Because the GPH supplements, and does not substitute for, departmental specializations, its members must be students earning the Ph.D. in an academic department at Stanford. Students may register for the program at any time, usually during the first quarter of graduate study. Members of the program are given first preference in registration for all of its offerings. Normally, the program involves taking 311-314, followed by 315, the core seminar on interdisciplinary study in the humanities. The course of study culminates in the nature of disciplinary and interdisciplinary studies.

Although students in the GPH generally complete the program course work in their first two years of graduate study, requirements of some participating departments may necessitate completion of the GPH over three years. In some instances, one or more of the GPH seminars may fit within the requirements of the student’s home department.

The departments of Art and Art History, Classics, Drama, English, French and Italian, German Studies, History, Modern Thought and Literature, Music, Philosophy, Religious Studies, Slavic Languages and Literatures, and Spanish and Portuguese all participate in the GPH. Doctoral students from other departments may participate with permission of their home departments and approval of the Chair of Interdisciplinary Studies in Humanities.

REQUIREMENTS

1. Continue satisfactory work in the student’s major field, in accordance with department requirements.
2. Complete the four chronologically ordered seminars (311-314) followed by the core seminar on interdisciplinary study in the humanities (315). To qualify for candidacy, students should complete at least three seminars in the first two years of graduate residence. Exemption from, or permission to audit, a seminar may be secured by petition if the student can show coverage of the material at an advanced level.
3. Participate in the GPH student symposium at the end of the second year of GPH course work (298; registration for units is optional).
4. At least one quarter of teaching for Interdisciplinary Studies in Humanities, normally a teaching internship in the third or fourth year; other interdisciplinary teaching may be substituted for this requirement by petition to the chair (299; registration for units is optional).
5. Reading knowledge of at least one foreign language, ancient or modern, to be certified in the first two years of graduate work.
6. Passing the University oral examination according to the schedule prescribed by the major department with one GPH representative, designated by the chair, as a member of the examining committee.
7. Submission of a Ph.D. dissertation acceptable to a committee which includes one representative of the GPH, designated by the chair.

COURSES

See quarterly Time Schedule for changes in listings.

20A.B. The Humanities: Breaking Boundaries—(Enroll in Introduction to the Humanities 20A.B.)
20A. 5 units, Win (Brooks)
20B. 5 units, Spr (Rayner)

100. Core Colloquium: Humanities—Required of all students in the Humanities Honors Program, to be taken in the sophomore year. Inquiry into the nature of disciplinary and interdisciplinary studies. 2 units, Spr (Brooks, Robinson)

130. Latin American Philosophy—(Enroll in Philosophy 194V.)
4 units, Spr (Vargas)

191-198. Interdisciplinary Core Seminars in Humanities—Students in the Humanities Honors Program must complete two different seminars from different areas before the end of the tenth quarter of undergraduate study. Other students may enroll if space allows and with the instructor’s consent.

192G. Core Seminar: Philosophical Art—(Same as Philosophy 298.) Surveys some of the important ideas and practices of avant garde artists in the 20th century. Emphasis is on the various interpretations of the work of Duchamp. 5 units, Aut (Guttmann)

193N. Core Seminar: Ecology in Philosophy and Literature—The basic principles of ecological thinking, and different ways of conceptualizing the “natural” world. Discussion of western literary and philosophical texts, looking at the rhetorical, narrative, and/or analytic strategies that articulate the continuities and discontinuities between human and non-human beings. What is nature, and where do humans fit in the natural world? How do humans differ from other animals? Do these differences make us superior beings? Are there moral reasons for granting other living beings the right to live and flourish? What is "ecological wisdom," and how does it situate us in relation to "nature?" Focus is "ecological hermeneutics" ("green theory"). Critical approach with feminist criticism and colonial literary studies; the ways these and other poststructural theoretical models lend themselves to ecological readings of literature and culture. Readings: recent work on eco-feminism and deep ecology, Descartes, Thoreau, Darwin, Conrad, Heidegger, Tournier, and Edward Abbey. 5 units, Spr (Nightingale)

194B. Core Seminar: Text and Context—Focus is on the contextual conditions that bring texts into their social, religious, historical, artistic and political spheres and that impact on conceptions of “meaning.” Changing views of the relationships between texts and audiences/readers, and the nature of humanistic discourse (and representation). Some film versions of the texts read: Shakespeare, Joyce, Woolf, Stein, Beckett, Picasso, selected poetry. 5 units, Aut (Brooks)

194W. Core Seminar: The Protagonist—The function and significance of a central individual within a literary work. How does the protagonist help shape the formal, thematic, and ideological aspects of a text? Does a story need to revolve around a single individual? What happens when more than one character vies for the central role? Three genres and their various constructions of heroism and character: Greek tragedy, the 19th-century European novel, and American war films. 5 units, Win (Woloch)
1968. Core Seminar: From Kant to Kierkegaard—The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis is on theories of religion, the epistemological status of discourse about God; the role of history, especially, the figure of Jesus; and the problem of alienation/reconciliation in four seminal modern philosophers (Kant, Schleiermacher, Hegel, and Kierkegaard). Theories of religion and Christology, the knowledge of God, the significance of history, and the problem of alienation.

5 units, Spr (Sockness)

197F. Core Seminar: Tolstoy's Anna Karenina and the Social Thought of Its Time—(Same as Slavic Languages and Literatures 190.) Reading of Tolstoy's novel in historical context. Comparative discussion of Marx and Engels, John Stuart Mill, Nietzsche, Freud, Emile Durkheim, and Max Weber. Confrontation of modernity and tradition, rational thought and religious sentiment, crisis of authority and legitimacy; charisma and routinization; changes in the institution of family, the question of gender and sex equality, the rise of individualism, estate society vs. class, capital and the modern city; autonomy of art and ideological engagement. GER:3a (DR:7)

5 units, Win (Freidin)

200A,B,C. Senior Research—Limited to Humanities honors students. A critical essay of about 15,000 words. Students develop a proposal beginning in Winter Quarter of the junior year, and research a topic and write the essay during senior year, taking a total of 5 units each of 200B and 200C, spread out during senior year as best suits their schedules. Deadline for submitting essays is the first working day on or after May 15.

200A. Research Proposal—Preliminary planning and study. Student drafts a proposal in Winter Quarter of the junior year to submit to the Committee in Charge for suggestions regarding focus and bibliography. After revisions, the student resubmits fully developed proposal to the committee for additional comment and/or final approval. 60 hours over two quarters are expected of students developing their essay proposals for 2 units, usually 1 unit each in winter and spring of the junior year. Students usually make revisions of some kind in either scope or formulation of the topic. Students overseas submit proposals and receive feedback by fax or e-mail.

1-2 units (Robinson)

200B. Senior Research—Regular meetings with tutor (thesis advisor). Prerequisite: 200A.

1-5 units (Robinson)

200C. Senior Research—Regular meetings with tutor; submission of complete first draft at least two weeks before final deadline. Final grade is assigned by chair of program based on evaluations received from the student's tutor and a second reader appointed by the committee. Prerequisite: 200B.

1-5 units (Robinson)

GRADUATE PROGRAM

275. Directed Reading

1-5 units (Staff)

298. GPH Symposium—Required of doctoral and master's students in the GPH. Participation in the student-organized symposium; presentation of a paper informed by texts addressed in GPH seminars.

1-3 units, Spr (Robinson)

299. Teaching Internship—Required of doctoral students in the GPH. Preparation for teaching in interdisciplinary programs. Closely supervised teaching responsibilities in the Humanities program courses.

1-3 units (Brooks)

311,312,313,314,315. Graduate Program in Humanities Seminars—Required of students in the GPH. Open to other graduate students by consent of the instructor.

311. Classical Seminar—Performing the Ancient City—Concentrates on the cultural and political formation of ancient Athens at Rome. Homer, Aeschylus, Sophocles, Euripides, Aristophanes, Thucydides, Plato, Virgil, Petronius, Seneca, St. Augustine.

3-5 units, Aut (Rehn)

312. Medieval Seminar—Mystics and Mysticism—(Same as Religious Studies 338.) The western middle ages are a laboratory for exploring accounts of mystical experience. Medieval mysticism was diverse: a neo-Platonic strand wound from Augustine and Pseudo-Dionysius to Meister Eckhart, Nicholas of Cusa and John of the Cross. An emotive, passion-filled version found voice among the Cistercians, Franciscans and the women mystics of the period, culminating in the Carmelites Teresa of Avila, and again, John of the Cross. Initial focus is on Christian tradition; participants are invited to explore the mystical literature of other traditions (Islam, Judaism, Buddhism) in cross comparison with medieval Christian accounts.

4 units, Win (Gelber)

313. Renaissance/Early Modern Seminar—Focus is on this period as it records the impact of major historical forces: the advent of printing; the reappropriation of classical thought; the expansion of trade; revolutions in religion; the exploration of uncharted realms of the self, the world, and the heavens; and the rise of historiography. Texts: De Pizan, Columbus, De Las Casas, More, Luther, Montaigne, Marlowe, Shakespeare, Donne, Wroth, and Descartes.

3-5 units, Spr (Brooks)

314. Modern Seminar—Focus is on the various ways in which meaning and "meaning" became a problem in what we call the modern period. Study of philosophical and literary texts, including Wittgenstein, Heidegger, Carroll, Conrad, Woolf, Joyce.

3-5 units, Aut (Bourbon)

315. Graduate Core Colloquium: The Interdisciplinary Study of the Humanities

3-5 units, Win (Mease)

INTERNATIONAL POLICY STUDIES

Director: Judith L. Goldstein (Political Science)
Deputy Directors: Coit D. Blacker (Institute for International Studies), David W. Brady (Business, and Political Science)
Faculty Committee: David B. Abernethy (Political Science), Jonathan Bendor (Business), Coit D. Blacker (Institute for International Studies), John Cogan (Hoover Institute), David L. Freyberg (Civil and Environmental Engineering), Avner Greif (Economics), Stephen Haber (History), Thomas C. Heller (Law), Timothy E. Josling (Institute for International Studies), Stephen D. Krasner (Political Science), Anne O. Krueger (Economics), Michael McFaul (Political Science), Ronald I. McKinnon (Economics), James D. Morrow (Hoover Institution), Norman M. Naimark (History), Roger G. Noll (Economics), Michel C. Okesenberg (Institute for International Studies), Robert A. Packenham (Political Science), Scott D. Sagan (Political Science)
Lecturers: Alison Alter (Political Science), Nigel Key (International Policy Studies), Ronald Mitchell (International Policy Studies), David Epstein (Political Science)
Affiliated Faculty: Walter P. Falcon (Institute for International Studies), Simon Jackman (Political Science), Douglas Rivers (Political Science), Pan Yotopoulos (Food Research Institute)
Other Affiliation: Walter J. Stone (Political Science), Barry O'Neill (Political Science)

GRADUATE PROGRAM

MASTER OF ARTS

University requirements for the A.M. degree are described in the "Graduate Degrees" section of this bulletin.

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International Policy Studies (IPS) is a highly analytical interdisciplinary program focusing on international policy analysis. Its goal is to provide students with in-depth exposure to a range of issues that they will face in the 21st century in international business and public policy, and to develop a foundation of skills and knowledge to address those issues. The program allows students to focus on the international economic system, developing and transition societies, security issues, or the world environment.

IPS requires the completion of the requirements as listed in items 1 through 5 below, which normally amounts to 48 units of credit. Additional units are required for students who have not fulfilled the prerequisites for these requirements.

ADMISSION

IPS is designed for students who have a strong undergraduate background in economics and political science. To enroll in the program, students must have taken at least one undergraduate course in international relations, and calculus-based undergraduate courses in statistics, microeconomics, and macroeconomics. Stanford courses satisfying these requirements are Political Science 55, Statistics 190, and Economics 51 and 52. In addition, to fulfill the program requirements in one year, students must have completed one advanced undergraduate course in international economics, and in either security studies or international political economy. Stanford courses that meet these requirements are Political Science 134A and 134B, and Economics 165.

Applicants from schools other than Stanford or applicants from Stanford who did not apply in their senior year should submit the Graduate Admission Application form and provide a statement setting forth relevant personal, academic, and career plans and goals; transcripts; three letters of recommendation; Graduate Record Examination (GRE) scores; relevant personal, academic, and career plans and goals; transcripts; three letters of recommendation; Graduate Record Examination (GRE) scores; and a writing sample of at least ten pages. Applications can also be filed by accessing the World Wide Web through the University Registrar’s web page at http://www.stanford.edu/dept/Registrar/. Applicants are expected to have an A.B. or B.S. degree from an accredited school. Applications for admission beginning Autumn Quarter must be filed together with supporting credentials by the preceding January 15.

Undergraduates at Stanford may apply for admission between their ninth and eleventh quarters. The application requires an official, current transcript, two letters of recommendation from University faculty, a course paper of at least ten pages, and a statement of relevant personal, academic, and career plans and goals. Students enroll in the program in the Autumn Quarter following completion of all of their undergraduate requirements including at least 180 units and, if graduating with honors, a senior thesis. Application is made through the International Policy Studies office. The closing date for filing applications and supporting credentials is January 15 of the senior year.

DEGREE REQUIREMENTS

To receive the A.M. degree in International Policy Studies, the student must complete items 1 through 5 below. Normally, these requirements entail 48 units of course work; exceptions are made with the written approval of the director of the program. These courses have the following prerequisites, which can not be counted toward any of the IPS degree requirements or for an area specialization. Economics 51, 52, and 165; Political Science 35 or IPS 204, 134A or 134B; Statistics 190 or Economics 80.

1. Core Requirement: IPS 200A, B, C (Seminar: Current Issues in International Policies, 3 units)
2. Skills Requirement (complete three of the following courses, 15 units):
   a) Introductory Econometrics (IPS 201)
   b) Advanced Econometrics (up to two of Economics 103, 104, Public Policy 105)
   c) Methods of Policy Analysis (up to two of IPS 201C, 201D, 201E, 209)
4. Foreign Policy Requirement: IPS 208 (Decision Making in U.S. Foreign Policy, 5 units)
5. Electives: students must take 20 units of other IPS approved courses, at least 10 units of which must be in one of the following areas of specialization. (A complete list of the courses available in these areas is available in the IPS Program Office, Building 60.)
   a) International Political Economy
   b) Conflict/Security Studies
   c) World Environmental Problems
   d) Political and Economic Development
   e) Public Organizations and Policy Implementation
6. a) Area Specialization: students may earn an area specialization certificate by completing 15 additional units focusing on one region. Options include Asia, Eastern Europe/Russia, Latin America, and Western Europe.
   b) Master’s Thesis: students are not required to write a master’s thesis; however, students may take up to 10 units of thesis research under the guidance of a faculty member as part of their electives.

In addition, students must meet the following deadlines:
1. Complete and file the IPS Program Proposal, available in the IPS office, no later than the second week of Autumn Quarter. All students should list all courses that will be used to fulfill the IPS requirements (including the required IPS 200 course). Coterminal students must list unduplicated courses, that is courses not counted toward an undergraduate degree.
2. Use Axess to file an Application to Graduate by the appropriate deadline, and complete and file the IPS Program Requirement Completion Worksheet with the IPS office.

Grade Requirements—All courses to be counted toward the 45 units must be taken for a grade of a ‘B-’ or higher.

Financial Aid—Undergraduates may petition for a fifth year of financial aid as coterminal students. Note that these petitions can only be made if the undergraduate degree has not been conferred. University-based financial aid is not normally available for graduate students entering the IPS program.

COURSES

Please refer to the IPS Degree Requirements sheet (available in the IPS Program Office) for information on additional core courses and electives.

103. Applied Macroeconomic Analysis—(Enroll in Economics 103.)
   5 units, Aut (Uhlig)

104. Applied Microeconomic Analysis—(Enroll in Economics 104.)
   5 units, Aut (Pistaferri)
   Spr (Hall)

105. Quantitative Methods and their Application to Public Policy—
   (Enroll in Public Policy 105.)
   5 units, Spr (Rothwell)

138B. International Negotiation—(Enroll in Political Science 138B.)
   5 units, Spr (O’Neill)

139B. Seminar: Foreign Policy Decision-Making—(Enroll in Political Science 139B.)
   5 units, Aut (O’Neill)

143S. Major Issues in International Conflict Management—(Enroll in Political Science 143S.)
   5 units, Spr (Stedman)
Scholars present their analysis of major international public policy issues.

201. Intermediate Statistics—Introduction to probability and statistical inference, with applications to political science and public policy. Prerequisite: calculus.

202. Issues in International Economics—Topics in international trade and international macroeconomics: "new" trade theory, tariff and non-tariff trade barriers, international factor mobility, regional trading arrangements, trade and the environment, trade and development, exchange rate determination, international financial policy, and the international monetary system. Prerequisite: Economics 165 or equivalent.

204. Theoretical Issues in International Policy Studies—War and violent conflict are clearly common in international relations. In realms outside of national security such as economic affairs, human rights, and environmental protection, states often miss obvious and important opportunities to solve problems through cooperation. The factors that make international cooperation possible, examining themes of continuity and change. How the increasing economic, informational, and ecological interdependence of recent years is likely to change and reshape international relations in the future. Understanding these related questions; using causal analysis to understand other social problems.

206. European Integration—The political and economic factors shaping European integration from its inception to the present day. The evolution of the European Union and its governing institutions through the lens of several policy areas: agricultural, regional, monetary, regulatory, and foreign. Debates about democratic accountability, the future of the European Union, and the interplay between EU institutions and the domestic political arenas of member states.

207. Methods of International Policy Analysis—An economic approach to policy analysis and project evaluation, covering the tools of benefit-cost analysis, cost-effectiveness assessment, welfare measurement, and economic valuation. Students apply the tools to international policy problems. Prerequisite: Economics 51, a course in statistics.

208. Seminar: Decision Making in U.S. Foreign Policy—(Same as Political Science 241B.) Priority given to students in International Policy Studies. The formal and informal processes involved in U.S. foreign policy decision-making. The formation, conduct, and implementation of policy, emphasizing the role of the president and executive branch agencies. Theoretical and analytical perspectives are supplemented by case studies. Preparation of policy memorandum and substantial research paper or take-home final.

209. International Economic Development—Current development policies and programs in the areas of poverty, technological change, land reform, micro-finance, product markets, and the environment. Theoretical arguments for policy involvement and how efficiency and equity considerations impact the design, implementation, and success of programs by developing countries, the World Bank, NGOs, and other development agencies. Case studies and assignments emphasize applied quantitative methods: measures of poverty and inequality, sustainable development, productivity measurement; impact analysis, etc.

210. International Regimes: How States Govern in an Anarchic World—When and why do states turn to international regimes in their efforts to overcome the problems that arise in an anarchic world of self-interested states? Do the international regimes that states succeed at creating actually produce outcomes any different than those which occurred otherwise? Why states use international regimes to solve some types of problems but not others. How states and non-state actors create institutions that help them surmount the obstacles that anarchy poses to achieving their goals and why they often fail. Cases involve national security, trade, human rights, and environment protection. Theories regarding how the kinds of problems states face influence the kinds of cooperative institutions they develop. The major tenets of various theories of international organization and which of two or more competing theories better explains the actual experience of a variety of different international organizations.

214. Dispute Settlement in the World Trade Order—How the WTO dispute settlement system operates. Introduction to the basic principles and obligations of the GATT/WTO Agreement and how the rules and procedures governing the WTO dispute settlement apply in practice. Representative cases under the WTO dispute settlement system such as Japan-Alcoholic Beverages, EC-Bananas, Japan-Films, U.S.-Shrimp, and U.S.-Foreign Sales Corporations. Students participate as complainants or defendants in moot panel proceedings, or upon instructor's approval, write a paper on the WTO dispute settlement system.

215A. International Environmental Politics—How do nations address international environmental problems that they cannot adequately manage through domestic unilateral action alone? Some have negotiated effective international treaties; others seem to have had few positive effects. Students identify and skeptically evaluate all causal claims regarding environmental problems and develop skills using causal analysis, counterfactuals, and rigorous empirical evaluation.

215B. International Environmental and Resource Economics—The impact of economic development and population growth on the environment, especially in developing countries. The environmental impact of agricultural intensification; and the causes of tropical deforestation, desertification, and biodiversity loss. The role of local incentives in achieving global objectives, and how international organizations and institutions can help mitigate the market and policy failures that lead to environmental degradation.

217. The World Food Economy—(Enroll in Food Research Institute 219.)

219. Development and Population Interactions in the Third World—(Enroll in Food Research Institute 219.)

220. The Economics of Regional Agreements—(Enroll in Food Research Institute 246.)

230. Game Theory Application in Political Science—(Enroll in Political Science 239.)

240. Strategy in Politics—(Enroll in Political Science 200.)

241. Seminar: Issues in International Political Economy—(Enroll in Political Science 241.) Critical examination of the major theories whi
shod light on contemporary issues of global economic relations.  
5 units, Win (Goldstein)

250. Economics and Public Policy—(Enroll in Public Policy 104.)  
5 units, Win (Noll)

260. Comparative Western European Institutions—(Same as Public Policy 160.) How institutions shape politics and policies in Western Europe. Electoral laws, parliamentary systems, and government institutions at the national level influence the quality and nature of representation, political competition, and policy outcomes. Institutional developments at the subnational level and within the European Union challenge the domestic politics and policies of the European nation states.  
5 units, Win (Alter)

261. Comparative Political Economy of Post-Socialist Transitions—  
The post-Socialist economic and political transitions ongoing in Eastern Europe and the former Soviet Union, investigating attempts to build market economies and democratic governments. The politics of constitutional choice and variation in reform strategies and outcomes across the cases.  
5 units, Spr (Alter)

INTERNATIONAL RELATIONS

Director: Judith L. Goldstein (Political Science)  
Faculty Committee: David B. Abernethy (Political Science), Jonathan Bendor (Business), Barton J. Bernstein (History), Coit D. Blacker (Institute for International Studies), John Cogan (Hoover Institute), David L. Freyberg (Civil and Environmental Engineering), Ayner Greif (Economics), Stephen H. Haber (History), Thomas C. Heller (Law), Timothy E. Josling (Institute for International Studies), Stephen D. Krasner (Political Science), Anne O. Krueger (Economics), Michael McPaul (Political Science), Ronald I. McKinnon (Economics), James D. Morrow (Hoover Institution), Norman M. Naimark (History), Roger G. Noll (Economics), Michel C. Oksenberg (Institute for International Studies), Robert A. Packenham (Political Science), Scott D. Sagan (Political Science)

Affiliated Faculty: Masahiko Aoki (Economics), Larry J. Diamond (Political Science), Peter Duus (History), Walter P. Falcon (Institute for International Studies), Hester G. Gelber (Religious Studies), Lawrence H. Goulder (Economics), David J. Holloway (History), Simon Jackman (Political Science), Kennell Jackson, Jr. (History), Terry L. Karl (Political Science), David M. Kennedy (History), Anjini Kochar (Economics), Michael Kumhof (Economics), Gail Lapidus (Institute for International Studies), Mark I. Mancall (History), Noah M. Mark (Sociology), Isabella Mares (Political Science), Michael M. May (Engineering-Economic Systems and Operations Research), Robert E. McGinn (Industrial Engineering), Jean C. Oi (Political Science), Daniel I. Okimoto (Political Science), Susan M. Okin (Political Science), William J. Perry (Institute for International Studies), Richard Roberts (History), Paul A. Robinson (History), Aron Rodrigue (History), Nathan Rosenberg (Economics), Debra M. Satz (Philosophy), James J. Sheehan (History), John B. Shoven (Economics), Thomas W. Simons (History), Peter D. L. Stansky (History), Andrew Walder (Sociology), Amir Weiner (History), John D. Wirth (History), Pan Yotopoulos (Food Research Institute)

Other Affiliation: Alison Alter (Political Science), Byron Bland (Education), Gerald A. Dornan (Hoover Institute), John Earle (Economics), David Epstein (International Policy Studies), Naushad Forbes (Science, Technology, and Society), David Holloway (Institute for International Studies), Nigel Key (International Policy Studies), Timothy Lane (History), Ronald Mitchell (International Policy Studies), Barry O'Neill (Political Science), Walter J. Stone (Political Science), Arnold Suppan (History), Mikl Titma (Sociology)

International Relations (IR) is an interdisciplinary undergraduate major focusing on the study of the changing relations among nation-states (political, economic, and cultural). Students pursue a course of study in world politics that includes classes in political science, economics, history, and languages, focusing on a range of issues including international security, international political economy, political and economic development, and the politics of the transition to democracy. All International Relations majors must spend at least one quarter abroad and show two-year proficiency in a foreign language.

The International Relations program provides students with both the foundational skills and specific knowledge necessary to analyze the contemporary behavior of countries. The major prepares students for a variety of careers in government, non-governmental organizations, and business, both domestic and international. In addition, many IR students go on to graduate school either in law, business, economics, or political science.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

Requirements for the major (65 units) are:

1. Political Science 35.
2. Either Political Science 134A or 134B or History 172A.
3. Economics 1, 50, or 51, plus two additional upper-division Economics courses from the IR course offerings lists.
4. At least one of the following skills classes:
   Economics 80 (Statistics 190)
   History 206
   Political Science 100A
   Sociology 180
   Statistics 60 (Psychology 10)
5. Specialization in one of three tracks by completing at least four additional courses from a specific list of classes. The three tracks are: Comparative Political and Historical Analysis (CPHA); Comparative Culture and Society (CCAS); Comparative and International Political Economy (CIPE). Specific classes may change. Consult the updated Course Offering lists available in the International Relations office.
6. Completion of at least three additional courses in the two remaining tracks. At least one course must be from a third track.
7. At least one seminar or colloquium.
8. At least one course designated as writing intensive (WIM) for International Relations.
9. No more than 20 units can be lower-division courses.
10. A minimum grade of 'C' is required for courses to count towards your major requirements.
11. Completion of study overseas either through the Stanford Overseas Studies Program or an approved non-Stanford program.
12. Under some circumstances, up to 10 units of Honors Thesis work may be used towards Track requirements.

Please refer to the Information Book for International Relations Majors for specific information and policies about major requirements.

The International Relations major must be declared before the end of the second quarter of the junior year. Students must submit an acceptable proposal to the director of the program and declare themselves as an IR major using the student AXESS system. Students completing a double major, or fulfilling International Relations as a secondary major, or declaring a minor are also required to file a proposal by the end of the second quarter of the junior year.

Students who have already been accepted as majors in the program may petition for credit for courses not listed in this section of the bulletin or in the updated course lists. Petitions should contain as much information as possible about the course in question (syllabi, reading lists, examinations, and papers). Courses should be clearly international in nature. Petitions are available in the International Relations Program office.
A minor in International Relations is intended to provide an interdisciplinary background allowing a deeper understanding of contemporary international issues. Students complete the minor by taking seven unduplicated courses from the IR curriculum, including the following:

1. Political Science 35
2. Political Science 134A and 134B
3. Four courses from one of the three tracks, or four courses relating to the same geographic region. Specific courses may change. Consult the updated Course Offering lists available in the International Relations office.

Declaration of the minor must take place no later than the end of the second quarter of the junior year. To declare, first pick up the updated Course Offering lists from the International Relations office and then access the Registrar’s Web page and select “Minor Declaration.” Send questions by email to kp.ask@forsythe.stanford.edu.

HONORS PROGRAM

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication, significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students should submit their honors thesis proposal during Spring Quarter of their junior year.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, successful experience in writing a research paper, and submission of an acceptable thesis proposal. Students admitted to the honors program spend three quarters in the Honors Colloquium and present a formal defense of their thesis, in addition to enrolling each quarter with their faculty adviser. Under some circumstances, up to 10 units of honors thesis work may be used towards Track requirements. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations or receive honors credit towards their degree requirements.

Further details of the International Relations honors program are available from the program office.

GRANTS

The International Relations Program offers funds to students writing senior honors theses in international relations to finance travel to places where field work or library research is to be conducted, or to support intensive work at Stanford. The grants are intended for use by IR majors during the summer between their junior and senior years. The creativity and intellectual promise of the project and the preparation of the student are major considerations in awarding these funds. Applications are made during the Spring Quarter through the office of Undergraduate Research Opportunities at Stanford.

GRADUATE PROGRAM

MASTER OF ARTS

It is possible for students majoring in International Relations to work simultaneously for a coterminal master’s degree in a number of related fields. Coterminal students should consult advisers in both departments or programs to make sure they fulfill the degree requirements in both fields. For information on the A.M. program in International Policy Studies, see the “International Policy Studies” section in this bulletin.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

For information on Track designations, consult the updated Course Offering Lists available in the International Relations Program office, and the quarterly University Time Schedule.


5 units, Aut (Clerici-Arias)
Win (Bernheim)
Spr (Wright)

50. Economic Analysis I—(Graduate students register for 151.) The neoclassical theory of consumer and firm behavior under perfect competition, partial equilibrium analysis, and the role of markets and prices in a decentralized system. Economic tools are developed concurrently with mathematical techniques from multivariable calculus, including partial differentiation and constrained and unconstrained optimization. Students who have not taken and passed Mathematics 51 take a diagnostic math test covering Mathematics 41 (or equivalent) during the first week of class; the results may preclude some students and require others to register concurrently for 50M. Prerequisite: Economics 1; Mathematics 41 (or equivalent). Recommended: Mathematics 51. GER:2c (DR:4)

5 units, Aut (Bajari)
Win (Hammond)
Spr (Rosston)

51. Economic Analysis II—(Graduate students register for 151.) Introduction to neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, intertemporal choice and asset markets, risk and uncertainty, game theory, adverse selection and moral hazard. Multivariable calculus is used. In Autumn and Winter Quarters, all students must have successfully completed either Economics 180 or Mathematics 51. Prerequisite: 50.

3-5 units, Aut, Win (Frankel)
Spr (Schmidt)

80. Introduction to Statistical Methods (Postcalculus) for Social Scientists—(Same as Statistics 190.) Introduction to statistical methodology relevant to the social sciences. Emphasis is on the description and examples of the use of statistical techniques. Probability: basic rules of probability, conditional probability, Bayes’ rule, discrete and continuous probability distributions. Statistical inference: point estimation, tests of hypotheses, confidence intervals, large-sample methods. Data analysis: linear regression techniques and diagnostics. Computer software (e.g., Excel) is used for inference and data analysis. Prerequisites: Mathematics 41 or equivalent, consent of instructor. GER:2c (DR:4)

3-5 units, Aut, Spr (Staff)
Win (Amemiya)

172A. The United States since 1945—Analyzes foreign policy and politics, and deals with social themes and intellectual history. GER:3b (DR:9)

4-5 units, Win (Bernstein)

206. Undergraduate Colloquium: The Logic of History—(Same as 306.) Introduction to the literature for students in history and the social sciences. How do historians advance and sustain arguments? What is evidence and how is it treated? What are the rules of argumentation that underlie different types of history, and how do these differ from those found in the social sciences? In the writing of history, what constitutes a truth claim? Readings/discussion of the literatures on case study methods, the philosophy of history and social science, and actual historical case studies.

3 units, Aut (Haber)
POLITICAL SCIENCE

35. International Politics—(Same as 135.) Approaches to the study of world politics including realism, liberalism, and decision-making theories. WW I, the nuclear weapons debate, and contemporary and economic problems. The normative and policy implications of different theories. GER: 3b (DR: 9)
5 units, Aut (Krasner)

100A. Statistical Methods I—(Same as 200A.) Introduction to probability and statistical inference, with applications to political science and public policy. Prerequisite: elementary calculus.
5 units, Aut (Stone)

133A. Strategy, War, and Politics—Traditional and modern theories on the causes of war and sources of peace. Contrasting explanations for the origins of WW I and II; alternative theories of deterrence in the nuclear age; the causes of war in the Persian Gulf, and ethnic conflicts and terrorism in the post-Cold War era. GER: 3b (DR: 9)
5 units, Spr (Sagan)

134A. America and the World Economy—Developmental approach analyzes American foreign economic policy, centering on a historical analysis of the basic issues involved in the formation of American foreign policy. Issues: evolution of American tariff and trade policy, development of mechanisms for international monetary management, and American foreign investment policy reflected in changing political goals pursued by American central decision-makers. Prerequisite: 35 or equivalent. (WIM)
5 units, Win (Goldstein)

134B. America and the World Economy—(Graduate students register for 404.) Introduces the methods used in contemporary sociological research, focusing on strategies for designing research and analyzing data.
5 units, Aut (Mark)

STATISTICS

60. Introduction to Statistical Methods: Precalculus—(Graduate students register for 160; same as Psychology 10.) Emphasis on techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. GER: 2c (DR: 4)
5 units, Aut (Griffin)
Win (Walther)
Spr (Thomson)

OFFERING LISTS
For information on Track designations, consult the updated Course Offering Lists available in the International Relations Program Office.

129. International Health Policy: Comparative National Health Care Systems—The structure and underlying policies of national health care systems in Europe, N. America, and Japan. How other countries have addressed issues of health care organization and finance and the issue of allocating scarce health care resources. Limited enrollment. Prerequisite: consent of instructor.
3 units, Win (Lee)

135. Global Environmental Policy and Law—Advanced seminar on the international management of regional and global environmental issues, focusing on the issues themselves, and on the international institutions and agreements created to manage them. The need for international environmental law, its sources, and the participants in its creation and implementation. What works in international environmental management and what does not. Topics: ozone depletion, global warming, forests, transboundary and marine waters, Antarctica, endangered species, biodiversity, plant genetic resources, trade and the environment, and the rights of indigenous people. The future of global environmental policy and law.
5 units, Aut (Rosencranz)

137. South Asia: Environment, Development, and Security—Parallel movements and activities in these three areas in India and Pakistan since independence in 1947, with emphasis on developments since 1991. The environment: air, water, and agrochemical pollution, and population growth and attempts to limit them. Development: new programs for economic and energy growth and their environmental consequences. The nuclear arms competition between the two countries and its potential to destabilize the region.
5 units, Aut (Rosencranz)

160. Comparative West European Institutions—(Same as Political Science 120A, Public Policy 160.) How institutions shape politics and policies in Western Europe. Electoral laws, parliamentary systems, and government institutions at the national level influence the quality and nature of representation, political competition, and policy outcomes. Institutional developments at the subnational level and within the European Union challenge the domestic politics and policies of the European nation states.
5 units, Win (Alter)

161. Comparative Political Economy of Post-Socialist Transitions—The post-Socialist economic and political transitions ongoing in Eastern Europe and the former Soviet Union, investigating attempts to build market economies and democratic governments. The politics of constitutional choice and variation in reform strategies and outcomes across the cases.
5 units, Spr (Alter)

191. International Relations Journal
1 unit, Aut, Win, Spr (Goldstein)

192. Global Hot Spots: Understanding Current World Conflicts and International Political Issues—Weekly lecture series surveying the historical background and current context of major issues in international politics today. (AU)
1 unit, Spr (Goldstein)

199T. Seminar: Transatlantic Economic and Security Relations in the Post-War Period—For International Relations students. The changing nature of the transatlantic relationship over the past 50 years, including economic, political and security dimensions. Emphasis is on the interplay of economic and trade issues, which have often led to conflicts between the U.S. and the EU, the predominant political motives which have been behind U.S. support for European integration, and the strengthening of Europe as a global actor. Lecture material, class presentation. Enrollment limited to 20. (WIM)
5 units, Spr (Josting)

201. Intermediate Statistics—Introduction to probability and statistical interference, with applications to political science and public policy. Prerequisite: calculus, Statistics 60.
5 units, Aut (Epstein)

202. International Trade Policy
5 units, Spr (Key)

204. Theoretical Issues in International Policy Studies—War and violent conflict are clearly common in international relations. In realms outside of national security such as economic affairs, human rights, and environmental protection, states often miss obvious and important opportunities to solve problems through cooperation. The factors that make international cooperation possible, examining themes of dependency and change. How the increasing economic, informational, and ecological interdependence of recent years is likely to change and reshape interna-
tional relations in the future. Understanding these related questions; using causal analysis to understand other social problems.

5 units, Aut (Mitchell)

205. European Integration—Seminar on the political and economic factors shaping European integration from its conception to the present day. The evolution of the European Union and its governing institutions through the lens of several policy areas. Agricultural, regional, monetary, regulatory, and foreign policy. The debates about democratic accountability, the future of the European Union, and the interplay between EU institutions and the domestic political arenas of the member states.

5 units, Aut (Alter)

207. Methods of International Policy Analysis

5 units, Win (Key)

209. International Economic Development—Current development policies and programs in the areas of poverty, technological change, land reform, micro-finance, product markets, and the environment. Theoretical arguments for policy involvement and how efficiency and equity considerations impact the design, implementation, and success of programs by developing country governments, the World Bank, NGOs, and other development agencies. Case studies emphasize applied quantitative methods: measures of poverty, inequality, and sustainable development, productivity measurement; impact analysis, etc.

5 units, Spr (Key)

210. International Regimes: How States Govern in an Anarchic World—When and why do states turn to international regimes in their efforts to overcome the problems that arise in an anarchic world of self-interested states? Do the international regimes that states succeed at creating actually produce outcomes any different than would have occurred otherwise? Why do states use international regimes to solve some types of problems but not others. How states and non-state actors create institutions that help them surmount the obstacles that anarchy poses to achieving their goals and why they often fail. Cases involve national security, trade, human rights, and environment protection. Theories regarding how the kinds of problems states face influence the kinds of cooperative institutions they develop. The major tenets of various theories of international organization and which of two or more contending theories better explains the actual experience of a variety of different international organizations. (WIM)

5 units, Spr (Mitchell)

215. International Environmental Politics—How do nations address international environmental problems that they cannot adequately manage through domestic unilateral action alone? Some negotiated effective international treaties; others have had few positive effects. Students identify and skeptically evaluate all causal claims regarding environmental problems and develop skills using analysis, counterfactuals, and rigorous empirical evaluation. (WIM)

5 units, Win (Mitchell)

220. The Economics of Regional Agreements—(Enroll in Food Research Institute 146.)

5 units, Win (Josling)

See the respective department listings for course descriptions and General Education Requirement (GER) information for the following.

ANTHROPOLOGICAL SCIENCES

123. Environmental Issues in the Americas

5 units (Staff) not given 1999-2000

ASIAN LANGUAGES

91. Traditional East Asian Civilization: China

5 units, Aut (Eagan)

92. Traditional East Asian Civilization: Japan

5 units, Win (Hare)

CULTURAL AND SOCIAL ANTHROPOLOGY

77. Japanese Society and Culture

5 units, Win (Inouye)

79. Anthropological Perspectives on the Middle East

5 units, Win (Razielli)

89B. Comparative Race and Inequality

5 units, Win (Tunstall)

129A. Gender in East Asia

5 units, Spr (Lee)

ECONOMICS

52. Economic Analysis III

5 units, Aut (D. Krueger)

Win (Jones)

Spr (Horvath)

113. Technology and Economic Change

5 units, Win (Rosenberg)

115. European Economic History

5 units, Win (Greif)

118. The Economics of Development

5 units, Spr (Chun)

120. Socialist Economies in Transition

5 units, Spr (Earle)

124. The Economy of Japan

5 units, Spr (Aoki)

150. Economics and Public Policy—(Same as Public Policy 104.)

5 units, Win (Noll)

155. Environmental Economics and Policy

5 units, Spr (Staff)

165. International Economics

5 units, Win (Razin)

Spr (Kumhof)

217. Money and Finance in Economic Development

5 units, Aut (McKinnon)

ENGINEERING-ECONOMIC SYSTEMS AND OPERATIONS RESEARCH

193. The Role of Technology in National Security

3 units, Aut (Perry)

FOOD RESEARCH

103. The World Food Economy

5 units, Win

119. Development and Population Interactions in the Third World

5 units, Win (Yotopoulos)

146. The Economics of Regional Agreements

5 units, Win (Josling)

HISTORY

22N. Stanford Introductory Seminar: Ethnic Cleansing in the 20th Century Europe

4 units, Aut (Naimark)
80. Culture, Politics, and Society in Latin America  
5 units, Win (Wirth)

99S. Sources and Methods Seminar: Re-Imagining Palestine  
5 units, Spr (S. Robinson)

102A. The International System  
5 units, Win (Naimark, Simons)

120C. 20th-Century Russian and Soviet History  
5 units, Aut (Patenaude)

145C. Modern Britain  
5 units, Spr (Stansky)

148C. Africa in the 20th Century  
5 units, Spr (Lane)

165C. The United States in the 20th Century  
5 units, Spr (Kennedy)

172A. The United States since 1945—(Fulfills the American Foreign Policy Requirement.)  
4-5 units, Win (Bernstein)

177. Modern Latin America  
5 units, Spr (Haber)

180. 20th-Century Brazil  
5 units, Spr (Wirth)

186A. Modern India: History, Society, Cultures  
5 units, Aut (Mancall, Gupta)

188C. Jews in the Modern World  
5 units, Aut (Zipperstein)

194D. The Rise of Modern Japan  
5 units, Spr (Duus)

201F. Undergraduate Colloquium: 20th-century Turkey, Iran, and Pakistan  
5 units, Spr (Simons)

222D. Undergraduate Colloquium: National Conflict in Eastern Europe  
5 units, Spr (Suppan)

224. Undergraduate Colloquium: Stalinism in Eastern Europe  
5 units, Spr (Naimark)

247C. Undergraduate Colloquium: Africa and African Americans since World War II  
5 units, Aut (Jackson)

252. Undergraduate Colloquium: Decision-Making in International Crises—The A-Bomb, the Korean War, and the Cuban Missile Crisis  
5 units, Aut (Bernstein)

272A. Undergraduate Colloquium: War and Society, 1941-68  
5 units, Spr (Bernstein)

278. Undergraduate Colloquium: Historical Aspects of Underdevelopment in Latin America  
5 units, Win (Haber)

281A. Undergraduate Colloquium: Environmental History of the Americas  
5 units, Spr (Wirth)

HUMAN BIOLOGY  
167. International Health  
3 units (Staff)

LATIN AMERICAN STUDIES  
195. Perspectives on Sustainable Development in Latin America  
5 units, Win (Rosset)

PHILOSOPHY  
20. Introduction to Moral Theory  
5 units, Spr (Rosner)

30. Introduction to Political Philosophy/Theory  
5 units, Aut (Okin)

171. Political Philosophy  
4 units, Spr (Satz)

POLITICAL SCIENCE  
20. Comparing Political Systems: Power, Policy, and Industrial Development  
5 units, Aut (Abernethy)

111D. British Politics  
5 units, Spr (Dorfman)

115B. Chinese Politics: The Transformation and the Era of Reform  
5 units, Spr (Oi)

116L. Comparative Democratic Development  
5 units, Spr (Diamond)

117K. The Global Politics of Human Rights  
5 units, Win (Karl)

118A. Political Change in Tropical Africa  
5 units, Win (Abernethy)

122. Seminar: Decolonization in Asia and Africa, 1940-80  
5 units (Abernethy) given 2000-01

125. The Rise of Industrial Asia  
5 units, Spr (Oi, Oksenberg, Rohlen, Rowen)

133. Peace Studies  
5 units, Spr (Bland, Holloway, Ross)

134A. Strategy, War, and Politics—(Fulfills American Foreign Policy requirement.)  
5 units, Spr (Sagan)

134B. America and the World Economy—(Fulfills American Foreign Policy requirement.)  
5 units, Win (Goldstein)

5 units, Win (Blacker, May, Perry, Sagan)

138B. International Negotiation  
5 units, Spr (O’Neill)

139B. Seminar: Foreign Policy Decision-Making  
5 units, Aut (O’Neill)
143S. Major Issues in International Conflict Management
5 units, Spr (Stedman)

167. Seminar: Gender, Development, and Women’s Human Rights in International Perspective
5 units, Aut (Okin)

217M. Seminar: Evolution of the Chinese State
5 units, Win (Oksenberg, Miller)

218L. Seminar: Ethnicity and Nationalism in Soviet and Post-Soviet Politics
5 units, Win (Lapidus)

221K. Seminar: Comparative Democratization—Latin America and other Regions
5 units, Aut (Karl)

223. Seminar: Japanese Politics
5 units, Spr (Staff)

226. Seminar: The Politics of Welfare State Expansion and Reform
5 units, Aut (Mares)

228D. Seminar: Non-Governmental Organizations and Development in Poor Countries
5 units (Abernethy) given 2000-01

237S. Seminar: War in the 20th Century
5 units, Win (Holloway, Stedman)

241. Seminar: Issues in International Political Economy
5 units, Win (Goldstein)

243B. Seminar: Theoretical Issues in International Security
5 units, Win (Sagan)

198H. Honors Thesis Colloquium—Open to International Relations majors in the honors program, and other majors, with approval of instructor.
2 units, Aut, Spr (Goldstein)

OVERSEAS STUDIES
These courses are approved for the International Relations major and taught at the campus indicated. Students should discuss with their major advisers which courses would best meet educational needs. Course descriptions can be found in the “Overseas Studies” section of this bulletin or in the Overseas Studies Program Office, 126 Sweet Hall.

For information on Track designations, please consult the updated Course Offering Lists available in the International Relations Program Office, the Overseas Studies Bulletin, and the quarterly University Time Schedule.

BERLIN

One Market, One Money, One Europe?—(Enroll in Economics 129X.)
4-5 units, Win (Bruckner)

Culture and Politics in Modern Germany—(Enroll in German Studies 177A.)
4-5 units, Win (Kramer)

Multiculturalism in Comparative Perspective: Germany and Israel—(Enroll in Overseas Studies 45.)
4 units, Win (Tempel)

The German Economy: Past and Present—(Enroll in Overseas Studies 46.)
4-5 units, Aut (Klein)

Contemporary German Political Economy—(Enroll in Overseas Studies 58.)
4-5 units, Spr (Ryll)

Environmental Policy in Europe—(Enroll in Public Policy 122, Human Biology 125X.)
4-5 units, Spr (Jakobeit)

FLORENCE

Italy: Crisis, Change, and Choice—(Enroll in Overseas Studies 31.)
5 units, Win (Morlino)

The Integration of Europe—(Enroll in Political Science 145X.)
4-5 units, Aut (Spini)

KYOTO

The Political Economy of Japan—(Enroll in Political Science 215X)
4-5 units, Spr (Kume)

MOSCOW

Economic Reform and Economic Policy in Modern Russia—(Enroll in Economics 120X.)
5 units, Aut (Mau)

Russian Politics—(Enroll in Political Science 119X.)
5 units, Aut (Bratersky)

OXFORD

Modern British Politics and Government—(Enroll in Overseas Studies 64.)
4-5 units, Aut (Wood)

European Imperialism and the Third World, 1870-1970—(Enroll in History 141V.)
5 units, Spr (Darwin)
INTRODUCTION TO THE HUMANITIES PROGRAM

Program Director: Harry Elam (Drama)

Introduction to the Humanities offers courses which satisfy a three-quarter General Education Requirement (GER) for first-year students. The purpose of the Area 1 requirement is to build an intellectual foundation in the study of human thought, values, beliefs, creativity, and culture. Introduction to the Humanities courses enhance skills in analysis, reasoning, argumentation, and oral and written expression, thus helping to prepare students for more advanced work in the humanities, and for work in other areas such as the sciences, social sciences, and engineering.

The Area 1 requirement may be satisfied in two different ways:

Introduction to the Humanities courses (one-quarter introductory courses followed by two-quarter thematic sequences), or with The Program in Structured Liberal Education (an intensive, three-quarter, residence-based program satisfying the Area 1 requirement, the University writing requirement, and one additional General Education Requirement)

COURSES INTRODUCTION TO THE HUMANITIES

Students enrolled in Introduction to the Humanities courses satisfy, in two parts, the Area 1 requirement by pairing a one-quarter introductory course in Autumn Quarter with a two-quarter thematic sequence in Winter and Spring Quarters. The Autumn Quarter introductory courses hone skills in humanistic disciplines through close reading and critical investigation of a limited number of works as preparation for further work in the humanities and, specifically, for any one of the Winter-Spring sequences.

AUTUMN

1. Great Works I—Small discussion sections explore some of the ideas, beliefs, values, and conflicts in the cultural heritage of contemporary America. By performing analysis and considering different approaches or “reading strategies” in the humanities, students develop critical styles relevant to current scholarship and tailored to their own specific interests. Concentrating on classic works of Western literature, religion, and philosophy, participants discover the ways that these works contribute to and critique their own immediate contexts and cultures. Works from outside the traditional Western canon are included, giving voice to the pluralistic strands in contemporary society and allowing students to consider the nature and source of many of the assumptions on which common beliefs are grounded. Students learn to question the very designation “great work” as they investigate the different historical, political, and cultural processes that contribute to and flow from such value judgments.

Track Coordinator: Renee Courey (Introduction to the Humanities)

5 units, Aut (Staff)

12. Word and the World: Conversations across Time and Space—The texts read are foundational, producing social, political, religious, and imaginative worlds. They constitute identities; imply selves; and define relationships between parents and children, women and men, subjects and objects, slaves and masters. These texts are webs, presenting tangled histories of editing, commentary, use, and appropriation, and entangling readers in their power. Students read and re-read them on their own terms, and in juxtaposition with each other. The goal is to develop a rich sense of the texts themselves, as well as the critical and interpretive approaches used to explore them. Partially web-based. Students should be prepared to use a computer to complete course work.

5 units, Aut (Friedlander, Lenoir, Saussy)

14. The Good Life—What does it mean to live the “good life”? What must people do in order to fulfill their potential as human beings and assert their difference from other species? What is the highest value, against which are rated all other human values and activities? Reason? Love? Freedom? Originality? Explicitly and implicitly, written texts (be they philosophical or literary in form) reveal prime values and comment on the nature of the good life. The texts read stage a conflict between competing values, values which although equally desirable turn out to be fundamentally incompatible. Through an analysis and discussion of these works, contrasting visions of the good life put forward by each text are explored.

5 units, Aut (Elam, Landy, Nightingale)

16. Freedom and Eros in Philosophy and Art—Plato and Nietzsche had fundamentally opposed philosophical visions. Plato proposes an elaborate metaphysical system that orders reality around the Good, and that subordinates the importance of freedom and of the arts as human values. By contrast, Nietzsche rejects Plato’s project of metaphysics, and claims that freedom and artistry are fundamental values for human life.
The place of freedom and of the arts within these two philosophies via traditional philosophical techniques. The experience of art, asking how philosophers view art, and how the viewer can experience freedom by engaging works of art, and thereby contributing to the completion of artistic expression.

5 units, Aut (Anderson, Berdini, Bobonich)

17. Themes and Variations—Three themes or narratives are presented that, in various incarnations and in different media, function as mythologies of Western culture. Each centers on a figure (Oedipus, Othello, Don Juan), who by his existence or behavior challenges or subverts perceived social norms and calls into question cultural boundaries. Students consider these figures as characters in written texts and as they are transformed in a variety of different media: film, opera, gospel. Emphasis is on viewing, hearing, and reading, and on how the medium itself affects experience and poses interpretative challenges.

5 units, Aut (Greenleaf, Hinton, Stephens)

18. Narrative: Telling It the Way It Is?—Humans narrate stories in order to recount events and make sense of them. There are ways of understanding different forms of narratives. Some forms of narrative studied are familiar: ancient epics, classic novels, short stories, and films. Other forms are more informal: gossip and rumor. There is narrative in unexpected locations, e.g., scientific laboratories, and stories from different times and cultures, enabling comparisons across time and space.

5 units, Aut (Ebron, Shanks)

19. The Self, the Sacred, and the Human Good—The works examined were written across a span of 2,300 years, from very different cultural and historical situations, and in very different forms and genres. Taken together, they create an urgent conversation about the ways in which human beings define their place in this world, and how they attempt to give meaning and dignity to lives subject to every kind of social and personal evil, bodily affliction, and spiritual doubt. In the face of such difficulties, and mortality, how do humans build systems of value, whether based on personal, sacred, or social authority? What is the relationship between these ways of making meaning and establishing standards of virtue and vice? Are they compatible or antithetical? The works studied give various answers, or refuse to answer at all. Their differences give creative tension to an examination of these issues, as they offer unique aesthetic and persuasive achievements.

5 units, Aut (Wolff, Yearley)

WINTER-SPRING SEQUENCES

2.3. Great Works: The Hereafter, the Here-and-Now—The sequence explores great texts (religious, philosophical, and literary) that have addressed the hereafter and the here-and-now, comparing different conceptions of the afterlife and the ways that traditions about the afterlife are created and appropriated. How the imagined involvement of the underworld in everyday life is modified, tracing the ways that the presence (or absence) of spirits takes on different meanings and makes different claims on the behavior of the living.

2A. 5 units, Win (Harrison, Schnapp)
2B. 5 units, Spr (Harrison, Schnapp)

8A, 9A. Myth and Modernity: Culture in Germany—The contrasts and interplays between traditional and modern cultures are explored, raising questions about history, progress, and change. What defines a cultural tradition? How do values change? When does a national past sustain or impinge on the present? These questions are posed with reference to German literary and philosophical writings, visual arts, films, and music. Within this cultural field, the focus is on the impact of modernization on values, expressivity, and community. Students are encouraged to assume a critical perspective on their own cultures, via close examination of the constellation of ideas and values that contributed to the German legacy, with its proximity of intellectual achievement and political disaster. How did an obsession with "race" overtake Germany? Do all cultures require such myths, or can mythic thinking be overcome?

8A. 5 units, Win (Strum)
9A. 5 units, Spr (Eshel)

20A, B. The Humanities: Breaking Boundaries—This sequence examines the persistent reappearance of "interdisciplinarity" in eras from the Middle Ages to the present. Students study key works that cross disciplinary boundaries in order to examine how texts themselves provide terms for interdisciplinary methods of reading. Reading, encompassing intellectual, social, literary, ethical, and artistic concerns, is explored to see how ideas become established, what their intellectual and social boundaries are, and what historical pressures break boundaries down.

20A. 5 units, Win (Brooks)
20B. 5 units, Spr (Rayner)

21A, B. The Literature of Transformation—This sequence explores the ways in which writers from Ovid to Maxine Hong Kingston have dealt with and described the phenomenon of change in their own lives and in the world around them. The foundational text is Ovid's Metamorphoses, which surfaces throughout the course in the original version (read in translation) and in various transformations from the medieval through the modern periods.

21A. 5 units, Win (Evans, Middlebrook)
21B. 5 units, Spr (Evans, Middlebrook)

23A, B. Reason, Passion, and Reality—What roles should passion and reason play in human life? Answers to this question cross various boundaries of human difference: gender, race, age, culture, and epochs. Contrasting roles for passion and reason are traced in the context of three traditional philosophical concerns: value and obligation; knowledge, emotion, and understanding; God and reality. These problems are explored through classics of philosophy and drama, poetry, novels, and wisdom literature.

23A. 5 units, Win (Moravcsik)
23B. 5 units, Spr (Anderson, Taylor)

24A, B. Ten Days that Shook the World—Focus is on ten events that "shook the world" in their own times, or owing to their medium-range and long-range effects (and usually both), or in terms of their emblematic nature for historical processes at work: the destruction of the Second Temple of Jerusalem (70 B.C.); the arrival of Islam in India; the Grott Plague in Europe, Asia, and N. Africa (1347-50); the battle of Kosovo (1389); the French Revolution; and the "opening" of Japan by Commodore Perry (1853). The leading theme is ideologies of imperialism, universalism, and globalism (religious, political, and economic) and the processes of empire-building and globalization (and resistance to them). The material begins and ends with "the West," because for better or worse, "the West" created successful world-unifying imperialism in ideology and fact. The Roman imperial, other formations such as the Muslim commonwealth and the Turkish empire, and through contact India, Japan, and Africa.

24A. 5 units, Win (Buc)
24B. 5 units, Spr (Rodrique)

26A, B. Democratic Society in Europe and America: Origins, Crises, Dilemmas—The development of the theory and practice of democracy is analyzed in Europe and the U.S. from the 18th century to the present. The technique is comparative: by studying European and American materials in parallel, perspectives are developed on both the universal and the particular elements that have shaped the histories of Europe and N. America in the last two centuries. Where appropriate, comparisons are drawn with developments in Asia, Africa, and Latin America.

26A. 5 units, Win (Kennedy, Sheehan)
26B. 5 units, Spr (Kennedy, Sheehan)

27A. B. Encounters and Identities—The formation of ideas about individual and collective identities is investigated in S. Asia, Western
Europe, and the U.S. Some contemporary ideas about identity, including nationalism and national identity, and historical encounters and social transformations linking these areas of the globe. In emphasizing the similarities and differences among ideas of individual and collective identity found in different regions of the world, challenges are presented to assumptions about the origins of human identity.

27A. 5 units, Win (Gupta)
27B. 5 units, Spr (Yanagisako)

28A, B. Poetic Justice: Order and Imagination in Russia—This sequence examines the difference between justice and law in the view of 19th- and 20th-century Russian writers, focusing on the notion of “poetic justice”: the artistic representation of order, whether divine, natural, or human. The aim is to heighten awareness of familiar narratives, mythologies, ideas, and images, and at the same time convey a sense of a long-established national culture with its own dynamic and vision.

28A. 5 units, Win (Safran)
28B. 5 units, Spr (Bulgakowa, Freidin)

30A, B. Transculturations—Literary and other works testify to the intermingling of flows of population, resources, stories, and social institutions across the world, and with analytic discussion and historical contextualization, demonstrate that the modern concept of globalization is new mainly in degree, questioning the tacit implication that the earlier history of cultures is one of mutual isolation. Through reading texts familiar and unfamiliar, from Homer to Soyinka, connections are fashioned among the arts and their near neighbors (history, anthropology, economics).

30A. 5 units, Win (Batchelor, Saussy)
30B. 5 units, Spr (Batchelor, Saussy)

PROGRAM IN STRUCTURED LIBERAL EDUCATION

Track Chair: Mark Mancall (History)

Structured Liberal Education (SLE) offers students an intensive, three-quarter, residence-based learning experience, which simultaneously satisfies the Area 1 requirement, the University writing requirement, and one General Education requirement in the humanities. SLE encourages students to live a life of ideas in an atmosphere that stresses critical thinking and a tolerance for ambiguity. The residence hall is the informal setting for lectures and small-group discussions. SLE instructors work closely with students and participate in dorm life. SLE enhances the classroom experience with other residence-based educational activities: a weekly film series throughout the year and a student-produced play each quarter.

SLE students receive intensive and individualized writing instruction from a team of instructors and peer writing tutors. See the “Structured Liberal Education” section of this bulletin.

9 units, Aut, Win, Spr (Mancall, Staff)

PROGRAM IN JEWISH STUDIES

Program Director: Steven Zipperstein
Faculty Advisory Committee: Joel Beinin (History), Arnold Eisen (Religious Studies), Amir Eshel (German Studies), John Felstiner (English), Mark Mancall (History), Norman Naimark (History), Jack Rakove (History), Aron Rodrigue (History), David Rosenhan (Law, Psychology), Gabriella Safran (Slavic Languages and Literatures), Peter Stansky (History), Amir Weiner (History), Steven Zipperstein (History)

The interdisciplinary Program in Jewish Studies investigates all aspects of Jewish life in history, literature, language, and culture from biblical times to the present. Courses are offered on the undergraduate and graduate levels in a program complemented by a full range of guest lectures, conferences, and symposia. The program annually sponsors the Donald and Robin Kennedy Undergraduate Award for the best undergraduate essay on any theme in Jewish studies, and it coordinates the annual Dorot Travel Grants for summer study in Israel.

Graduate students enroll in the program through the departments of English, History, or Religious Studies and must meet the requirements of those departments.

UNDERGRADUATE PROGRAMS

INDIVIDUALLY DESIGNED MAJOR

The Individually Designed Major in Jewish Studies permits interested students to focus their attention on the broad field of Jewish Studies and, at the same time, to expand their knowledge of one or another related fields.

Each major should complete at least 60 units, all in courses at or above the 100 level (or their equivalent). A maximum of 15 of these 60 units may be taken on a credit/no credit basis. A maximum of 5 of these 60 units may be taken in individual study or directed reading. Students must present evidence that demonstrates their ability to do independent work and have at least three full quarters of undergraduate work remaining at Stanford after the date on which the proposal is approved by the committee. Each major must obtain sponsorship from three faculty members, one of whom is the student’s primary adviser, and from the Director of the Program in Jewish Studies. Details about the written procedures and documents necessary for application for an Individually Designed Major can be obtained at the Undergraduate Advising Center, Sweet Hall, first floor (650) 723-2426.

REQUIREMENTS

The faculty members in Jewish Studies have designed the following structure for the major:

<table>
<thead>
<tr>
<th>Category</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>History and Society: students must take one course in each of the three periods—biblical and ancient, medieval and modern, and contemporary</td>
<td>15</td>
</tr>
<tr>
<td>Religion: biblical, rabbinic, medieval, modern</td>
<td>15</td>
</tr>
<tr>
<td>Literature: Hebrew, Yiddish, Holocaust, American Jewish</td>
<td>10</td>
</tr>
<tr>
<td>Hebrew Language (second year or beyond): Students who demonstrate by examination that they have completed the equivalent of at least two years of university-level Modern Hebrew may apply the 12 units required in this category to more work in one of the other categories required by the major, with the approval of their primary adviser.</td>
<td>12</td>
</tr>
<tr>
<td>Ancillary Courses: ancient history, Medieval history, modern European history, history of philosophy, Islam, Christianity</td>
<td>8-10</td>
</tr>
<tr>
<td>Total number of units required</td>
<td>60-62</td>
</tr>
</tbody>
</table>

Students planning an Individually Designed Major in Jewish Studies are also strongly urged to write an honors thesis. Students interested in majoring in Jewish Studies should discuss this with their adviser(s) when discussing the major itself. Up to 10 honors thesis units may be included in the major.

No course proposed for the major may be counted as fulfilling more than one required category in the proposed major. Transfer credits from other universities must be approved by the appropriate Stanford authorities.

MINORS

The Jewish Studies minor is open to students in any department who wish to enrich their studies through an acquisition of knowledge in Jewish history, thought, religion, literature, and society. Students must complete their declaration of the minor no later than the last day of the quarter four quarters before degree conferral. For example, a student graduating in June (Spring Quarter) must declare the minor no later than the last day of Spring Quarter of the junior year.

Students must complete six courses for a maximum of 36 units toward the minor. All courses of study should be discussed and approved by a Jewish Studies faculty member in the departments of English, History, or Religious Studies, and by the program director. In addition to suggested introductory courses, students are also encouraged to take courses in Hebrew language as part of their Jewish studies minor, and are granted
credit toward the minor for up to 5 units of language study. Any variations on the minor requirements must be approved in advance by the Director of the Program in Jewish Studies.

Courses credited toward the minor must be distributed in the following ways: (1) three introductory courses at the 100 level or below in the fields of history, religious studies, literature, or Hebrew language (for a maximum of 5 units) or one of the designated introductory-level courses offered through the Program in Comparative Studies in Race and Ethnicity; (2) two courses at the 100 level or above from two of three areas of concentration (history, religious studies, or literature); and (3) one seminar or undergraduate colloquium at the 200 level or above in one area of concentration (history, religious studies, or literature). No course credited toward the Jewish Studies minor may be double counted toward major requirements.

HONORS PROGRAM
The Jewish Studies honors program fosters a sustained examination of the field of Jewish studies for students majoring in any discipline, and it extends its concerns across broad interdisciplinary terrain, with implications beyond the humanities in areas such as psychology, law, business, international relations, medicine, etc. Students may apply for entry, at the latest, by the Autumn Quarter of their junior year, and must have a cumulative grade point average (GPA) of 'B' or higher.

Each student is required to take a lower-division 5-unit "Jewish Civilization" survey (History 88/Religious Studies 29) co-taught by a cross-section of the faculty in Jewish Studies from the departments of English, History, and Religious Studies, with the cooperation of faculty in American Studies, Feminist Studies, and Slavic Languages and Literatures. This course is designed to provide honors students and others with a broad grasp of the variety and conflicting approaches to Jewish studies. In addition, students are required to take two 5-unit courses chosen from offerings in English, History, or Religious Studies. Students are urged to take at least one course in Jewish history from the course offered in the Department of History (188A,B,C). Jewish studies honors students are required to write an honors thesis during Autumn and Winter Quarters of the senior year. An honors seminar (202A,B) is offered for students to share their work-in-progress. Thesis proposals are submitted to the Faculty Advisory Committee at least one year prior to the intended date of graduation.

COURSES

CULTURAL AND SOCIAL ANTHROPOLOGY
79. Anthropological Perspectives on the Middle East
5 units, Win (Razielli)

HISTORY
22N. Stanford Introductory Seminar: Ethnic Cleansing in 20th-Century Europe
4 units, Aut (Naimark)

85Q. Stanford Introductory Seminar: Jews and Muslims
5 units, Win (Rodrigue)

88S. Sources and Methods Seminar: Transformation of Jewish Identity in Eastern Europe, 1881-1939
5 units, Win (Moss)

89S. Sources and Methods Seminar: Re-Imagining Palestine
5 units, Spr (S. Robinson)

188C. Jews in the Modern World
5 units, Aut (Zipperstein)

209B/309B. Undergraduate/Graduate Colloquium: Crusaders, Pilgrims, and Merchants—The Mediterranean World, 700-1600
4-5 units, Spr (Miller)

285B. Undergraduate Colloquium: The Bible ("Old Testament")
5 units, Win (Mancall)

384A. Graduate Core Colloquium in Jewish History, 17th-19th Centuries
4-5 units, Aut (Rodrigue)

384B. Graduate Core Colloquium in Jewish History, 20th Century
4-5 units, Win (Zipperstein)

485A. Graduate Research Seminar in Modern Jewish History
4-5 units, Spr (Zipperstein)

LANGUAGE CENTER

Director: Elizabeth Bernhardt
Assistant Director: Patricia de Castries
Senior Lecturer, and Coordinator African and Middle Eastern Languages: Khalil Barhoum (Arabic)
Lecturer, and Coordinator Special Language Program: Eva Priou (Modern Greek)
The Stanford Language Center was created to oversee all language instruction at Stanford and is principally responsible for all first- and second-year foreign language courses taught at Stanford. The center’s charge is to guarantee that Stanford language programs are of the highest quality; to develop and administer achievement and proficiency tests needed to implement the language requirement; to provide technical assistance and support to the graduate students, lecturers, and faculty who deliver Stanford’s language instruction; and to take leadership in research and development efforts in language learning.

UNDERGRADUATE PROGRAM
MINOR IN MIDDLE EASTERN LANGUAGES, LITERATURES, AND CULTURES

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to the Arabic and Hebrew languages, as well as an introduction to the cultures and civilizations of the Middle East.

Students declaring a minor must do so no later than the last day of the quarter four quarters before degree conferral. For example, students graduating in June (Spring Quarter) must declare the minor no later than the last day of Spring Quarter of their junior year. If a student is not able to meet this deadline, he or she may petition the Language Center director and request a revised declaration date, which may be granted at the director’s discretion.

The requirements for a minor in Middle Eastern Languages, Literatures, and Cultures are:

1. Completion of six courses in either Track A: Cultural Studies, or Track B: Language Studies.
2. Courses for the minor must be taken for a letter grade unless only offered for faculty-elected satisfactory/credit.
3. All courses must be completed with a letter grade of ‘C’ or better.
4. Courses may not overlap with those taken for a major course of study.
5. Courses taken which also fulfill a GER count toward fulfilling both minor and GER requirements.
6. Students pursuing Track B: Language Studies, must complete the prerequisite of Beginning Arabic or Hebrew, or demonstrate equivalent competence.

CULTURAL STUDIES TRACK

Requirements are:

1. Successful completion of the prerequisite, Beginning Arabic (or Hebrew), or a demonstrated equivalent competence.
2. Completion of three courses from Appendix A.
3. Completion of three courses from Appendix B.

Course No. and Subject:

Appendix A:
SLP125A. The Contemporary Arab World through Literature and Culture 4
SLP125B. Readings in Contemporary Arab Writers 3
SLP125C. Influences and Issues in Contemporary Arab Women Writers* 4
SLP125D. The Arab World through Travel Literature* 4

Appendix B:
Comp. Lit. 10N. Stanford Introductory Seminar: Egyptian East/Egyptian West 3
History 85Q. Stanford Introductory Seminar: Jews and Muslims 5
History 87. Empires and Cultures in the Modern World 5
History 185. Introduction to Islamic Civilization 5
History 187B. The Middle East in the 20th Century* 5
History 187T. Palestine, Zionism, and the Arab-Israeli Conflict 5
History 187C. Women in the Modern Middle East 5
History 189A. Israel: 1800 to the Present 5
History 207. Jews, Christians, and Muslims: Medieval Spain 5
History 209A. Law, Society, and Identity in Christianity and Islam, 500-1900 5
History 285A. Problems in Israeli History: The National Identity and Political Culture of the Israeli State 5
History 285B. Zionist Theory and Practice 5

History 286. Undergraduate Colloquium: Economic and Social History of the Modern Middle East 5
History 287S. Topics in the Modern History of Egypt, Palestine, and Israel 5
History 288. Palestine and the Arab-Israeli Conflict 5
Relig. Studies 121. People of the Book: Abraham and Joseph 4-5

* Units of course work earned from GER courses listed in the Language track and Cultural Studies tracks may be used to fulfill the unit requirements for the minor.

LANGUAGE TRACK

Requirements are:

1. Successful completion of the prerequisite, Beginning Arabic (or Hebrew), or a demonstrated equivalent competence.
2. Completion of one year of language study at the intermediate level (Special Language Program 121A,B,C for Arabic, or 129A,B,C for Hebrew).
3. Completion of three courses from Appendix B.

GRADUATE PROGRAM

Ph.D. MINOR IN APPLIED LINGUISTICS

The Ph.D. minor in Applied Linguistics has been designed to give students the opportunity to examine and explore language as it pertains to teaching, learning, translation, education, and language policies.

The Ph.D. minor requires the completion of less than 30 units of unduplicated course work. Course work must include Linguistics 201 (Foundations of Linguistic Analysis, 4 units). At least one additional Linguistics course must also be taken. Courses taken for the minor must be incremental units beyond those used to satisfy the major (with the exception of Linguistics 201 for Linguistics students). At least 20 of the 30 units must be at the 200 level or above. Students may also supplement their Applied Linguistics training with an array of courses from the departments of Cultural and Social Anthropology, Linguistics, and Spanish and Portuguese.

Overlapping applied linguistics concentrations are available in the Learning, Teaching, and Translation of Second Languages; and in Educational and Policy Applications of Linguistics.

Some suggested courses relevant to each track are listed below the track description; a fuller listing of courses which are appropriate for the minor can be found on the Language Center’s web site (http://language.stanford.edu/).

Students in either track should develop a program of study in consultation with an academic adviser and submit the proposed program of study for approval by the Applied Linguistics Steering Committee.

THE LEARNING, TEACHING, AND TRANSLATION OF SECOND LANGUAGES TRACK

This overall program concentration requires general reading in second language acquisition (SLA) and/or translation while offering students course work in the following areas:

1. Second language acquisition in instructed contexts
2. Elements of curricular design for university and college settings
3. The acquisition of second language literacy
4. The use of technology to enhance student performance
5. Linguistics and the teaching of foreign languages
6. Theoretical foundations in the translation of various languages

Course No. and Subject:

Ed. 248. Theory and Issues in Literacy 4
Ed. 390. Advanced Seminar in Bilingual Education 1-3
Lang. Ctr. 201. The Learning and Teaching of Second Languages 3
Lang. Ctr. 203. Second Language/Second Dialect Acquisition (Same as Span. 204) 3-5
Lang. Ctr. 204. Issues and Methods in the Teaching of Heritage Languages (Same as Span. 300) 3-5
Lang. Ctr. 205. Educational Applications of Sociolinguistics (Same as Edu. 341) 3-4
Ling. 189/289. Linguistics and the Teaching of English as a Foreign Language (Same as Ed. 282) 4-5
Ling. 140/240. Language Acquisition I 4

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EDUCATIONAL AND POLICY APPLICATIONS OF LINGUISTICS TRACK

This concentration is oriented toward a combination of conceptual and research foci regarding language minority populations and their educational welfare. The education of women, low-income, and language minority populations receive primary attention within this concentration.

Course No. and Subject Units
Ed. 248. Theory and Issues in Literacy 4
Ed. 249. Theory and Issues in the Study of Bilingualism 3-4
Ed. 270. African-American English in Educational Context 3-4
Ed. 277X. Education of Immigrants in Cities 4
Ed. 289X. Introduction to Linguistics for Educational Research (Same as Ling. 290) 4
Ed. 297X. Research in Second Language Classrooms 3
Ed. 335X. Language Policy and Planning: National and International (Perspectives) 3
Ed. 390. Advanced Seminar in Bilingual Education 1-3
Ed. 435X. Research Seminar in Applied Linguistics 2-4
Ling. 75/273. African American Vernacular English 4
Ling. 150. Introduction to Language in Society 6
Ling. 250. Sociolinguistic Theory and Analysis 4-6
Ling. 252. Language and Ethnicity 4

COURSES

201. The Learning and Teaching of Second Languages—The teaching of second languages from a learning perspective, eschewing the traditional sense of "teaching methods." Focus is on instructional decision-making within the context of the students’ intellectual and linguistic development. Language instructors are prepared to teach languages in a variety of university settings to an array of populations. Some general reading in second language acquisition (SLA) and language-specific reading within the database in SLA.

3-5 units, Spr (Bernhardt)


2-4 units, Spr (Staff)

204. Issues and Methods in the Teaching of Heritage Languages—(Same as Spanish 300.) Focus is on the teaching of Spanish as a heritage language to students raised in Spanish-speaking homes. The fundamental issues relating to the language abilities of heritage students, including aspects of language variation in the Spanish-speaking world, characteristics of English/Spanish bilingualism in the U.S., and the process of second dialect acquisition. Emphasis is on the methods and techniques for developing the academic Spanish language skills of heritage-background students in a classroom setting.

3-5 units, Aut (Valdés)

AFRICAN AND MIDDLE EASTERN LANGUAGES

AFRICAN LANGUAGES

100A,B,C. Beginning Amharic
100A. 3 units, Aut (Staff)
100B. 3 units, Win (Staff)
100C. 3 units, Spr (Staff)

102A,B,C. Beginning Hausa
102A. 3 units, Aut (Staff)
102B. 3 units, Win (Staff)
102C. 3 units, Spr (Staff)

106A,B,C. Beginning Swahili—Successful completion of 106C may fulfill the foreign language requirement.
106A. 4 units, Aut (Staff)
106B. 4 units, Win (Staff)
106C. 4 units, Spr (Staff)

107A,B,C. Intermediate Swahili
107A. 4 units, Aut (Staff)
107B. 4 units, Win (Staff)
107C. 4 units, Spr (Staff)

108A,B,C. Advanced Swahili
108A. 4 units, Aut (Staff)
108B. 4 units, Win (Staff)
108C. 4 units, Spr (Staff)

111A,B,C. Beginning Chichewa
111A. 3 units, Aut (Staff)
111B. 3 units, Win (Staff)
111C. 3 units, Spr (Staff)

133A,B,C. The African Evening Forum
133A. 1-4 units, Aut (Staff)
133B. 1-4 units, Win (Staff)
133C. 1-4 units, Spr (Staff)

MIDDLE EASTERN LANGUAGES

120A,B,C. Beginning Arabic—Successful completion of 120C may fulfill the foreign language requirement.
120A. 4 units, Aut (Barhoum)
120B. 4 units, Win (Barhoum)
120C. 4 units, Spr (Barhoum)

121A,B,C. Intermediate Arabic
121A. 4 units, Aut (Salti)
121B. 4 units, Win (Salti)
121C. 4 units, Spr (Salti)

122A,B,C. Advanced Arabic
122A. 4 units, Aut (Salti)
122B. 4 units, Win (Salti)
122C. 4 units, Spr (Salti)

125A,C,D. Topics in Arabic Literature and Culture—Examines several literary and cultural facets of the Arab world not usually dealt with in other courses at Stanford. May be taken independently. Readings in discussion in English.

125A. The Contemporary Arab World and Culture through Literature—Introduces the Arab world through a survey of different literary genres (i.e., poetry, novels, short stories), providing a glimpse of contemporary Arab society and culture. Readings are from prominent male and female authors, dealing with dominant cultural topics (nationalism, religion, gender and women issues, kinship and social concepts, etc.). Texts delineate the cultural uniqueness of the Arab world, including major works by Neguib Mahfouz, Nawal El-Saadawi, Ghassan Kanafani, Tanyaeb Salih, Etef Aladn and representative samples of poetry and short stories spanning the Arab world. GER: 3a,4 (DR: 2 or 7)

4 units, Aut (Barhoum)

125C. Contemporary Arab Women Writers and Issues—Selections of fiction and non-fiction works by prominent Arab women writers, with discussion and analysis of the main cultural factors contributing to the shaping of their dominant feminist conceptions and attitudes. Readings: Fatima Mernissi’s Dreams of Trespass; Nawal Saadawi’s God Dies by the Nile; Etef Adan’s Sit Marie Rose; Hanan Al-Shaykh’s The Story of Zara, Alifa Rifaat’s Distant View of Minaret. Alternates with 625B. GER: 3a,4c (DR: 7f)

4 units, Win (Barhoum)

125D. The Arab World through Travel Literature—Early colonialist and postcolonialist portrayals of Arab culture in the West and recent critical examinations of such stereotypical depictions of Arab and Islam. Readings: Gustave Flaubert’s Flaubert in Egypt; Jonathan...
Raban’s Arabia through the Looking Glass; Elizabeth Fernea’s Guests of the Sheik; Lady Mary Wortley Montagu’s Letters; Lawrence Durrell’s The Alexandria Quartet; Edward Said’s Covering Islam and the Introduction to Orientalism; Jack Shaheen’s The T.V. Arab; Maxime Rodinson’s Europe and the Mystique of Islam; Geraldine Brooks’ Nine Parts of Desire; Eric Hansen’s Motoring with Mohammed.

128 A, 4 units, Spr (Barhoum)

128 A. 4 units, Aut (Berman)
128 B. 4 units, Win (Berman)
128 C. 4 units, Spr (Berman)

129 A, 4 units, Aut (Berman)
129 B. 4 units, Win (Berman)
129 C. 4 units, Spr (Berman)

130 A, B, C. Advanced/Conversational Hebrew
130 A. 4 units, Aut (Berman)
130 B. 4 units, Win (Berman)
130 C. 4 units, Spr (Berman)

141 A, B, C. Beginning Yiddish
141 A. 4 units, Aut (Staff)
141 B. 4 units, Win (Staff)
141 C. 4 units, Spr (Staff)

142 A, B, C. Intermediate Yiddish
142 A. 4 units, Aut (Staff)
142 B. 4 units, Win (Staff)
142 C. 4 units, Spr (Staff)

SPECIAL LANGUAGE PROGRAM

The Special Language Program (SLP) offers a number of foreign languages not otherwise taught at Stanford. Based on current funding and student requests, the courses planned for 1999-00 are listed below; however, not every course listed will be taught. Additional languages may still be offered upon request, provided funding is available. Requests for the 2000-2001 academic year should be made by Spring Quarter of this year at the Special Language Program office.

All beginning-level 3-unit courses are offered on a satisfactory/no credit basis only. Intermediate-level and 4-unit courses are offered with a grading option. No auditors. “Beginning” and “Intermediate” each refer to an academic year’s sequence of language study; the suffixes A, B, and C refer to first-, second-, and third-quarter of language instruction that year. Most 3-unit language courses are offered for a two-year, three-quarter sequence; however, a beginning or intermediate level might be offered on alternate years.

For further information consult the Special Language Program, Building 40, room 41B.

To request a language, apply via the web at http://www.stanford.edu/dept/SLP.

126 A, B, C. Beginning Turkish
126 A. 3 units, Aut (Ayanoglu)
126 B. 3 units, Win (Ayanoglu)
126 C. 3 units, Spr (Ayanoglu)

132 A, B, C. Beginning Tibetan
132 A. 3 units, Aut (Staff)
132 B. 3 units, Win (Staff)
132 C. 3 units, Spr (Staff)

140. Beginning Haitian/Creole
3 units, Spr (Staff)

144 A, B, C. Beginning Tagalog
144 A. 3 units, Aut (Gonzalez)
144 B. 3 units, Win (Gonzalez)
144 C. 3 units, Spr (Gonzalez)

146 A, B, C. Beginning Persian
146 A. 3 units, Aut (Fahimi)
146 B. 3 units, Win (Fahimi)
146 C. 3 units, Spr (Fahimi)

150 A, B, C. Beginning Vietnamese
150 A. 3 units, Aut (Ha)
150 B. 3 units, Win (Ha)
150 C. 3 units, Spr (Ha)

152 A, B, C. Beginning Hindi
152 A. 3 units, Aut (Singh)
152 B. 3 units, Win (Singh)
152 C. 3 units, Spr (Singh)

154 A, B, C. Beginning Gujarati
154 A. 3 units, Aut (Ranchod)
154 B. 3 units, Win (Ranchod)
154 C. 3 units, Spr (Ranchod)

156 A, B, C. Beginning Indonesian
156 A. 3 units, Aut (Burke)
156 B. 3 units, Win (Burke)
156 C. 3 units, Spr (Burke)

159 A, B, C. Beginning Punjabi
159 A. 3 units, Aut (Dhillon)
159 B. 3 units, Win (Dhillon)
159 C. 3 units, Spr (Dhillon)

162 A, B, C. Beginning Tamil
162 A. 3 units, Aut (Rangaraju)
162 B. 3 units, Win (Rangaraju)
162 C. 3 units, Spr (Rangaraju)

164 A, B, C. Beginning Czech
164 A. 3 units, Aut (Staff)
164 B. 3 units, Win (Staff)
164 C. 3 units, Spr (Staff)

167 A, B, C. Beginning Polish
167 A. 3 units, Aut (Staff)
167 B. 3 units, Win (Staff)
167 C. 3 units, Spr (Staff)

170 A, B, C. Beginning Modern Greek
170 A. 4 units, Aut (Prionas)
170 B. 4 units, Win (Prionas)
170 C. 4 units, Spr (Prionas)

171 A, B, C. Intermediate Modern Greek
171 A. 4 units, Aut (Prionas)
171 B. 4 units, Win (Prionas)
171 C. 4 units, Spr (Prionas)
173A,B,C. Beginning Hungarian
   173A. 3 units, Aut (Szabo)
   173B. 3 units, Win (Szabo)
   173C. 3 units, Spr (Szabo)

174A,B,C. Beginning Quechua
   174A. 3 units (Fajardo)
   174B. 3 units (Fajardo)
   174C. 3 units (Fajardo)

176A,B,C. Beginning Thai
   176A. 3 units, Aut (Staff)
   176B. 3 units, Win (Staff)
   176C. 3 units, Spr (Staff)

178A,B,C. Beginning Sign (ASL)
   178A. 4 units, Aut (Haas)
   178B. 4 units, Win (Haas)
   178C. 4 units, Spr (Haas)

179A,B,C. Intermediate Sign (ASL)
   179A. 3 units, Aut (Haas)
   179B. 3 units, Win (Haas)
   179C. 3 units, Spr (Haas)

199Q. Stanford Introductory Seminar: Literature and Culture of
   Modern Greece—Preference to sophomores. The focus is on modern
   Greece since its establishment as a nation. Discussion and analysis of
   literary works of prominent authors, films, and documents highlight
   issues related to Greek institutions, social structures, traditions, and
   culture. Emphasis is on topics of ethnicity, Greek heritage and national
   identity, kinship and gender issues, and migration patterns. GER:3a
   3-5 units, Aut (Pronas)

CENTER FOR LATIN AMERICAN STUDIES

Chair of the Committee and Director of the Center: Terry Karl
Associate Director: Kathleen B. Morrison
Visiting Professor: Torcuato Di Tella
Anthropological Sciences: Clifford Barnett, William Durham, James
Fox, John W. Rick
Biological Sciences: David Ackerly, Paul Ehrlich, Harold Mooney
Cultural and Social Anthropology: Akhil Gupta, Renato Rosaldo
Dance: Susan Cashion
Economics: Donald Harris, Anne Krueger
Education: Martin Carnoy, Kathleen Morrison, Amado Padilla
History: Stephen Haber, Herbert Klein, John D. Wirth
Law: School of: John Barton, Thomas Heller
Linguistics: Shirley B. Heath, John Rickford
Medicine, School of: Yvonne Maldonado, Julie Parsonnet, Gary
Schoolnik, Peter M. Small
Political Science: Terry Karl, Beatriz Magaloni, Robert Packenham
Spanish and Portuguese: Claire Fox, Mary Pratt, Richard Rosa, Jorge
Ruffinelli, Lucia De Sá, Guadalupe Valdés, Lyris Wiedemann

The Center for Latin American Studies coordinates the University’s
   teaching, research, and extracurricular activities related to Latin America.
   Field research, language training, and interdisciplinary approaches are
   stressed in the Latin American Studies program, which draws on the
   strength and diversity of its nationally recognized faculty affiliates and
   substantial library holdings on Latin America. These resources are enhanced
   by the Tinker Visiting Professorship in Latin American Studies

and the Nabuco Visiting Chair in Brazilian Studies, which bring distinguished Latin American academics to teach at Stanford each year. The center is a U.S. Department of Education Title VI National Resource Center for Latin American Studies.

The principal programs administered by the center (the bachelor’s degree, the honors certificate program, summer field research grants, master’s degree, and concurrent degrees with the schools of Business, Education, Law, and Medicine) are described below. For further information, contact the Center for Latin American Studies, Bolivar House, 582 Alvarado Row, Stanford University, Stanford, California 94305; 8545; phone (650) 723-4444. Consult the center’s Web site for updates on information including course offerings and public programs: www.leland.stanford.edu/group/las.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The A.B. in Latin American Studies (LAS) offers qualified undergraduates the opportunity to pursue an individualized, interdisciplinary study of Latin America, culminating in the preparation of a senior honors thesis written under the guidance of a faculty sponsor, or the completion of an approved service internship and the submission of a satisfactory report that meets program guidelines.

To declare a major in Latin American Studies, a student must apply to the center’s Subcommittee on Undergraduate Programs no later than the beginning of the second quarter of the junior year; exceptions are made only in unusual circumstances.

Requirements for the major include the following:

1. Sixty (60) units: no more than 5 units may be taken pass/no credit; at least 40 units must be taken at the 100-level or higher; no more than 20 units completed in overseas study may be applied to the 60-unit requirement. The 60 units must include:
   a) 10 units that provide a broad survey of Latin America, for example, LAS 80, 87; History 278; Economics 118; Political Science 113A, 114K, 117K; Spanish 160, 161; Overseas Studies (Santiago) 112X, 117X.
   b) 30 units devoted to one of the three core concentrations:
      1) Culture and Identity of Latin America
      2) Political Economy of Latin America
      3) Ecology, Environment, and Health in Latin America

The core concentration must include one course in theory and methods (see below), and at least one seminar or colloquium. Twenty units must be taken at the 100-level or higher. For example, students selecting the concentration on Culture and Identity might take Spanish 160; students selecting Political Economy might select Political Science 117K; students selecting Ecology, Environment, and Health might take LAS 195 or Anthropological Sciences 164. A complete list of courses and the core concentrations to which they may be applied is available at the LAS program office.
   c) 15 units at the 100-level or higher drawn from the two other core concentrations, with at least 5 units in each.
   d) 5 units in the interdisciplinary senior seminar (LAS 199).

2. Fulfillment of the foreign language requirement (see below). First-or second-year language courses may not be counted toward the 60-unit requirement.

3. Field experience (study abroad, internship, field research) in Latin America.

4. An honors thesis or service internship. Students may enroll in up to 15 units of credit work for the thesis or internship, of which no more than 5 units may be applied to the core concentration or breadth requirement. Prior to the end of the Spring Quarter of the junior year, students who wish to write an honors thesis must present a written proposal with faculty sponsorship to be approved by the Subcommittee on Undergraduate Programs. Only the completion of an honors thesis of substantial quality earns the degree designation of Honors in Latin American Studies. Service internships may be completed any time prior to the final quarter before graduation and require a substantial report written according to program guidelines and endorsed by the Subcommittee on Undergraduate Programs. Students
are strongly advised to seek prior approval for the internship from the LAS program office.

THEORY AND METHODS COURSES

The following courses may be used to satisfy the theory and methods requirement: (recommended for Culture and Identity) Art and Art History 1, Comparative Literature 101, Cultural and Social Anthropology 90, History 80, Spanish 140; (recommended for Political Economy; or Ecology, Environment, and Health) Economics 80, Political Science 35, Psychology 10, Sociology 180A, B; Statistics 60 or 190; (recommended for Ecology, Environment, and Health) Biological Sciences 141.

FOREIGN LANGUAGE REQUIREMENT

Acquisition of a language of Latin America is critical to an in-depth understanding of the region, both for advanced study and fieldwork and for future professional endeavors. The minimum requirement for completion of the degree or honors certification (see below) is three years of university-level language study, equivalent to advanced proficiency by ACTFL standards.

The foreign language requirement can be satisfied by any of the following: (1) completion of a foreign language class at the third-year level of university training; (2) completion of an upper division (100-level or higher) course taught in the foreign language; or (3) achievement of the Advanced Proficiency level on the ACTFL scale in a test administered by the Department of Spanish and Portuguese. Students entering with advanced proficiency in Spanish are encouraged to enroll in Portuguese for Spanish Speakers; alternatively, students may arrange to study an Amerindian language such as Quechua or Quiche Maya, or Haitian Creole. All students are expected to enhance their language proficiency as part of their program of study.

MINORS

The minor in Latin American Studies is offered for students in other majors who wish to develop a complementary concentration on the region. To pursue the minor, students must declare their intention no later than the second quarter of their junior year. Requirements for the minor include:

1. Completion of 25 units as follows: a 5-unit course surveying Latin America, for example, LAS 80 or an approved substitute; 20 additional units at the 100-level or higher which together comprise a coherent focus on a theoretical problem or issue of the region; for example, culture and identity, political economy, sustainable development. At least 10 of the total 25 units must be completed at Stanford.
2. Demonstration of proficiency in either Spanish or Portuguese, equivalent to the requirement for the major and honors certificate.
3. Field experience in Latin America (study abroad, summer research, internship, and so on) is recommended.

Upon satisfactory completion of all requirements, the center’s Subcommittee on Undergraduate Programs authorizes the designation of the Minor in Latin American Studies on the student’s transcript.

HONORS CERTIFICATION FOR MAJORS IN OTHER DEPARTMENTS OR PROGRAMS

As distinguished from the major in Latin American Studies, Honors Certification in Latin American Studies is intended to complement study in any conventional major. The aim of certification is to enable the student to pursue a foreign area focus through interdisciplinary coursework and individualized research on Latin America, culminating in the preparation of a senior honors thesis written under the guidance of a faculty sponsor.

The Honors Certification program is of particular interest to students who plan further disciplinary study or a career with an international or foreign-area focus. Students in the humanities, social sciences, or natural sciences may wish to enrich their studies by acquiring a first-hand understanding of a related aspect of Latin American life.

To pursue the Honors Certification program, students must apply to the Subcommittee on Undergraduate Programs no later than the Spring Quarter of the junior year with a written proposal with faculty sponsorship.

REQUIREMENTS

1. Completion of a coherent interdisciplinary program of at least 30 units, based on an individualized plan of study achieved in consultation with the student's adviser and approved by the center's Subcommittee on Undergraduate Programs. The curriculum ordinarily includes:
   a) At least one course (5 units) surveying Latin America comprehensively, whether historically from the perspective of a discipline, or in an explicitly interdisciplinary framework. Appropriate courses include, but are not limited to: LAS 80, 87; Economics 118; History 278; Political Science 113A, 117K; 160, 161; Overseas Studies (Santiago) 112X, 117X.
   b) At least four additional courses (20 units) in 100-level courses or higher, focusing directly on Latin America. First- or second-year language courses may not be counted toward the 25 units. Only 5 units of satisfactory/no-credit work may be counted toward the program.
   c) Five units in the interdisciplinary senior seminar.
2. Fulfillment of the Foreign Language Requirement (see above).
3. Field experience in Latin America (study abroad, summer research, internship, and so on).
4. Submission in the senior year of a research paper of acceptable quality on a topic pre-approved by the Subcommittee on Undergraduate Programs and written under the guidance of a faculty adviser. Up to 15 units may be given for preparation of the senior paper, but no more than 5 of these units may be counted toward the 20 units in "b." Prior to the end of the Spring Quarter of the junior year, students who wish to write an honors thesis must present for approval a written proposal with faculty sponsorship. Only the completion of an honors thesis of substantial quality earns the degree designation of Honors in Latin American Studies.

SUMMER FIELD RESEARCH

Each summer, the center awards research grants to a small number of undergraduates to conduct individual research projects in Latin America. Students must have demonstrated the ability to work independently and must possess the necessary language competence. Applications must include a research proposal that has been reviewed and endorsed by a faculty member who agrees to serve as sponsor. A pre-fieldwork course, Latin American Studies (LAS) 165, is required the Spring Quarter before departure. Students from all departments are eligible to apply.

GRADUATE PROGRAMS

MASTER OF ARTS

The M.A. in Latin American Studies is designed for students who wish to develop an advanced interdisciplinary area focus prior to the pursuit of: (1) a Ph.D. in one of the disciplines; (2) a professional degree, for example, J.D., M.B.A., M.D.; or (3) a career in business, government, international development, journalism, teaching, or another field in which advanced knowledge of the region is desirable.

Entering M.A. students are expected to possess language proficiency at the minimum of the university-intermediate level in either Spanish or Portuguese, to have completed a course surveying the history of the region as well as training in at least one of the social sciences, and to have field experience (study abroad, extended residence, internship) in Latin America. Applicants must also take the General Test of the Graduate Record Examination (GRE) and have the results sent to Graduate Admissions, Office of the Registrar. Candidates whose native language is not English and who have not studied in an English-speaking institution for at least one and one-half years must take the Test of English as a Foreign Language (TOEFL). The deadline for submission of applications for admission and financial aid is January 1. Admission is normally granted only beginning in Autumn Quarter.

The M.A. is normally completed in one academic year. A total of 45 units is required, distributed as follows:
1. Ten units offered in the Autumn and Winter Quarters as the A.M. core seminar (LAS 250 and 251).

2. Twenty units in one of the three core concentrations: Culture and Identity; Political Economy, or Ecology, Environment, and Health. All of the units must be at the 100-level or higher, with no fewer than 10 units at the 200-level or higher.

3. Fifteen units at the 100-level or higher, drawn from an approved list of courses outside the core concentration. No more than 5 of these 15 units may be devoted to individual directed research (LAS 269).

A minimum of 5 units of course work must be devoted to language study. These units must be taken for a letter grade. Students who already possess proficiency in Spanish are encouraged to pursue the study of Portuguese or a language indigenous to the region (for example, Quechua, Quiche Maya, Haitian Creole).

All A.M. students are expected to complete a non-credit workshop on bibliographic resources given early in the Autumn Quarter.

In addition, at the end of the Spring Quarter students must either: (1) pass a comprehensive written exam, or (2) submit an extended research paper of satisfactory quality. The research option requires approval early in the Winter Quarter, based on the submission of an advanced proposal with faculty sponsorship. No more than 10 of the 45 required units may be devoted to individual directed research (LAS 269), and no more than 5 units of LAS 269 may be applied to the 15-unit breadth requirement of item ‘3’ above.

Concurrent Degree Programs—The Center for Latin American Studies collaborates with the schools of Business (M.B.A.), Education (M.A.T.), Law (J.D.), and Medicine (M.D.) to allow students to simultaneously pursue concurrent degrees in LAS (A.M.) and the respective professional field. Students must apply to and be independently admitted to both degree programs. For additional information about specific plans of study and degree requirements, contact the Center for Latin American Studies.

Summer Field Research—The center awards summer research grants for continuing graduate students to conduct individual research projects in Latin America. A competition is held each Spring Quarter, and continuing graduate and professional school students in any field and at any level are eligible to apply. Applicants must provide evidence of appropriate language competence and have the sponsorship of a faculty member. For additional information, contact the Center for Latin American Studies.

DOCTOR OF PHILOSOPHY

Since the University does not offer a Ph.D. in Latin American Studies, students who wish to remain in an academic program at Stanford after completing their A.M. must be accepted by one of the departments offering a Ph.D. with an emphasis on Latin America.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

See the respective department section of this bulletin for cross-listed course descriptions.

80/170. Culture, Politics, and Society in Latin America—(Same as History 80.) Introduction to the political and social history of Latin America. Emphasis is on the interaction between institutional change, social structure, and political movements, emphasizing the environment and cultural values. GER:3b,4a (DR:2 or 9) (WIM)

5 units, Win (Wirth)

87Q. Stanford Introductory Seminar: Urbanization, Poverty, and Children in Latin America—Preference to sophomores. Regional issues through the study of street children in Latin America: rural-urban migration patterns, the informal economy and labor sector, human rights, ethnicity and identity, the costs of structural adjustment policies, environmental and other health hazards, the role of public and private institutions, and grassroots mobilization. Disciplinary perspectives on

the plight of street children include sociological and demographic profiles; psychological studies; depictions in literature, film, and popular culture; ethnographies; and economic analyses. Case studies of institutional responses. Enrollment limited to 10.

5 units, Win (Morrison)

117K. Global Politics of Human Rights—(Enroll in Political Science 117K.)

5 units, Win (Karl)

120. Chilean Studies: Modern Chilean Culture through Music, Film, and Literature 1945-1997—(Same as Spanish 168E.) Recommended for students planning to attend the Santiago program and open to all students. Introduction to the history, culture, politics, and literature of Chile, mainly in the 20th century.

3-5 units, Spr (Missana)

122A. The Maya—(Enroll in Anthropological Sciences 122.)

5 units, Win (Fox)

137A. Darwin, Evolution, and Galapagos—(Enroll in Anthropological Sciences 137.)

5 units, Win (Durham)

142. Incas and their Ancestors: Peruvian Archaeology—(Enroll in Anthropological Sciences 142.)

5 units, Spr (Rick)

161. Conservation and Community Development Issues in the Amazon—(Enroll in Anthropological Sciences 161.)

5 units (Durham) not given 1999-2000

165A. Human Ecology of the Amazon—(Enroll in Anthropological Sciences 165.)

5 units, Win (Lu)

165. Introduction to the Design and Methodology of Interdisciplinary Field Research—Preparation for summer fieldwork in Latin America or other regions. Issues of interdisciplinary research design and methodology; the relationship between evidence and argument; practicalities of field research in developing countries; ethical and political considerations.

5 units, Spr (Staff)

169/269. Directed Individual Study—(Graduate students register for 269.) For students engaged in special interdisciplinary work that cannot be arranged by department.

1-5 units, Aut, Win, Spr (Staff)

181. Undergraduate Colloquium: Slavery and Race Relations in the Americas—(Enroll in History 283A.)

5 units (Klein) not given 1999-2000

181/281. Political Systems of Argentina, Brazil, and Chile—Similarities and contrasts between the class structures, populist experiences, dictatorial periods, and emerging party systems. Recommended: some previous knowledge of these countries.

5 units, Spr (Di Tella)

192. The Information Revolution in Latin America—Obstacles and Opportunities through the Internet—Multiple disciplines are used to analyze the opportunities and obstacles that the Information Revolution presents for newly developing countries in Latin America. Students develop the framework and tool set for formulating, evaluating, and recommending possible policy changes and courses of action through country case studies. Topics: internet infrastructure issues; technology transfer, human capital formation, and capacity-building; challenges of access and opportunity; government policy and the role of the private sector.
sector; strategies for enterprise development. Mandatory weekly section. 
Limited enrollment.
5 units, Aut (Staff)

194. Latin American Philosophy—(Enroll in Philosophy 194V.)
4 units, Spr (Vargas)

195. Perspectives on Sustainable Development in Latin America—
Cross-disciplinary examination of perspectives for “sustainable develop-
ment” in rural areas of Latin America. Interactions between poverty,
development, environmental degradation, and approaches to growth and
sustainability in agroecology, agroforestry, small farm development,
and conservation biology. Limited enrollment.
5 units, Win (Rosset)

198. Senior Thesis—Restricted to undergraduate majors and those
writing the honors thesis in Latin American Studies.
1-10 units, Aut, Win, Spr (Staff)

199. Senior Seminar in Latin American Studies—Required for senior
majors in LAS and open to seniors writing honors theses related to Latin
America.
5 units, Win (Morrison)

221K. Seminar: Comparative Democratization—Latin American and
other Regions—(Enroll in Political Science 221K.)
5 units, Aut (Karl)

250. Graduate Core Seminar in Latin American Studies: Discourses
of Race and Identity in Latin America—Restricted to A.M. degree
students, or consent of instructor. A historical approach to the debate on
race and identity in Latin America. Analysis of the works of Sarmiento,
DaCunha, Marti, Rodo, Vasconcelos, Mariategui, Freyre, Paz, Menchu,
and Ferre.
5 units, Aut (Sid)

251. Graduate Core Seminar in Latin American Studies: Society and
Politics in Latin America—Restricted to A.M. degree students, or
consent of instructor. Analysis of social structures and political systems
in the main Latin American countries. Review and interpretation of
events since the 1920s provides the basis for comparative conclusions.
5 units, Win (Di Tella)

306B. Design and Methodology for International Field Research—
(Enroll in History 306B.) Preparation for area studies field research.
Collaborative project of centers for African, East Asian, Latin American,
and Russian and East European Studies.
1 unit, Win (Kollman)

AFFILIATED DEPARTMENT OFFERINGS

The courses listed below by department deal primarily with Latin
America. See the respective department listings for course descriptions
and General Education Requirement (GER) information. Additional
relevant courses by resident or visiting faculty may be offered; for up-
dated information, consult the quarterly Time Schedule or contact the
Center for Latin American Studies for a list of approved courses and their
respective core concentration areas.

ANTHROPOLOGICAL SCIENCES

3. Introduction to Prehistoric Archaeology
3-5 units, Aut (Rick)

23N. Stanford Introductory Seminar: Maya Mythology Multimedia
Project
3 units (Fox) not given 1999-2000

111. Language and Prehistory
5 units, Spr (Fox)

123. Environmental Issues in the Americas
5 units (Staff) not given 1999-2000

141. Hunter-Gatherers in Archeological Perspective
5 units (Rick) not given 1999-2000

158. Theories in Demography
4 units, Win (Wilson)

162. Indigenous Peoples and Environmental Problems
3-5 units (Durham, Charnley) not given 1999-2000

163. Community-Based Conservation
5 units (Charnley) not given 1999-2000

164. Ecological Anthropology
5 units, Spr (Durham, Charnley)

167. Social Policy for Sustainable Resource Use
5 units, Win (Irvine)

168. Ecology and Equity
5 units, Win (Guha)

170. Medical Anthropology
5 units, Aut (Barnett)

203. Theory and Method in Cultural Evolution
5 units (Durham) not given 1999-2000

208. Models and Imaging in Anthropological Computing
3 units, any quarter (Rick)

250. Advanced Ecological Anthropology
5 units (Staff) not given 1999-2000

251. Anthropological Solutions to Environmental Problems
5 units (Staff) not given 1999-2000

252. Political Ecology
5 units (Durham) not given 1999-2000

266. Human Evolutionary Ecology
5 units, Spr (La)

267. Social Policy for Sustainable Resource Use
5 units, Win (Irvine)

269. Research Methods in Ecological Anthropology
5 units (Staff) not given 1999-2000

270. Advanced Medical Anthropology
5 units, Win (Barnett)

COMMUNICATION

133/233. Communication and Culture
4 units, Win (Bar)

155/255. Interethnic Communication
4 units (Leets) not given 1999-2000

166/266. Communication Policy in Comparative Perspectives
4 units, Win (Bar)

176. International Communication
4 units (Staff) not given 1999-2000

CULTURAL AND SOCIAL ANTHROPOLOGY
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Terms</th>
<th>Instructors</th>
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</thead>
<tbody>
<tr>
<td>86.</td>
<td>Environmental Politics and Development</td>
<td>5</td>
<td>Spr (Gupta)</td>
<td></td>
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<tr>
<td>93.</td>
<td>Prefield Research Seminar</td>
<td>5</td>
<td>Spr (Rosaldo)</td>
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<tr>
<td>94.</td>
<td>Postfield Research Seminar</td>
<td>5</td>
<td>Aut (Delaney)</td>
<td></td>
</tr>
<tr>
<td>133A,B,C</td>
<td>Ethics of Development in a Global Environment (EDGE)</td>
<td>1-4</td>
<td>Aut, Win, Spr (Lasignan, Gupta)</td>
<td></td>
</tr>
<tr>
<td>138.</td>
<td>Anthropology of Medicine: Illness, Suffering, and Health Policy</td>
<td>5</td>
<td>Spr (Kohman)</td>
<td></td>
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<tr>
<td>DANCE</td>
<td>42. Dances of Latin America</td>
<td>1</td>
<td>Aut (Cashion)</td>
<td></td>
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<tr>
<td></td>
<td>43. Afro-Brazilian and Afro-Peruvian Dance</td>
<td>1</td>
<td>Aut (Cashion)</td>
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<tr>
<td></td>
<td>75. Mexican Dance and Folklore</td>
<td>2</td>
<td>Win (Cashion)</td>
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<tr>
<td>ECONOMICS</td>
<td>99Q. Stanford Introductory Seminar: State, Market, and Development</td>
<td>5</td>
<td>Aut (Meier)</td>
<td></td>
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<tr>
<td></td>
<td>106. The World Food Economy</td>
<td>5</td>
<td>Win (Falcon, Naylor)</td>
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<tr>
<td></td>
<td>118. The Economics of Development</td>
<td>5</td>
<td>Spr (Chun)</td>
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<tr>
<td></td>
<td>165. International Economics</td>
<td>5</td>
<td>Win (Razin)</td>
<td>Spr (Kumhof)</td>
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<td></td>
<td>265. International Finance</td>
<td>5</td>
<td>Aut (Kumhof)</td>
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<td></td>
<td>266. International Trade Theory</td>
<td>5</td>
<td>Win (A. Krueger, Razin)</td>
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<tr>
<td></td>
<td>267. Special Topics in Intertemporal Economics</td>
<td>5</td>
<td>Spr (A. Krueger, Razin)</td>
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<tr>
<td></td>
<td>315A,B,C. Workshop in Economic Development</td>
<td>10</td>
<td>Staff</td>
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<tr>
<td></td>
<td>365A,B,C. Workshop in International Economics</td>
<td>10</td>
<td>Staff</td>
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<tr>
<td>EDUCATION</td>
<td>197. Education and the Status of Women: Comparative Perspective</td>
<td>4-5</td>
<td>Win (Ramirez)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>202. Introduction to Comparative and International Education</td>
<td>4-5</td>
<td>Aut (Carnoy)</td>
<td></td>
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<tr>
<td></td>
<td>283. Attitudes toward Language and Language Study</td>
<td>3</td>
<td>Padilla</td>
<td>not given 1999-2000</td>
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<tr>
<td></td>
<td>306A. Education and Economic Development</td>
<td>5</td>
<td>Win (Carnoy)</td>
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<tr>
<td></td>
<td>306B. Seminar: The Politics of International Cooperation in Education</td>
<td>3-4</td>
<td>Spr (Mundy)</td>
<td></td>
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<tr>
<td></td>
<td>306C. Technologies of the Mind</td>
<td>4</td>
<td>Spr (McDermott)</td>
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<tr>
<td></td>
<td>306D. World, Societal, and Educational Change: Comparative Perspectives</td>
<td>3-5</td>
<td>Aut (Ramirez)</td>
<td></td>
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<tr>
<td></td>
<td>335X. Language Policy and Planning: National and International Perspectives</td>
<td>3</td>
<td>Spr (Valdés)</td>
<td></td>
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<tr>
<td></td>
<td>376. Education and Theories of the State</td>
<td>5</td>
<td>Win (Carnoy)</td>
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<tr>
<td></td>
<td>387A,B,C. Workshop: Comparative Studies of Educational and Political Systems—(Same as Sociology 311A,B,C.)</td>
<td>2-5</td>
<td>Aut, Win, Spr (Meyer, Ramirez)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>406X. Topics in Comparative Educational Research</td>
<td>1-3</td>
<td>Ramírez</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td></td>
<td>408. Research Workshop in International and Comparative Education</td>
<td>2-5</td>
<td>Win (Carnoy)</td>
<td></td>
</tr>
<tr>
<td>GEOPHYSICS</td>
<td>50Q. Stanford Introductory Seminar: Earthquakes and Archaeology in the Eastern Mediterranean—Lectures and Fieldtrip</td>
<td>2</td>
<td>Win (Nur)</td>
<td></td>
</tr>
<tr>
<td>HISTORY</td>
<td>50N. Stanford Introductory Seminar: The Black Atlantic</td>
<td>4</td>
<td>Win (Thompson)</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td></td>
<td>177. Modern Latin America</td>
<td>5</td>
<td>Spr (Haber)</td>
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<tr>
<td></td>
<td>248A. Undergraduate Colloquium: The End of Slavery in Africa and the Americas</td>
<td>5</td>
<td>Win (R. Roberts)</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td></td>
<td>263B/363B. Undergraduate Colloquium: The Making of the Atlantic World, 1600-1960</td>
<td>5</td>
<td>Win (Saville)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>276/376. Undergraduate Colloquium: The Creation of North America</td>
<td>5</td>
<td>Win (Wirth)</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td></td>
<td>277/377. Undergraduate/Graduate Colloquium: History and Public Policy—The Political Economy of Economic Growth</td>
<td>5</td>
<td>Win (Haber)</td>
<td>not given 1999-2000</td>
</tr>
<tr>
<td></td>
<td>278. Undergraduate Colloquium: Historical Aspects of Underdevelopment in Latin America</td>
<td>5</td>
<td>Win (Haber)</td>
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</tr>
<tr>
<td></td>
<td>281 A/381 A. Undergraduate/Graduate Colloquium: Environment of the Americas</td>
<td>4-5</td>
<td>Win (Wirth)</td>
<td></td>
</tr>
</tbody>
</table>
282/382. Undergraduate Colloquium: The Agrarian Origins of Underdevelopment in Latin America
  5 units (Haber) not given 1999-2000

283/383. Undergraduate/Graduate Colloquium: The Process of Industrialization—Europe, the United States, and Latin America
  4-5 units (Haber) not given 1999-2000

476. Graduate Seminar on Brazil
  4-5 units (Wirth) not given 1999-2000

477. Graduate Seminar: Economic and Social History of Colonial Latin America
  4-5 units, Spr (Klein)

478. Graduate Seminar: Economic and Social History of Latin America
  4-5 units, Spr (Haber) not given 1999-2000

482. Graduate Seminar: Historical Approaches to Social Science
  4-5 units, Spr (Haber)

HUMAN BIOLOGY

167. International Health
  3 units (Staff)

172. Indigenous Forest Management
  5 units (Irvin) not given 1999-2000

POLITICAL SCIENCE

25. Colonialism and Nationalism in the Third World
  5 units (Abernethy) given 2000-01

35/135. International Politics
  5 units, Aut (Krasner)

112M. Parties and Elections in Latin America
  5 units, Win (Magaloni)

113A. Politics and Development in Latin America
  5 units, Win (Magaloni)

114K. Political Economy of Development
  5 units (Karl) not given 1999-2000

116L/216L. Comparative Democratic Development
  5 units, Spr (Diamond)

132D. Seminar: Controversies over Foreign Aid
  5 units (Abernethy) given 2000-01

142S. Seminar: Advanced Study in the United Nations and the Wars of the 1990s
  5 units (Stedman) not given 1999-2000

211M. Seminar: Comparative Party Politics and Elections
  5 units, Spr (Magaloni)

212M. Seminar: Comparative Political Institutions
  5 units, Spr (Magaloni)

213P. Seminar: Economic Reform and Development in Latin America
  5 units (Packenham) not given 1999-2000

224. Seminar: States and Markets in Development
  5 units (Packenham) not given 1999-2000

227D. Seminar: Consolidating Democracy
  5 units (Diamond) given 2000-01

228D. Seminar: Non-Governmental Organizations and Development in Poor Countries
  5 units (Abernethy) given 2000-01

267. Seminar: Gender, Development, and Women’s Human Rights in International Perspective—(Same as 167.)
  5 units, Aut (Okin)

297. Graduate Seminar: The Political Economy of Immigration
  5 units (Wong) given 2000-01

311. Graduate Seminar: Major Theories in Comparative Politics
  5 units, Aut (Packenham)

314K. Seminar: Political Economy of Development
  5 units (Karl) not given 1999-2000

SCIENCE, TECHNOLOGY, AND SOCIETY

279. Technology Policy and Management in Newly-Industrializing Countries
  2-4 units, Aut (Forbes)

SOCIOLOGY

110/210. Politics and Society
  5 units, Spr (McAdam)

311A,B,C. Workshop: Comparative Studies of Educational and Political Systems—(Same as Education 387A,B,C.)
  2-5 units, Aut, Win, Spr (Meyer, Ramirez)

SPANISH AND PORTUGUESE

PORTUGUESE

134. Brazilian Cultural Perspectives
  4 units (Sá)

193Q. Stanford Introductory Seminar: Spaces and Voices of Brazil
  3-5 units (Wiedemann)

SPANISH

102. Composition and Writing Workshop
  4 units, Spr (Cartagena-Calderón)

112N. Stanford Introductory Seminar: The U.S.-Mexico Border Region in Film and Literature
  3-5 units (Fox)

113N. Stanford Introductory Seminar: Latin American Culture in the '60s
  3-5 units, Win, Spr (Ruffinelli)

114N. Stanford Introductory Seminar: Lyric Poetry
  3-5 units (Predmore)

130N. Stanford Introductory Seminar: Reading the Rain Forest—Visions of the Amazon
  3-5 units, Aut (Sá)

131. Spanish American Cultural Perspectives
  4 units, Aut (Schroeder)

132. Mexican and Chicano Cultural Perspectives
  4 units, Aut (Prieto)

135. Caribbean Cultural Perspectives
  4 units, Win, Spr (Negrón, Johnson)

140. Introduction to Methods of Literary and Cultural Analysis
  3-5 units, Aut (Rosa)
Spanish American Literature I  
3-5 units, Win (Rosa)

Spanish American Literature II  
3-5 units, Spr (Staff)

Brazilian Literature II  
3-5 units, Spr (Sd)

Introduction to Chicana/o Life and Culture  
5 units (Yarro-Bejarano) given 2000-01

Fiction and Political Imagination  
3-5 units, Spr (Pratt)

Academic Writing Workshop  
5 units (Ruffinelli)

Spanish use in Chicano Communities  
3-5 units (Valdés)

Theory and Issues in the Study of Bilingualism  
3-4 units (Valdés)

Magical Realism: Gabriel García Márquez  
3-5 units (Ruffinelli)

Mexico through the Eyes of Buñuel and Ripstein  
3-5 units, Spr (Ruffinelli)

Dictatorships Aftermath: New Literature/New Cinema  
3-5 units, Spr (Ruffinelli)

Power, Resistance, and Culture  
3-5 units (Rosa)

The Southern Cone Dictatorships  
3-5 units (Sd)

Market and Culture in the Caribbean  
3-5 units, Aut (Rosa)

Senior Seminar: Pan-American Movements—(WIM)  
3-5 units (Fox)

"Flor y Canto" A Poetry Workshop  
3-5 units (Moraga)

Chicana/o Cultural Studies  
3-5 units, Spr (Yarbo-Bejarano)

Concepts of Literacy and Cultural Theory  
3-5 units (Rosa)

Latin American Cultural Theory: A Historical Perspective  
3-5 units (Sd)

Gabriel García Márquez and Magical Realism  
3-5 units, Win (Ruffinelli)

Latin American Fiction of the 1990s  
5 units, Aut (Pratt)

Latin American Short Story: Theory and Practice  
3-5 units (Ruffinelli)

Third Cinema and After  
3-5 units (Fox)

A Latin American Woman Voice: Clarice Lispector  
3-5 units, Win (Sd)

OVERSEAS STUDIES  
These courses are approved for the Latin American Studies major as taught at the campus indicated. Students should discuss with their major advisers which courses would best meet their educational needs. Course descriptions can be found in the "Overseas Studies" section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

PUEBLA  
104X. Cholula: The Working of a Sacred City  
5 units, Win (Knab)

105X. Mexico: Explaining Change in an Era of Globalization  
5 units, Win (Morales)

113X. Economics of Emerging Financial Markets—(Same as Overseas Studies 112X.)  
5 units, Win (Castañeda)

114X. Development Macroeconomics: The Mexican Case  
5 units, Win (Cárdenas)

SANTIAGO  
118X. Cultural Modernization: The Case of Chile  
5 units, Win (Fuenzalida)

120X. Modernization and Culture in Latin America  
5 units, Aut, Spr (Subercaseaux)

121X. Social Heterogeneity in Latin America—(Same as Overseas Studies 111.)  
5 units, Aut (Valdés)

122X. Man-Environment Interactions: Case Studies from Central Chile—(Same as Overseas Studies 106H.)  
5 units, Aut (Hajek)

129X. Latin America in the International System  
4-5 units, Win (Rojas)

130X. Latin American Economies in Transition  
5 units, Aut (Muñoz)

162X. Core Seminar: Ecology-Policy Studies  
5 units, Win (Ffrench-Davis)

163X. Latin America in the International Economy  
5 units, Win (Ffrench-Davis)

LINGUISTICS  
Emeriti: (Professors) Clara N. Bush, Joseph H. Greenberg  
Chair: Stanley Peters  
Professors: Joan Bresnan, Eve V. Clark, Penelope Eckert, Shirley Bit-Heath, Martin Kay, Paul Kiparsky, William R. Leben, Beth Levin(leave), Stanley Peters, John R. Rickford, Ivan A. Sag, Elizabeth Traugott, Thomas A. Wasow  
Associate Professor: Peter Sells  
Assistant Professors: David Beaver, Edward Flemming, Christoph Manning  
Consulting Professor: John Baugh  
Senior Lecturers: Philip L. Hubbard, Beverley J. McChesney  
Acting Assistant Professor: Michael Dukes  
Consulting Professors: Jerry Hobbs, Charlotte Linde, Geoffrey Nunberg  
Consulting Associate Professor: Jared Bernstein
Linguistics concerns itself with the fundamental questions of what language is and how it is related to the other human faculties. In answering these questions, linguists consider language as a cultural, social, and psychological phenomenon and seek to determine what is unique in languages, what is universal, how language is acquired, and how it changes. Linguistics is, therefore, one of the cognitive sciences; it provides a link between the humanities and the social sciences, as well as education and hearing and speech sciences.

The department offers courses at the undergraduate and graduate levels in the areas central to linguistic theory and analysis. Many of them deal with the analysis of structural patterns in the different components that make up language, including sounds (phonetics and phonology), meanings (semantics), words (morphology), sentences (syntax), and the way they change. Other courses integrate the analysis of linguistic structure with phenomena that directly concern other disciplines. These include courses in computational linguistics, language acquisition, the philosophy of language, and sociolinguistics.

A variety of open forums provide for the discussion of linguistic issues, including colloquia and regularly scheduled workshops in child language, phonology, semantics, sociolinguistics, and syntax. Faculty and visiting scholars in the Cognitive Science Group and the Center for the Study of Language and Information, whose members are linguists, philosophers, psychologists, and computer scientists, participate extensively in the activities of the department.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The undergraduate major stresses the study of language both as a fundamental human faculty and as a changing social institution. At the core of the program is a set of departmental courses on the nature of human language; in addition, the major draws on courses offered by other departments and programs.

The Linguistics major cuts across the humanities, social, and physical sciences, and provides a solid general education as a background for advanced studies in such disciplines as anthropology, communication, computer science, education (language, literacy, and culture), hearing and speech sciences, languages, law, linguistics, philosophy, and psychology.

REQUIREMENTS

Requirements for the A.B. include at least 50 units of course work in linguistics and related fields (typically twelve courses plus Linguistics 197, Linguistics Seminar), and a short research paper. No more than twelve of the 50 units may be below 100-level. No more than two courses, neither of which can be a core course, may be taken on a credit/no credit basis.

Core Courses—The core courses are:

110. Introduction to Phonetics and Phonology
120. Introduction to Syntax
130. Introduction to Linguistic Meaning
150. Language in Society, which fulfills the writing requirement (WIM)
160. Introduction to Language Change, or, in consultation with their adviser, a course in historical linguistics or the history of a language

All majors must complete at least four core courses, including 150, Language and Society, which fulfills the writing requirement (WIM).

Other Courses—Other courses counting toward the unit requirement should form a coherent program and be approved by an adviser. Students select emphases from among the areas of concentration listed below (or design one in consultation with their adviser). Students should consult with an adviser when declaring the major, and maintain regular contact during the remainder of their Stanford career.

Of the 50 units for the major, at least 16 come from the core courses. If only four core courses are taken, Linguistics 1, Introduction to Linguistics, is required for breadth. Students must also take:

1. At least two 200-level Linguistics courses.
2. Linguistics 197, preferably in the junior year. This course is offered each year for 2 units and may be repeated. The goal is to provide a forum for students to work on a small project that helps define a focus for their linguistic studies at Stanford.

Language Requirement—Majors must have competence in at least one language other than English as part of their understanding of the field of linguistics and its study. This is usually demonstrated by the completion of six quarters of language study at Stanford or equivalent (level of proficiency is determined by the Language Center or the relevant language department).

Research Paper—Students complete a short (10-15 page) primary research paper with a grade of 'B' or better by the end of their junior year (special arrangements can be made for transfer students and others who start the major late). The research paper requirement may be fulfilled in one of the following three ways:

1. Completion of a research paper project in a Linguistics course (for example, 110, Phonetics and Phonology; 124, Introduction to Formal Universal Grammar; 137, Symbolic Systems Seminar; 150, Language in Society; 182, Introduction to Typology) subject to approval of the instructor.
2. Expansion of the pilot research project in a Linguistics course (for example, 140, Language Acquisition; or 197, Linguistics Seminar) into a research paper. Typically, students sign up for 1 additional unit of 199, Independent Study, with a faculty adviser.
3. Writing a paper in the context of a 2-unit independent research course (199, Independent Study).

AREAS OF CONCENTRATION

Students select one of the following areas of concentration or develop one themselves. All areas of concentration should be designed in advance in consultation with an undergraduate adviser in Linguistics. See the department’s web pages for details.

General Linguistics (all five core courses required)
Language and Society
Language Specialization
Language Structures

MINORS

Requirements for the minor include at least 28 units of course work (typically seven courses) in linguistics and related fields. The minor consists of:

1. Linguistics 1, Introduction to Linguistics
2. Two out of the following five Linguistics core courses:
   110. Introduction to Phonetics and Phonology
   120. Introduction to Syntax
   130. Introduction to Linguistic Meaning
   150. Language in Society
   160. Introduction to Language Change (or, in consultation with their adviser, a course in historical linguistics or the history of a language)
3. At least four other courses. Students are encouraged to take at least one 200-level Linguistics course. Students may also choose to do independent work with a faculty member of their choice.

Students should work out a coherent program in advance in consultation with a Linguistics undergraduate adviser who should ascertain that the courses chosen are offered during the time of anticipated enrollment. The courses counting toward the minor must be incremental units beyond
those needed to satisfy the major. They should form a coherent program, and are subject to approval by the Linguistics Undergraduate Studies Committee.

HONORS PROGRAM

Students who wish to undertake a more intensive program of study, including independent research, should seek departmental honors. An application to pursue honors work should be presented to a Linguistics undergraduate adviser before the end of the junior year. Approval is given only to students who have maintained a grade point average (GPA) of 'B+' or better in the courses required for the major.

Honors students take a total of 60 units. These must include the 50 units for the major, 10 additional units, and an honors thesis based on research conducted with a principal adviser who must be a member of the Linguistics faculty, and a secondary faculty adviser, who may, with the approval of the Undergraduate Studies Committee, be a member of another department. In the Autumn Quarter of the senior year, honors students enroll in Linguistics 199, Independent Study, to work closely with one of the advisers on the research project. In Winter and Spring Quarters, honors students register in 198, Honors Research, with the principal adviser for close supervision of the honors thesis. The thesis must be submitted in final, acceptable form by May 15. The thesis topic is presented orally at a department Honors Colloquium late in Spring Quarter.

COTERMINAL A.M.

The Department of Linguistics admits a very limited number of undergraduates to work for their coterminal degree in Linguistics. Students are required to submit to the department a complete application, which includes a statement of purpose, a Stanford transcript, three letters of recommendation (at least one of which must be from a faculty member in Linguistics), and a proposed course of study (worked out in advance with a Linguistics adviser). Applicants for the coterminal degree may apply as early as their eighth quarter and no later than early in the eleventh quarter of undergraduate study. Decisions on admission to the coterminal degree rest with the Graduate Admissions Committee of the Department of Linguistics. For further application information and criteria, see the department’s web pages.

GRADUATE PROGRAMS

MASTER OF ARTS

The University’s basic requirements for the master’s degree are discussed in the “Graduate Degrees” section of this bulletin. The following are additional departmental requirements. Candidates should review the department’s “Guidelines for the A.M. and Ph.D. Degrees” for further particulars concerning these requirements.

1. Courses: candidates must complete a minimum of 40 units of graduate work in linguistics, including at least four courses in the student’s area of specialization. No more than two courses should be at the 100 level.

Individual programs should be worked out in advance with an adviser who should ascertain that the necessary courses in the area of specialization are offered over the course of the year of anticipated enrollment. The overall grade point average (GPA) must be at least ‘B’ for all degree program course work.

2. Language: reading knowledge of a non-native language in which a substantial linguistic literature is written, with sufficient facility to understand and interpret linguistic research published in that language or in-depth research on the structure of a non-native language.

3. Thesis or Thesis Project: a research paper supervised by a committee of three faculty (normally fulfilled by up to 6 units of Linguistics 398, Directed Research).

DOCTOR OF PHILOSOPHY

The following requirements are in addition to the basic University requirements for the degree sought; see the “Graduate Degrees” section of this bulletin. Candidates should review the department’s “Guidelines for the A.M. and Ph.D. Degrees” for further particulars concerning these requirements.

1. Language: candidates must demonstrate the ability to read at least one foreign language in which a substantial linguistic literature is written, with sufficient facility to understand and to interpret linguistic research published in that language. (Particular areas of specialization may require additional research languages.)

In addition, each candidate must demonstrate an explicit in-depth knowledge of the structure of at least one language (normally neither the candidate’s native language nor the language used for the required exam). This requirement is fulfilled by writing an original research paper on a language.

2. Courses: a minimum of 80 units of graduate work beyond the A.M. or B.S. exclusive of dissertation units or, beyond the A.M., 40 units exclusive of dissertation units. A basic course requirement details in the Ph.D. guidelines guarantees that each student covers a sufficient set of subareas within the field.

Candidates must maintain a satisfactory record in the number and distribution of units completed. The overall course work GPA must be at least 'B,' and all of the "basic" courses should be completed with at least a 'B.'

3. Research: the prospective Ph.D. candidate is expected to complete two substantial qualifying papers. The deadline for completion of the first qualifying paper is the end of the Autumn Quarter of the second year; the deadline for completion of the second qualifying paper is the end of Spring Quarter of the second year. The subject matter of the two papers, although it may be related (for example, same language), must be clearly distinct. The requirement is fulfilled by 395A, Research Workshop (2 units each), and oral discussion with a committee of at least three faculty members selected by the student at the faculty.

4. Candidacy: students must complete the basic course requirement (see item 2 above), one foreign language requirement (see item 1 above), and one qualifying paper (see item 3 above) by the end of their second year.

5. Teaching: at least three quarters serving as teaching assistant in linguistics course; students on University fellowships teach four quarters.

6. Colloquia: two oral presentations exclusive of the oral presentation of the dissertation proposal (see item 7 below). This requirement is satisfied by class presentations, conference papers, or colloquium talks. Normally, both should be given during the first three years of study.


b) Oral presentation of the dissertation proposal, preferably at colloquium.

c) Approval of the dissertation topic and appointment of dissertation committee.

d) Successful passing of a University oral examination on the dissertation and related areas.

e) Dissertation (up to 15 units of 399).

Ph.D. MINOR

1. Courses: the candidate must complete 30 units of course work in linguistics at the 100 level or above, including 110, 120, and 130 (10 level courses are waived if 200-level courses in the same area are taken), and at least three courses related to the area of specialization.

Courses submitted for the minor must be incremental units beyond those used to satisfy the major. Individual programs should be worked out in advance with the student’s Ph.D. minor adviser in Linguistics.

2. Research Project (optional): the candidate may elect to present a paper, which integrates the subject matter of linguistics into the field of specialization of the candidate.

3. The linguistics adviser or designee serves on the candidate’s University oral examination committee and may request that up to one-third of the examination be devoted to the minor subject.
Linguistics involves the study of language, the processes of language acquisition and change, and the structure and meaning of language. Courses in this field are designed to provide students with a deep understanding of language as a cognitive and social instrument. Topics include the sound patterns of a language, the structure of words and sentences, and the analysis of meaning. The course offerings are divided into various categories, including General Linguistics, Phonetics, Phonology, and Morphology, and Syntax, Semantics, and Pragmatics; Mathematical and Computational Linguistics.

1. Introduction to Linguistics

At all levels, the course numbering indicates a special area, as follows:
- 00-04 General
- 05-19 Phonetics, Phonology, and Morphology
- 20-39 Syntax, Semantics, and Pragmatics; Mathematical and Computational Linguistics
- 40-49 Language Acquisition and Psycholinguistics
- 50-59 Sociolinguistics
- 60-69 Language Change, Language, and Culture
- 70-84 Linguistic Analysis of a Language
- 85-94 Methods
- 95-99 Directed Work, Theses, Dissertations

1N. Stanford Introductory Seminar: Accents of English

Preferences to freshmen. The accents of English, focusing on the U.S. and other parts of the world. GER:3b (DR:9) 4 units, Win (Leben)

1Q. Stanford Introductory Seminar: Slips of the Tongue

Preferences to sophomores. Slips of the tongue and other types of linguistic mistakes, using collections of real-life errors as windows on how languages are structured and used. 3 units, Win (Zwicky)

30Q. Stanford Introductory Dialogue: Legal Language

Preference to sophomores. Why is legal language so different from ordinary English? Can it be simplified? How legal language became crystallized in the quest for precision, definition, and the goals of the profession. The various purposes and audiences of legal language in the courtroom and in documentation. The history of legal language in English. 2 units, Aut (Traugott)

35Q. Stanford Introductory Seminar: Computers and Human Language

Preferences to sophomores. Will computers use natural language to understand, communicate, or translate? Why is language processing difficult? How like a human must one be to understand human language? GER:2b (DR:6) 3 units, Win (Hubbard, Kay)

44N. Stanford Introductory Seminar: Living with Two Languages

Preferences to freshmen. The nature of bi- and multilingualism, with emphasis on the social and educational effects in the U.S. and worldwide, in individual vs. society, and in the child and the adult. The social, cognitive, psycholinguistic, and neurological consequences of bilingualism. Participation in planning and carrying out a survey of language use on campus to establish the language background, range of languages spoken, contexts of use, and general attitudes towards each language used. GER:3b (DR:9) 3 units, Spr (E. Clark)

62. History of English Language

(As English 102.) not given 1999-2000

64. Development of Englishes Around the World

The emergence of standard English in Britain in connection with the establishment of Caxton's printing press in the late 15th century. The transformation of English in the context of colonialism and postcolonialism, focusing on the United States, the Caribbean, South Asia, and Africa. The characteristics of these languages, their literary/expressive, social, and political uses. The nature of language mixture, and of the simplification and complication processes which resulted in new "pidgins" and "creoles." The future of international English. GER:3a (DR:7) 3-5 units, Spr (Traugott)

70. Structure of English Words

(Graduate students register for 270.) Analysis of vocabulary to determine word meanings. Goals: to increase vocabulary, and by discovering the principles behind changes in pronunciation and meaning, to take the mystery out of the processes that have made our vocabulary what it is today. (Optional practicum for 5 units.) GER:3a (DR:7) 4-5 units, Spr (Leben)

71. Language of Poetry

Introduction to the analysis of verbal art through English poetry. The poetic function of language. Versification: theories of rhythm and meter, normative prosody and its ideology. The grammar of parallelism. The semantics and pragmatics of figurative language. Tradition, innovation, and individual style. (Register for 5 units for additional research.) GER:3a (DR:7) 3-5 units, Win (Kiparsky)

72. The Language of Short Stories

(As English 105.) not given 1999-2000

73. African American Vernacular English

Survey of the English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands ("Gullah"), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. GER:3b,4b (DR:3 or 9) 3-5 units, Win (Rickford)

77. The Literary History of American English

(As English 103B.) The development of American English and ideas around "standard" and "literary," with emphasis on 19th- and early 20th-century writings. Various topics: American periodicals, dialect literature, folk-
85. Introduction to Teaching English as a Second Language—
Practical approach to teaching English to non-native speakers, focusing on a survey of the features of English which present particular difficulties. Preparation of lessons, practice answering questions, and tutoring of an individual learning to speak English.
3-4 units, Spr (McChesney)

86. Practicum in Teaching English as a Second Language—
Observation and participation in an English as a second language class on a regular basis. Weekly workshop in course planning. Prerequisite: 189, or concurrent enrollment in 85.
1-2 units, Spr (McChesney)

105. Phonetics—See 205. GER:2a (DR:5)
4 units, Aut (Flemming)

110. Introduction to Phonetics and Phonology—
Introduction to the study of sounds as part of language. Survey of sounds of the world’s languages; practice in producing and perceiving them. The theory of the sound patterns of languages, analysis of phonological data. GER:2a (DR:5)
4 units, Spr (Flemming)

120. Introduction to Syntax—
Analyses of various grammatical constructions, primarily English, and their consequences for a general theory of language. Practical experience in forming and testing linguistic hypotheses, reading, and constructing rules. GER:3b (DR:9)
4 units, Aut (Sag, Wasow)

121. Intermediate Syntax—
Builds on the techniques for linguistic analysis and expression developed in 120. How different languages convey meaning through their syntactic structures and morphology, and the search for commonalities across different languages. Case studies focus on structures which are counterintuitive to speakers of English but, on closer examination, have parallels to structures in English. 4 units (Staff) not given 1999-2000

124. Lexical Functional Grammar—See 224.
4-6 units, Aut (Bresnan)

130. Introduction to Linguistic Meaning—
Linguistic meaning and its role in communication. Students learn how diagnostic tests can be used to categorize and separate various semantic phenomena (e.g., ambiguity and vagueness, entailment, and presupposition). How basic set theory and logic can be used to specify meanings and explain semantic phenomena. Pragmatic complications involving the assumptions and intentions of language users. For those who have not taken logic (e.g., Philosophy 159), an associated pass/fail 1-unit self-study lab is offered using Tarski’s World. Prerequisite: 120 or consent of instructor. GER:3b (DR:9)
4 units, Win (Beaver)

137. Symbolic Systems Seminar: Problems in Intelligence, Information, and Learning—
(Same as Education 120, Philosophy 200, Symbolic Systems 200.) Interdisciplinary topics in cognitive science (e.g., modularity, representation, reasoning, situated action, or creativity.)

Prerequisites: 120 or 130, Computer Science 109, Philosophy 80, Psychology 40, or consent of instructors.
3-4 units, Win (Greeen, Wasow)

138. Introduction to Computational Linguistics—See 238. GER:3. (DR:6)
4 units, Aut (Kay)

140. Language Acquisition I—See 240. GER:3b (DR:9)
4 units, Aut (E. Clark)

145. Language and Thought—(Enroll in Psychology 131.)
4 units, Aut (H. Clark)

146. Language and Gender—
Survey of the literature on how gender influences language use. Topics: differences in men’s and women’s speech styles, how these are acquired, how gender influences spoken and written language; the interaction of class and gender in language.
GER:3b,4c (DR:9)
4 units, Aut (Eckert)

150. Language in Society—
The ways in which language and society affect each other. Social dialects, class, ethnic, and gender differences in speech. Prestige and stigma associated with different ways of speaking the official English movement. Stylistic variation; how speakers adapt their language to different audiences and different social contexts. In addition, additional units, optional public service internship in an organization dealing with linguistic minorities or language-related issues (bilingual education or language rights), focusing on the field experience.
GER:3 (DR:9) (WIM)
4-5 units, Spr (Richford)

152. Introduction to Bilingualism—
Overview of empirical findings on the study of bilingualism, primarily from a sociolinguistic perspective. Survey of bilingual communities and issues surrounding societal bilingualism. Student project using primary data.
4 units, Aut (Morimoto)

160. Introduction to Language Change
not given 1999-2000

3 units, Win (Baugh)

182. Introduction to Linguistic Typology—
Introduction to universal and linguistic typology, with emphasis on classification based on semantic, syntactic, and morphological factors. Cross-linguistic analysis of grammatical systems, and general considerations in the typological descriptions of languages.
4 units, Spr (Sells)

187. Field Methods—See 287.
4 units, Win (Dukes)

189. Linguistics and the Teaching of English as a Second/Foreign Language—See 289. GER:3b (DR:9)
4-5 units, Win (Hubbard)

197. Linguistics Seminar—
Introduction to research goals and methods in linguistics and related disciplines. Provides a forum for student work on a small project that helps define a focus for their linguistic studies. Presentations, discussion, and final paper.
2 units, Win (Traugott)

198. Honors Research
I or more units, Win, Spr (Staff)

199. Independent Study
I or more units, any quarter (Staff)
200. Foundations of Linguistic Theory—Theories that have shaped 20th-century linguistics.
4 units (Staff) not given 1999-2000

201. Foundations of Linguistic Analysis—Primarily for graduate students. Introduction to the leading ideas of linguistic description and linguistic argumentation. The fundamental representational notions in phonology, syntax, and semantics, and the place of these notions in wider linguistic analysis.
4 units, Win (Flemming)

205. Phonetics—(Same as 105.) The study of speech sounds. How we produce them, how we perceive them, their acoustic properties. The influence of the production and perception systems on sound change and phonological patterns. Acoustic analysis and experimental techniques. Lab exercises. Prerequisite: 110 or consent of instructor.
4 units, Aut (Flemming)

4 units, Win (Leben)

4 units (Staff) not given 1999-2000

207B. Morphosyntax—The role of morphology in grammar: how word structure serves syntax in the expression of meaning. Universal properties and typology of morphological categories; proposals towards their principled explanation in a restrictive theory of language.
1-4 units, Win (Kiparsky)

207C. Morphology Seminar: Alternations in Stems, Affixes, and Shapes—Exploration of aspects of morphophonology that are "purely morphological." Unlike the phonology associated with inflection and derivation, these variants do not directly signal meaning, but serve as alternative versions of stems, affixes, or entire word-forms, suitable for different phonological, morphological, or syntactic contexts.
1-4 units, Aut (Zwicky)

208A. Phonology Seminar: Tone and Pitch Accent Systems—Study of the behavior of tone in the different types of tone language and of the question of where languages traditionally referred to as pitch accent belong in the typology of tonal systems. Prerequisite: 206.
1-4 units, Aut (Leben)

208B. Phonology Seminar—Selected topics in phonological theory.
1-4 units, Win (Flemming)

208C. Phonology Seminar—Selected topics in phonological theory.
1-4 units, Spr (Kiparsky)

220A. Cross-Linguistic Syntax I—The types of critical phenomena found in diverse syntactic systems and their implications for syntactic theory. Emphasis is on cross-linguistic diversity, typological variation, and their relation to general theoretical issues.
4 units, Aut (Sells)

220B. Cross-Linguistic Syntax II—The types of critical phenomena found in diverse syntactic systems and their implications for syntactic theory. Emphasis is on cross-linguistic diversity, typological variation, and their relation to general theoretical issues.
4 units, Win (Sells)

209C. Themes in Generative Syntax—Examination of a theme relevant to current issues in syntax, e.g., mathematical foundations, historical antecedents, or methodologies of data collection.
1-4 units (Staff) not given 1999-2000

221A. Introduction to Head-Driven Phrase Structure Grammar—Systematic introduction to Head-Driven Phrase Structure Grammar (HPSG), a constraint-based and lexicalist approach to grammatical theory. Topics: lexical and phrasal organization in terms of type hierarchies and constraint inheritance, the analysis of complementation, the English auxiliary system, extraction dependencies, cross-dialect and cross-linguistic variation, and the syntax-semantics interface. Problems are selected from a variety of languages.
4 units, Win (Sag)

221B. Advanced Topics in Head-Driven Phrase Structure Grammar—Current research on grammatical theory within HPSG and closely related frameworks.
4 units, Spr (Sag)

222A. Austronesian Syntax—Examination of empirical and theoretical issues in Polynesian syntax from a broadly lexicalist perspective. Focus is on the grammar of Tongan; the treatment of grammatical relations, ergativity, null pronouns and complex clauses in the language; comparative and typological issues arising from the analysis.
1-4 units, Spr (Dukes)

222B. Advanced Topics in Austronesian Syntax—Selected topics in Polynesian syntax from a broadly lexicalist perspective. Focus is on the grammar of Tongan; the treatment of grammatical relations, ergativity, null pronouns and complex clauses in the language; comparative and typological issues arising from the analysis.
1-4 units, Win (Dukes)

222C. Introduction to Optimality Theory Syntax—Optimality Theory (OT) as an appropriate framework for expressing universal principles and language-particular effects of prominence hierarchies in (morpho)syntax. Topics: universal and language-particular effects of prominence, generative and typological accounts of prominence-driven phenomena, further development of an OT-based account. Possible empirical domains: voice, case marking, word and morpheme ordering, freezing effects, and the expression and neutralization of morphosyntactic contrast. Goal: provide a context for the assessment of existing approaches to prominence-related phenomena, and for further progress in the development of an OT approach. Lectures/discussion of reading, and participant research. Offered jointly with Judith Aissen of UCSC.
1-4 units, Win (Bresnan)

222A. Optimality Theory Syntax—Optimality Theory (OT) as an appropriate framework for expressing universal principles and language-particular effects of prominence hierarchies in (morpho)syntax. Topics: universal and language-particular effects of prominence, generative and typological accounts of prominence-driven phenomena, further development of an OT-based account. Possible empirical domains: voice, case marking, word and morpheme ordering, freezing effects, and the expression and neutralization of morphosyntactic contrast. Goal: provide a context for the assessment of existing approaches to prominence-related phenomena, and for further progress in the development of an OT approach. Lectures/discussion of reading, and participant research. Offered jointly with Judith Aissen of UCSC.
1-4 units, Win (Bresnan)

2 units, Spr (Sells)

223B. Introduction to the Minimalist Program—The development of the Minimalist Program from Government-Binding Theory, and recent innovations in the approach. Prerequisite: knowledge of Government-Binding Theory.
2 units, Spr (Sells)

224. Lexical Functional Grammar—(Same as 124). Open to students with and without background in LFG. A formal model of universal grammar explaining radical crosslinguistic variation in syntactic structure. General issues: universal grammar design, lexical integrity, and modeling variation and analytic problems from a variety of natural languages. Advanced topics: lexical mapping theory, X' theory and nonconfigurationality, lexical integrity, and complex predicatives. Prerequisites: 120 and some familiarity with logic or other symbolic systems, or consent of instructor.
4-6 units, Aut (Bresnan)

225A. Austronesian Syntax—Examination of empirical and theoretical issues in Polynesian syntax from a broadly lexicalist perspective. Focus is on the grammar of Tongan; the treatment of grammatical relations, ergativity, null pronouns and complex clauses in the language; comparative and typological issues arising from the analysis.
1-4 units, Spr (Dukes)

225B. Austronesian Syntax II—Selected topics in Polynesian syntax from a broadly lexicalist perspective. Focus is on the grammar of Tongan; the treatment of grammatical relations, ergativity, null pronouns and complex clauses in the language; comparative and typological issues arising from the analysis.
1-4 units, Win (Dukes)

225A. Optimality Theory Syntax—Optimality Theory (OT) as an appropriate framework for expressing universal principles and language-particular effects of prominence hierarchies in (morpho)syntax. Topics: universal and language-particular effects of prominence, generative and typological accounts of prominence-driven phenomena, further development of an OT-based account. Possible empirical domains: voice, case marking, word and morpheme ordering, freezing effects, and the expression and neutralization of morphosyntactic contrast. Goal: provide a context for the assessment of existing approaches to prominence-related phenomena, and for further progress in the development of an OT approach. Lectures/discussion of reading, and participant research. Offered jointly with Judith Aissen of UCSC.
1-4 units, Win (Bresnan)
230A. Introduction to Semantics and Pragmatics—Introduction to meaning in natural language. Topics: elementary set theory; propositional logic, predicate logic, and lambda calculus together with their relation to semantic analysis; model theoretic characterizations of meaning and semantic properties of English conjunctions and determiners. Grice's theory of implicature, speech acts, Davidson's theories of "logical form," and Montague Grammar. Recommended: familiarity with elementary logic and set theory.
4 units, Win (Peters)

230B. Semantics and Pragmatics—Expands on 230A. Standard approaches to formal semantics (Montague Grammar, DRT, and basic dynamic semantics). Analyses of selected semantic phenomena in these frameworks. Prerequisites: 230A, or combination of 130, and Philosophy 159 and 160.
1-4 units, Spr (Beaver)

230C. Topics in Semantics and Pragmatics—More advanced work on the semantic and pragmatic analysis of central phenomena of language: plurals, quantification, type shifting, tense and aspect, questions.
1-4 units, Aut (Peters)

233A. Presupposition—Introduces and compares all the major contemporary linguistic theories of presupposition, considering decisive linguistic examples. The wider ramifications for the semantics/pragmatics interface. Beaver's "Presupposition" in the Handbook of Logic and Language (1998) and his forthcoming publications are supplemented by original source readings. Prerequisite: 230B or consent of instructor.
1-4 units, Win (Beaver)

233B. Dynamic Semantics—Covers a variety of approaches to meaning, inspired by the fact that natural language statements change the hearer's state of knowledge. Discourse representation theory, file change semantics, dynamic predicate logic, and situation semantics. Singular anaphora in dynamic frameworks, generalized anaphora, E-type anaphora, reference quantification, contextually restricted quantification, presupposition and epistemic modality.
1-4 units, Win (Peters)

233C. Semantics Research Seminar—Advanced topics of current interest to students and instructor.
1-4 units, Spr (Beaver)

234. Introduction to Discourse Analysis—Discussion of the methods and models of varying approaches to language beyond the sentence. Topics: information packaging, topic, and focus; discourse markers; tense and aspect; their different uses in conversation and narrative; spoken and written discourse.
4 units, Win (Traugott)

235. Mathematical Linguistics—Introduction to structures and methods from mathematical logic which are useful in linguistic theories of the structure and meaning of natural languages. Prerequisite: Computer Science 154 or consent of instructor.
1-4 units, Aut (Peters)

237. Natural Language Processing—Develops an in-depth understanding of the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages. Morphological, syntactic, and semantic processing from a linguistic and an algorithmic perspective. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models in acquisition, representative systems. Prerequisites: 138/238 or Computer Science 121/221, and programming experience. Recommended: background in logic and probability.
4 units, Spr (Manning)

238. Introduction to Computational Linguistics—(Same as 138.) Introduction to the computational aspects of basic linguistic processes: morphology, syntax, and semantics. Grades are based on computer programs implementing key algorithms for parsing, generation, etc. Recommended: Prolog programming.
4 units, Aut (Kay)

239A. Topics in Computational Linguistics
1-4 units, Win (Kay)

240. Language Acquisition I—(Same as 140.) Survey of the present knowledge of processes of language acquisition from a linguistic point of view. Recent and past literature.
4 units, Aut (E. Clark)

241. Language Acquisition II: Lexicon and Syntax in Acquisition—Advanced topics in language acquisition.
1-4 units, Win (E. Clark)

246. Psycholinguistics—(Enroll in Psychology 214.)
1-3 units, Spr (H. Clark)

247. Ethnography of Communication—(Enroll in Cultural and Social Anthropology 167.)
4-5 units, Spr (Heath)

250. Sociolinguistic Theory and Analysis—The kinds of problems which sociolinguists deal with, including language acquisition, language contact, language contact, and language change. Emphasis is on what general linguistics might gain from the socio-linguistics approach to problems of linguistic theory and description, and linguistic change. Prerequisite: graduate standing in Linguistics or consent of instructor.
4-6 units (Staff) not given 1999-2000

251. Pidgin and Creole Sociolinguistics—Key issues in sociolinguistics and pidgin-creole studies, especially issues whose understanding is one field has been assisted by methods or advances in the other, including diglossia, the acts of identity model, the notion of speech community, variable rules, implicational scaling, and the scope of sociolinguistic competence.
4 units (Staff) not given 1999-2000

254. Style, Language, Ideology, and Culture—Interdisciplinary seminar addressing the intersection between linguistic and social theory. Grounded in emerging research on personal and group linguistic styles, explores the relation between these styles and linguistic, political, and social ideologies. Students have research interests grounded in linguistic, anthropological, or other social science perspectives. Ongoing discussions of major student research projects.
1-4 units, Aut (Rickford)
Win, Spr (Eckert)

258. Sociolinguistic Variation—Advanced introduction to the study of linguistic variation in time, space, and society. Theoretical issues related to social and linguistic constraints in variation, and issues and methods in the quantitative analysis of variation.
1-4 units, Spr (Eckert)

260A. Historical Phonology and Morphology—Sound change and analogical change in the perspective of linguistic theory. Internal and comparative reconstruction.
4 units, Aut (Kiparsky)
266. Topics in Historical Linguistics: Grammaticalization—The kinds of issues that historical linguists address when studying grammaticalization, focusing on the theories and models currently being debated. The hypothesis of unidirectionality, the role of reanalysis in grammaticalization, differences between grammaticalization and lexicalization. 4 units, Spr (Traugott)

270. Structure of English Words—(Same as 70.) Analysis of vocabulary to determine word meanings. Goals: to increase vocabulary, and by discovering the principles behind changes in pronunciation and meaning, to take the mystery out of the processes that have made our vocabulary what it is today. Practicum required. 4-5 units, Spr (Leben)

273. African-American English in Educational Context—(Enroll in Education 275.) 3 units, Win (Baugh)

280. Structure of English Words—(Same as 70.) Analysis of vocabulary to determine word meanings. Goals: to increase vocabulary, and by discovering the principles behind changes in pronunciation and meaning, to take the mystery out of the processes that have made our vocabulary what it is today. Practicum required. 4-5 units, Spr (Leben)

281. Japanese Pragmatics—(Enroll in Asian Languages 281.) 4 units, Win (Matsumoto)

286. Sociolinguistic Field Methods—Overview of and practice in the principal methods of data collection in sociolinguistics, along with an assessment of their strengths and weaknesses. 4 units, Aut (Rickford)

287. Field Methods—(Same as 187.) Hands-on overview of methods by which linguists gather raw linguistic data about a language and begin the task of analyzing its structure. Working with a speaker of a language not previously studied by class participants, students attempt to develop a description of key aspects of the grammar of the language and examine methodologies for obtaining, storing, and manipulating data. 4 units, Win (Dukes)

289. Linguistics and the Teaching of English as a Second/Foreign Language—(Same as 189.) Methods and techniques for teaching languages, using ideas from modern linguistics and language acquisition theory. Focus is on teaching English, but the principles underlying methods and techniques discussed are applicable to teaching any language. 4.5 units, Win (Hubbard)

290. Introduction to Linguistics for Educational Researchers—(Enroll in Education 289.) 4 units, Aut (Baugh, Hakuta)

292. The History of Chinese—(Enroll in Asian Languages/Chinese 192/292.) 4 units (Sun) not given 1999-2000

395A, B. Research Workshop—Restricted to students in the doctoral program. Student presentations of research toward qualifying papers.

395A. 1-2 units, Spr (E. Clark)

395B. 1-2 units, Spr (Wasow)

397. Directed Reading 1-5 units, any quarter (Staff)

398. Directed Research—Research at predissertation level. 1-6 units, any quarter (Staff)

399. Dissertation Research 1-15 units, any quarter (Staff)

435A. Research Seminar in Applied Linguistics—(Enroll in Education 435X.) 1-4 units, Spr (Baugh)

ENGLISH AS A SECOND LANGUAGE (683-699)

These courses represent offerings for non-native speakers in Autumn, Winter, and Spring Quarters. Enrollment in one or more courses may be required of, or recommended to, current graduate students from other countries after they have taken the English screening examination. To enroll, students must come to the English for Foreign Students office the first day of each quarter.

During the Summer Session, courses in spoken and written English are offered. Two six-week intensive courses are also offered during the summer. Summer visitors must apply directly to the EFS program.

690A. Interacting in English—Strategies for effective interaction in academic settings. Emphasis is on functional language used in typical university settings, including active listening, asking questions, and contributing ideas and opinions. Activities include simulation and discussion, with feedback on pronunciation, grammar, and usage. 3 units, Au (Rylance, Staff)

690B. Academic Discussion—The refinement and practice of discussion skills, with attention to pronunciation, grammar, and appropriateness for specific tasks. Preparation for effective participation in the classroom and research group communication. Detailed feedback on pronunciation, grammar, and usage. Prerequisite: 690A or consent of instructor. 3 units, Au, Win, Spr (Rylance, Staff)

691. Oral Presentation—For advanced graduate students. Practice in academic presentation skills; strategy, design, organization, and use of visual aids. Focus is on improving fluency and delivery style, with videotaping for extensive feedback on language accuracy and usage. Prerequisite: 695 or consent of instructor. 3 units, Win, Spr (Rylance, Mawson, Staff)

692. Speaking and Teaching in English—For non-native speakers who must teach in English. Focus is on developing clarity, intelligibility, and effectiveness through weekly presentations simulating actual teaching assistant responsibilities. 1-3 units, Au, Spr (McChesney, Rylance, Staff)

693A. Listening Comprehension—Strategies for effective listening in an academic setting, focusing on identifying key ideas in lectures. Practice in understanding words and phrases commonly encountered in classroom settings. Work with computer-based exercises promotes comprehension of rapid, natural speech. 3 units, Au (Rylance, Staff)

693B. Listening and Communication—The development of listening strategies and vocabulary for understanding English in a variety of academic and non-academic contexts. Discussion and interpretation improve comprehension of communicative intent. Computer-based and video exercises plus an individual project. Prerequisite: 693A or consent of instructor. 3 units, Au, Win (Hubbard, Rylance)

694A. The Language of Interpersonal and Professional Relationships—For advanced graduate students. Analysis and practice of communicative intent in interpersonal relationships and in the mass media. Use of indirectness, assertiveness, humor. Prerequisite: 693A,B or consent of instructor. 3 units, Win (McChesney, Staff)
694B. Communication Strategies in Professional Life—For advanced graduate students. Task-based practice of language appropriate for professional settings such as consulting, startups, and related teamwork. Simulate the roles of manager, applicant, subordinate, and co-worker. Prerequisite: 693A, B or consent of instructor
3 units, Spr (McChesney)

695A. Pronunciation and Intonation—Recognition and practice of American English sounds, stress, and intonation patterns for greater comprehension and intelligibility. Analysis of problem areas. Assignments include audiotaping exercises for instructor’s feedback in conferences.
3 units, Aut, Win, Spr (Mawson, Staff)

695B. Advanced Pronunciation and Intonation—Continuation of 695A, focusing on American English sounds, stress, rhythm, and intonation patterns. Emphasis is on self-monitoring, integrated with short videotaped presentations. Biweekly tape assignments and tutorials. Prerequisite: 695A.
2 units, Win, Spr (Mawson)

698A. Writing Academic English—Prepares graduate students to write academic papers; emphasis is on fluency, organization, documentation, and appropriateness for specific writing tasks.
3 units, Aut, Win, Spr (McChesney, Rylander)

698B. Advanced Graduate Writing—For graduate students experienced in English writing and currently required to write for courses and research. Class meetings and frequent individual conferences. Prerequisite: 698A.
3 units, Aut, Win, Spr (Hubbard, Staff)

DIVISION OF LITERATURES, CULTURES, AND LANGUAGES

Chair of the Executive Committee: Seth Lerer
Executive Committee: Russell Berman (German Studies), Elizabeth Bernhardt (Language Center), Gregory Freidin (Slavic Languages and Literatures), Seth Lerer (Comparative Literature), Haun Saussy (Asian Languages), Jeffrey Schnapp (French and Italian), Yvonne Yarbo-Bejarano (Spanish and Portuguese).
Members at Large: Brigitte Cazelles (French and Italian), Lazar Fleishman (Slavic Languages and Literatures)

The Division of Literatures, Cultures, and Languages embraces six academic departments: Asian Languages and Literatures, Comparative Literature, French and Italian, German Studies, Slavic Languages and Literatures, Spanish and Portuguese, and the Language Center, which is charged with facilitating and overseeing all language instruction at Stanford. All the member departments of the division offer full-fledged academic programs leading to bachelor’s, master’s, and doctoral degrees. The division brings together scholars and instructors dedicated to the study of foreign literatures, cultures, and languages from humanistic and interdisciplinary perspectives. The departments in the division are distinguished by the quality, size, and diversity of their faculty, a wide variety of approaches to cultural tradition and expression, and the intense focus on the mastery of foreign languages. This wealth of academic resources, together with small classes and the emphasis on individual advising, creates a superior opportunity for students who wish to be introduced to or develop a deeper understanding of non-English speaking cultures.

The division’s member departments and the Language Center offer instruction at all levels, including introductory and general courses that do not require knowledge of a foreign language. The more advanced and specialized courses requiring skills in a foreign language are listed under the specific departments and programs. These introductory and general courses, among them many Stanford Introductory Seminars with preferences for freshmen and sophomores, are listed below. As indicated, they satisfy a variety of the undergraduate requirements and can serve as a basis for developing a minor or a major program in the member departments. For descriptions of the minor and major programs, see the sections under the individual departments.

COURSES

See the respective department listings for course descriptions and General Education Requirements (GER) information.

STANFORD INTRODUCTORY SEMINARS

PREFERENCE TO FRESHMEN

ASIAN LANGUAGES

71N. Stanford Introductory Seminar: Language and Gender in Japan—Myths and Reality
3 units, Spr (Matsumoto)

81N. Stanford Introductory Seminar: Writing and Writing System
3 units, Spr (Hare)

COMPARATIVE LITERATURE

25N. Stanford Introductory Seminar: Latin American Nobel Prize Winners
5 units, Spr (Pratt)

30N. Stanford Introductory Seminar: Opera and Literature
3-5 units, Aut (Lindbergh)

70N. Stanford Introductory Seminar: The Bible and World Culture
3 units, Spr (Parker)

80N. Stanford Introductory Seminar: The Science of Wars—Does Physics Get Closer to Reality than Poetry?
5 units, Aut (Rorty)

FRENCH AND ITALIAN

108N. Stanford Introductory Seminar: Female Saints—The Rhetoric of Religious Perfection
4 units, Aut (Cazelles)

GERMAN STUDIES

1N. Stanford Introductory Seminar: German Studies
5 units, Aut (Bernhardt)

120N. Stanford Introductory Seminar: Virtue and Terror—Kant, Rousseau, and the French Revolution
4 units, Spr (Strum)

123N. Stanford Introductory Seminar: The Brothers Grimm and their Fairy Tales
4 units, Spr (Robinson)

SLAVIC LANGUAGES AND LITERATURES

13N. Stanford Introductory Seminar: Russia, Russian, Russians
3-4 units, Spr (Schapbach)

SPANISH AND PORTUGUESE

111N. Stanford Introductory Seminar: Contemporary Spain—The Challenge of Change, from Fascism to Democracy (1939 to Present)
3 units, Aut (Haro)

113N. Stanford Introductory Seminar: Latin American Culture in the ’60s
3-5 units, Win (Ruffinelli)

115N. Stanford Introductory Seminar: Growing Up Bilingual—Introduction to the Study of Bilingualism in the U.S.
3-5 units, Spr (Valdés)
3-5 units, Win (Gómez)

130N. Stanford Introductory Seminar: Reading the Rain Forest Visions of the Amazon
3-5 units, Aut (Sá)

PREFERENCE TO SOPHOMORES

COMPARATIVE LITERATURE

3-5 units, Aut (Palumbo-Liu)

84Q. Stanford Introductory Dialogue: Shakespeare, Haying, Gender
3 units, Win (Parker)

115Q. Stanford Introductory Dialogue: Thinking in the Present—20th-Century European Philosophy
2 units, Win (Gumbrecht)

FRENCH AND ITALIAN

189Q. Stanford Introductory Seminar: Romance—Texts and Movies
4 units, Win (Gazelles)

190Q. Stanford Introductory Seminar: Parisian Cultures of the 19th and Early 20th Century
4 units, Win (Bertrand)

GERMAN STUDIES

126Q. Stanford Introductory Seminar: Reading German Literature—An Introduction
4 units, Aut (Herman)

SPECIAL LANGUAGE PROGRAM

199Q. Stanford Introductory Seminar: Literature and Culture of Modern Greece
3-5 units, Aut (Prionas)

TAUGHT IN ENGLISH

ASIAN LANGUAGES

92. Traditional East Asian Civilization: Japan
5 units, Win (Hare)

131/231. Chinese Poetry in Translation
4 units, Win (Egan)

132. Chinese Fiction and Drama in Translation
4 units, Win (J. Wang)

133A/233A. Introduction to Modern Chinese Literature
4 units, Spr (Sang)

137/237. Classical Japanese Fiction in Translation
4 units, Aut (Wallace)

138. Modern Japanese Literature in Translation
4 units, Win (A. Ueda)

FRENCH AND ITALIAN

166E. Women's Voices in Contemporary Italian Literature
4 units, Spr (Springer)

170E. Introduction to African Systems of Thought
3-5 units, Win (Mudimbe)

190E. The Decameron and the 1001 Nights
4-5 units, Aut (Mallette)
292A. Concord and Jena: The Coming of Romanticism to America
3-5 units, Spr (Mueller-Vollmer)

SLAVIC LANGUAGES AND LITERATURES

110. Russian “Crash” Course for Departing Students
1 unit, Spr (Schupbach)

142/242. Literature and Formation of State Mythology in Russia from Catherine II to Nicholas I
4 units, Win (Zorin)

145/245. The Age of Experiment (1820-1864)
3-4 units, Aut (Fleishman)

146/246. The Age of Transgression: Russian Literature from Turgeniev through Tolstoy
3-4 units, Win (Safran)

147/247. The Age of Revolution: Russian Literature and Culture since 1917
3-4 units, Spr (Fleishman)

151. Dostoievsky
4 units, Win (Frank)

155/255. Anton Chekhov and the Turn of the Century
3 units, Spr (Safran)

166/266. Russia on the Silver Screen: U.S., Western European and Emigre Cinema
4 units, Spr (Bulgakowa)

168/268. Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present
4 units, Aut (Bugalkowa)

170B/270B. Pushkin in the Romantic Context
4 units, Aut (Greenleaf)

221. Modernism and the Jewish Voices in Europe
4 units, Aut (Safran, Eshel)

SPANISH AND PORTUGUESE

130. Spanish and Cultural Perspectives
4 units, Spr (Haro)

131. Spanish American Cultural Perspectives
4 units, Aut (Schroeder)

132. Mexican and Chicano Cultural Perspectives
4 units, Aut (Pietro)

135. Caribbean Cultural Perspectives
4 units, Spr (Negrón, Johnson)

168E. Chilean Studies: Modern Chilean Culture through Music, Film, and Literature 1945-1997
3-5 units, Spr (Missana)

285E. Chicana Cultural Studies
3-5 units, Spr (Yarbrough-Bejarano)

308E. Scholarly Research and Writing: Workshop and Tutorial
3-5 units, Win (Pratt)

372E. A Latin American Woman Voice: Clarice Lispector
3-5 units, Win (Safran)

389E. Race and Sexuality
5 units, Win (Yarbrough-Bejarano)

SPECIAL LANGUAGE PROGRAM

125A. The Contemporary Arab World and Culture through Literature
4 units, Aut (Barhoum)

125C. Contemporary Arab Women Writers and Issues
4 units, Win (Barhoum)

125D. The Arab World through Travel Literature
4 units, Spr (Barhoum)

MATHEMATICAL AND COMPUTATIONAL SCIENCE

Chair: Bradley Efron
Committee in Charge: Takeshi Amemiya (Economics), Gunnar Carlson (Mathematics), Richard Cottle (Engineering-Economic System and Operations Research), Bradley Efron (Statistics), Gene Golub (Computer Science), George Papanicolaou (Mathematics), David Rogosa (Education), David Siegmund (Statistics), Leon Smith (Mathematics), Arthur F. Veinott Jr. (Engineering-Economic Systems and Operations Research)

Program Administrator: Helen Tombokopoulos

This interdepartmental, interschool undergraduate program is designed as a major for students interested in the mathematical and computational sciences, or in the use of mathematical ideas and analysis problems in the social or management sciences. It provides a core of mathematics basic to all of the mathematical sciences and an introduction to the concepts and techniques of automatic computation, optimization, decision-making, probabilistic modeling, and statistical inference. It also provides an opportunity for elective work in any of the mathematical science disciplines at Stanford.

The program utilizes the faculty and courses of the departments of Computer Science, Engineering-Economic Systems and Operations Research, Mathematics, and Statistics. It prepares students for graduate study or employment in the mathematical and computational sciences in those areas of applied mathematics which center around the use of high-speed computers and are concerned with the problems of the social and management sciences.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

The requirement for the bachelor's degree, beyond the University's basic requirements, is an approved course program of 76 to 80 units, distributed as follows:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics: 33-34 units</td>
<td></td>
</tr>
<tr>
<td>Math. 41, 42. Single Variable Calculus</td>
<td></td>
</tr>
<tr>
<td>or Math. 19</td>
<td></td>
</tr>
<tr>
<td>and Math. 20</td>
<td>A,W</td>
</tr>
<tr>
<td>and Math. 21</td>
<td>S</td>
</tr>
<tr>
<td>Math. 51. Linear Equations and Differential Calculus</td>
<td></td>
</tr>
<tr>
<td>Math. 52. Integral Calculus of Several Variables</td>
<td>W,S</td>
</tr>
<tr>
<td>or Math. 110. Applied Number Theory and Field Theory (WIM)</td>
<td>S</td>
</tr>
<tr>
<td>or Math. 120. Modern Algebra (WIM)</td>
<td>S</td>
</tr>
<tr>
<td>Math. 113. Linear Algebra and Matrix Theory</td>
<td>A,W</td>
</tr>
<tr>
<td>and Math. 104. Matrix Theory and Its Applications</td>
<td>W,S</td>
</tr>
<tr>
<td>Math. 130. Ordinary Differential Equations</td>
<td>A,W,S</td>
</tr>
<tr>
<td>or Math. 53. Ordinary Differential Equations with Linear Algebra</td>
<td>A,W,S</td>
</tr>
</tbody>
</table>

One of the following:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comp. Sci. 137. Introduction to Scientific Computing</td>
<td>A,S</td>
</tr>
<tr>
<td>Math. 115. Fundamental Concepts of Analysis</td>
<td>A,W</td>
</tr>
<tr>
<td>Math. 160A. First Order Logic</td>
<td>W</td>
</tr>
</tbody>
</table>
## Technical Requirements

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 160. Game Theory and Economic Applications</td>
<td>A 5</td>
</tr>
<tr>
<td>Econ. 171-172. Intermediate Econometrics II-III</td>
<td>W,S 5</td>
</tr>
<tr>
<td>Econ. 181. Optimization and Economic Analysis</td>
<td>W 3</td>
</tr>
<tr>
<td>EES&amp;OR 211. Linear and Nonlinear Optimization</td>
<td>A 4</td>
</tr>
<tr>
<td>EES&amp;OR 212. Network and Integer Programming</td>
<td>A 3</td>
</tr>
<tr>
<td>EES&amp;OR 251. Stochastic Decision Models</td>
<td>W 3</td>
</tr>
<tr>
<td>EES&amp;OR 273. Stochastic Models in Operations Research</td>
<td>S 3</td>
</tr>
<tr>
<td>Math. 106. Introduction to Theory of Functions of a Complex Variable</td>
<td>S 5</td>
</tr>
<tr>
<td>Math. 131. Partial Differential Equations I</td>
<td>W 5</td>
</tr>
<tr>
<td>Math. 132. Partial Differential Equations II</td>
<td>W 3</td>
</tr>
<tr>
<td>Stat. 201. Statistical Methods</td>
<td>W 3</td>
</tr>
<tr>
<td>Stat. 203. Analysis of Variance</td>
<td>W 3</td>
</tr>
</tbody>
</table>

## Computer Science (CS): 16-18 units

**A** and **W** indicate Approved or Selected and Winter Quarters, respectively.

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 106X. Programming Methodology and Abstractions (Accelerated)</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>CS 109. Introduction to Computer Science</td>
<td>A,W 4</td>
</tr>
<tr>
<td>or CS 106A and B may be substituted</td>
<td>A,W,S 5</td>
</tr>
<tr>
<td>CS 170. Programming Paradigms</td>
<td>A,S 5</td>
</tr>
<tr>
<td>CS 177. Introduction to Scientific Computing</td>
<td>A,S 4</td>
</tr>
<tr>
<td>CS 180. Introduction to Computer Theory for non-Computer Science Majors, Part II</td>
<td>S 4</td>
</tr>
<tr>
<td>CS 185. Introduction to Automata and Complexity Theory</td>
<td>W,S 4</td>
</tr>
<tr>
<td>CS 161. Design and Analysis of Algorithms</td>
<td>W,S 3</td>
</tr>
<tr>
<td>CS 260. Concrete Mathematics (not given 1999-2000)</td>
<td>S 3</td>
</tr>
</tbody>
</table>

## Engineering-Economic Systems and Operations Research (EES&OR): (8-9 units)

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES&amp;OR 111. Introduction to Optimization</td>
<td>A,S 4</td>
</tr>
<tr>
<td>EES&amp;OR 121. Introduction to Stochastic Modeling</td>
<td>W 4</td>
</tr>
<tr>
<td>or three of the following:</td>
<td></td>
</tr>
<tr>
<td>EES&amp;OR 211. Linear and Nonlinear Optimization</td>
<td>A 4</td>
</tr>
<tr>
<td>EES&amp;OR 212. Network and Integer Programming</td>
<td>A 3</td>
</tr>
<tr>
<td>EES&amp;OR 251. Stochastic Decision Models</td>
<td>W 3</td>
</tr>
<tr>
<td>EES&amp;OR 273. Stochastic Models in Operations Research</td>
<td>S 3</td>
</tr>
</tbody>
</table>

## Statistics (11 units)

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stat. 200. Introduction to Statistical Inference</td>
<td>W 3</td>
</tr>
<tr>
<td>Stat. 201. Statistical Methods</td>
<td>A 3</td>
</tr>
<tr>
<td>or Stat. 203. Analysis of Variance</td>
<td>S 3</td>
</tr>
</tbody>
</table>

## Electives (9 units)

Three courses in mathematical and computational science, 100-level or above, and at least 3 units each. At least one must be chosen from the following:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 106. Introduction to Theory of Functions of a Complex Variable</td>
<td>S 5</td>
</tr>
<tr>
<td>Math. 131. Partial Differential Equations I</td>
<td>W 5</td>
</tr>
<tr>
<td>Math. 132. Partial Differential Equations II</td>
<td>W 3</td>
</tr>
<tr>
<td>Stat. 217. Introduction to Stochastic Processes</td>
<td>W 3</td>
</tr>
</tbody>
</table>

For Computer Science (CS), suggested electives include those courses not taken under item 3 of the above Computer Science list and the following:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 108. Object Oriented Systems Design</td>
<td>A,W 4</td>
</tr>
<tr>
<td>CS 110. Introduction to Computer Systems and Assembly</td>
<td>A,W 4</td>
</tr>
<tr>
<td>Language Programming</td>
<td>S 4</td>
</tr>
<tr>
<td>CS 112. Computer Organization and Design</td>
<td>A,S 3</td>
</tr>
<tr>
<td>CS 140. Operating Systems</td>
<td>A,W 4</td>
</tr>
<tr>
<td>CS 143. Compilers</td>
<td>A,S 4</td>
</tr>
<tr>
<td>CS 157. Logic and Automated Reasoning</td>
<td>A,S 4</td>
</tr>
<tr>
<td>CS 161. Design and Analysis of Algorithms</td>
<td>W,S 4</td>
</tr>
<tr>
<td>CS 194. Software Project (prereq. CS 108)</td>
<td>S 3</td>
</tr>
<tr>
<td>CS 211. Logic Design</td>
<td>A,W 3</td>
</tr>
<tr>
<td>CS 221. Artificial Intelligence: Principles and Techniques</td>
<td>A 4</td>
</tr>
<tr>
<td>CS 225A. Experimental Robotics</td>
<td>S 3</td>
</tr>
<tr>
<td>CS 237A. Numerical Linear Algebra</td>
<td>S 3</td>
</tr>
<tr>
<td>CS 243. Advanced Compiling Techniques</td>
<td>W 4</td>
</tr>
</tbody>
</table>

With the adviser's approval, courses other than those offered by the sponsoring departments may be used to fulfill part of the elective requirement. These may be in economics, biology, electrical engineering, industrial engineering, medicine, and so on, that might be relevant to a mathematical sciences major, depending on the particular interest of the student.

1. At least three quarters before graduation, majors must file with their advisers a plan for completing degree requirements.
2. All courses used to fulfill major requirements must be taken for a letter grade with the exception of courses offered satisfactory/no credit only.
3. A course used to fulfill the requirements of one section of the program may not be applied toward the fulfillment of the requirements of another section.
4. The student must have a grade point average (GPA) of 'C' or better in all course work used to fulfill the major requirement.

## MINORS

The minor in Mathematical and Computational Science is intended to provide an experience of the four constituent areas: computer science (CS), mathematics, engineering-economic systems and operations research (EES&OR), and statistics. Four basic courses are required:

1. CS 106X. Programming Methodology and Abstractions
   or CS 106A.B. Programming Methodology
2. Math. 51. Linear Equations and Differential Calculus
   or Math. 103. Matrix Theory and its Applications
3. EES&OR 111. Introduction to Optimization
   or EES&OR 121. Introduction to Stochastic Modeling
   or Stat. 190. Statistics for Social Scientists

In addition to the above, the minor requires three courses (total) from the following, two of which must be in different departments:

- CS 106X. Programming Paradigms
- CS 137. Introduction to Scientific Computing
- CS 138. MATLAB and MAPLE for Science and Engineering Applications
- CS 154. Introduction to Automata and Complex Theory
- CS 260. Concrete Mathematics
- Elect. Engr. 261. The Fourier Transform and its Applications
- Econ. 160. Game Theory and Economic Applications (prereq. Econ 51)
- Econ. 171-172. Intermediate Econometrics II-III
- Econ. 181. Optimization and Economic Analysis
- EES&OR 211. Linear and Nonlinear Optimization/Programming
- EES&OR 212. Network and Integer Programming
- EES&OR 251. Stochastic Models
- EES&OR 273. Stochastic Models in Operations Research
- Math. 104. Matrix Theory and its Applications
- Math. 106. Introduction to Theory of Functions of a Complex Variable
- Math. 110. Applied Number Theory and Field Theory
- Math. 115. Fundamental Concepts of Analysis or Math. 171
- Math. 131. Partial Differential Equations I
- Math. 132. Partial Differential Equations II
- Math. 160A. First Order Logic
- Stat. 200. Introduction to Statistical Inference
- Stat. 201. Statistical Methods
- Stat. 203. Analysis of Variance
- Stat. 217. Introduction to Stochastic Processes

Other upper-division courses appropriate to the program major may be substituted with the permission of the program director. Undergraduate majors in the constituent programs cannot count courses in their own departments.

## HONORS PROGRAM

The honors program is designed to encourage a more intensive study of mathematical sciences than the Bachelor of Science program. In addition to meeting all requirements for the B.S. in Mathematical and Computational Science, the student must:

1. Maintain an average letter grade equivalent in mathematical sciences courses of at least a 3.4.
2. Complete at least 15 units in mathematical sciences in addition to the requirements for the major listed above. These courses should form a sustained effort in one area and constitute a program approved by the committee in charge of the Mathematical and Computational Science Program.
3. Include in the above 15 units at least one of the following:
   a) an approved higher-level graduate course
   b) participation in a small group seminar
   c) at least three units of directed reading

Students interested in doing honors work should consult with their advisers by the last quarter of the junior year to prepare a program of study for submission to the committee in charge for their approval. Honors work...
may be concentrated in a wide variety of fields outside of the Mathematical and Computational Science programs, for example, physics, biological sciences, medicine.

**COURSES**

**100. Mathematics of Sports**—(Spring Quarter 1999-2000, enroll in Statistics 50.) For freshmen only. The use of mathematics, statistics, and probability in the analysis of athletic performance, sports records, strategy, etc. Topics: mathematical analysis of the physical and biological aspects of human performance, the effects of variations in technique and equipment, the determination of optimal strategies, traditional sports statistics and the development of new statistics, calculation of probabilities of various outcomes, etc. Different sports are considered. Prerequisites: Mathematics 51. Corequisite: Statistics 116.

3 units (Cover) alternate years, not given 2000-01

**MATHEMATICS**

Emeriti: (Professors) Kai Lai Chung, Robert Finn, David Gilbarg, Samuel Karlin, Joseph Keller, Georg Kreisel, Harold Levine, Robert Osserman, Hans Samelson, Mary Sunseri

Chair: Leon Simon


Associate Professor: Amir Dembo

Assistant Professors: Julie Benson, Jeffrey Brock, David Carlton, Kai Cieliebak, Michael Hutchings, Kefeng Liu, Jonathan Mattingly, Gigliola Staffilani, Mu-Tao Wang

Courtesy Professor: Renata Kallosh

Lecturer: Helen Moore

The Department of Mathematics offers programs leading to the degree of Bachelor of Science, Master of Science, and Doctor of Philosophy in Mathematics and participates in the program leading to the B.S. in Mathematical and Computational Science. The department also participates in the M.S. and Ph.D. degree programs in Scientific Computing and Computational Mathematics.

**ADVANCED PLACEMENT FOR FRESHMEN**

Students of unusual ability in mathematics often take one or more semesters of college-equivalent courses in mathematics while they are still in high school. Under certain circumstances, it is possible for such students to secure both advanced placement and credit toward the bachelor's degree. A decision as to placement and credit is made by the department after consideration of the student’s performance on the Advanced Placement Examination in Mathematics (forms AB or BC) of the College Entrance Examination Board. This examination is only the one used for granting credit.

The department does not give its own advanced placement examination. Students may receive either 5 or 10 units of advanced placement credit, depending on their scores on the Advanced Placement Examination. Entering students who have credit for two quarters of single variable calculus (10 units) are encouraged to enroll in Mathematics 51-53 in multivariable mathematics, or the honors version 51H-53H. These three-course sequences, which can be completed during the freshman year, supply the necessary mathematics background for most majors in science and engineering. They also serve as excellent background for major or minor degrees in Mathematics, or in Mathematical and Computational Science. Students who have credit for one quarter of single variable calculus should take Mathematics 42 in the Autumn Quarter and 51 in Winter Quarter. Options available in the Spring Quarter include Mathematics 52, 53, 103, or 130. For proper placement, contact the Department of Mathematics.

**UNDERGRADUATE PROGRAMS**

**BACHELOR OF SCIENCE**

The following department requirements are in addition to the University’s basic requirements for the bachelor’s degree:

**MAJORS**

Students wishing to major in Mathematics must satisfy the following requirements

1. Department of Mathematics courses totaling at least 49 units credit, and such courses must be taken for a letter grade. For the purposes of this requirement, Statistics 116 counts as a Department of Mathematics course.

2. Additional courses taken from Department of Mathematics course numbers 100 and above or from approved courses in other disciplines with significant mathematical content, totaling at least 15 units credit.

3. A Department of Mathematics adviser must be selected, and the courses selected under items ‘1’ and ‘2’ above must be approved by the adviser, acting under guidelines laid down by the department’s Committee for Undergraduate Affairs. The Department of Mathematics adviser can be any member of the department’s faculty.

4. To receive the department’s recommendation for graduation, a student must have been enrolled as a major in the Department of Mathematics for a minimum of two full quarters, including the quarter immediately before graduation. In any case students are strongly encouraged to declare as early as possible, preferably by the end of the sophomore year.

Students are normally expected to complete either the sequence 19, 20, 21 or the sequence 41, 42 (but not both). Students with an Advanced Placement score of at least 3 in BC math or 5 in AB math may, if they so choose, take 10 units credit and fulfill requirement ‘1’ by taking at least 39 units of Department of Mathematics courses numbered 51 and above. Students with an Advanced Placement score of at least 3 in BC math or 5 in AB math may, if they so choose, take 5 units credit and fulfill requirement ‘1’ by taking at least 44 units of Department of Mathematics courses numbered 42 and above.

It is recommended that the choice of courses under requirement ‘1’ above should include at least the following: the sequences 51H, 52H, 53H (but not both); 104 or 114; 106; 115 or 171; 120 or both 109 and 110. In addition, it is recommended that students make a reasonably broad selection of courses from the department’s algebra and analysis courses 121, 131, 132, 134A-B, 152, 153, 155, 156, 173, 175, 176, the geometry/topology courses 141, 143, 145, 147, 149 and foundation courses 160A, 160B, 161. The probability course Statistics 116 is also recommended.

Some of the additional courses mentioned under (2) above could, for example, be taken from the physics series 41, 43, 45, 47, or the physics series 61, 63, 65. A variety of other courses would be allowed under (2) including some courses taken from the departments of Engineering Computer Science, Statistics, and Economics.

Subject to approval of the department’s Committee for Undergraduate Affairs, it may, in some cases, be permitted to count freshmen and sophomore seminar courses as part of a choice of courses under item ‘1’. Other variations of the course requirements laid down above (under item ‘1’ and ‘2’) may, in some circumstances, be allowed (for example, students transferring from other universities may be allowed credit for some courses completed before their arrival in Stanford). In all cases, approval must be obtained from the department’s Committee for Undergraduate Affairs. Application for such approval should be made through the student’s Department of Mathematics adviser.

It is to be emphasized that the above regulations are minimum requirements for the major—students contemplating graduate work in mathematics are strongly encouraged to include the courses 14, 120, and 114 in their selection of courses, and in addition, take at least three Department of Mathematics courses over and above the minimum requirements laid out under items ‘1’ and ‘2’ above, including at least one 200-level course. Such students are also encouraged to consider the possibility of taking the honors program, discussed below.
To help develop a sense of the type of course selection (under items '1' and '2' above) which would be recommended for math majors with various backgrounds and interests, see the following examples. These represent only a few of a very large number of possible combinations of courses which could be taken in fulfillment of the Mathematics major requirements:

Example 1—A "General" program (a balanced program of both pure and applied components, without any particular emphasis on any one field of mathematics or applications) as follows:

Either 19, 20 and 21, or 41 and 42 (or satisfactory Advanced Placement credit); 51, 52, 53; 104; 106; 110; 115
Plus any selection of at least eight of the following courses, including three math department courses (or two Department of Mathematics courses and Statistics 116): Mathematics 131, 132, 143, 147, 152, 153, 161, 173; Statistics 116; Physics 41, 43, 45; Computer Science 137; Economics 50

It would be common in this sequence to also include Mathematics 103 or 113 in the selection of Department of Mathematics courses here, especially for students wishing to supplement their knowledge of linear algebra, gained in Mathematics 51 and 53, before attempting some of the other courses listed. However, Mathematics 51 and 53 would generally be deemed sufficient introduction to linear algebra for these other courses. Students could take 103 (or 113) and 130 in lieu of 53.

Example 2—A "Theoretical" program (recommended for those contemplating possible later graduate work (see, also, the discussion of the honors program below), providing an introduction to the main areas of mathematics both broader and deeper than the general program outlined above).

Either 19, 20, and 21, or 41 and 42 (or satisfactory Advanced Placement credit)

Either the sequence 51, 52, 53, or the sequence 51H, 52H, 53H; 106; 114; 120; 171
Plus at least nine of the following courses: 121, 131, 132, 134A, 141, 143, 145, 147, 148, 152, 153, 155, 156, 160A, 161, 173, 175, 176; Statistics 116

In addition, those contemplating eventual graduate work in mathematics should seriously consider including at least one graduate-level math course such as Mathematics 205A or 206A. Such students should also consider the possibility of entering the honors program.

(Students taking 51, 52, 53 rather than 51H, 52H, 53H should consider taking 113 before attempting 114.)

Example 3: An "Applied Mathematics" program:

Either 19, 20 and 21; or 41 and 42 (or satisfactory Advanced Placement credit); 51, 52, 53; 104; 106; 110; 115; 131; 132; Statistics 116

Plus at least 15 units of courses in Applied Mathematics, including, for example, suitable courses from the departments of Computer Science, Economics, Engineering, and Statistics

Students with interests in applied mathematics, but desiring a broader-based program than the type of program suggested in Example 3, including significant computational and/or financial and/or statistical components, are encouraged to also consider the Mathematics and Computational Sciences program.

MINORS

To qualify for the minor in mathematics, a student should successfully complete, for a letter grade, at least six Department of Mathematics courses numbered 51 or higher, totaling a minimum of 24 units. It is recommended that these courses include either the sequence 51, 52, 53 or the sequence 51H, 52H, 53H.

HONORS PROGRAM

The honors program is intended for students who have strong theoretical interests and abilities in mathematics. The goal of the program is to give students a thorough introduction to the main branches of mathematics, especially analysis, algebra, and geometry. Through the honors thesis, students may be introduced to a current or recent research topic, although occasionally more classical projects are encouraged. The program provides an excellent background with which to enter a masters or Ph.D. program in mathematics. Students successfully completing the program are awarded a B.S. in Mathematics with Honors.

It is recommended that the sequence 51H, 52H, 53H be taken in the freshman year. Students who have instead taken the sequence 51, 52, 53 in their freshman year may be permitted to enter the honors program, but such entry must be approved by the Department of Mathematics Committee for Undergraduate Affairs.

To graduate with a B.S. in Mathematics with Honors, the following conditions apply in addition to the usual requirements for math majors:

1. The selection of courses under items '1' and '2' above must include all the math courses 106, 114, 120, 171 and also must include at least two courses from the analysis sequence 131, 132, 134A, 134B, 173, 175, 176; at least two courses from the algebra sequence 121, 152, 153, 155, 156; at least one course in the geometry/topology sequence 141, 143, 145, 147, 148; and at least one course in logic or set theory (from 160A, 160B, 161). The probability course Statistics 116 is also strongly recommended.

2. Students in the honors program must write a senior thesis. In order to facilitate this, the student must, by the end of the junior year, choose an undergraduate thesis adviser from the Department of Mathematics faculty, and map out a concentrated reading program under the direction and guidance of the adviser. During the senior year, the student must enroll in Mathematics 197 for a total of 6 units (typically spread over two quarters), and work toward completion of the thesis under the direction and guidance of the thesis adviser. The thesis may contain original material, or be a synthesis of work in current or recent research literature. The 6 units of credit for Mathematics 197 are required in addition to the course requirements laid out under items '1' and '2' above of the usual requirements for math majors.

In addition to the minimum requirements laid out above, it is strongly recommended that students take at least one graduate-level course (that is, at least one course in the 200 plus range). Mathematics 205A, 206A are especially recommended in this context.

Students with questions about the honors program should see the Director of Undergraduate Advising.

BACHELOR OF SCIENCE IN MATHEMATICAL AND COMPUTATIONAL SCIENCE

The Department of Mathematics participates with the departments of Computer Science, Engineering-Economic Systems and Operations Research, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Department of Mathematical and Computational Science" section of this bulletin.

GRADUATE PROGRAMS

MASTER OF SCIENCE

The University’s basic requirements for the master’s degree are discussed in the "Graduate Degrees" section of this bulletin. The following are additional department requirements:

Candidates must complete an approved course program of 36 units beyond the department requirements for the B.S. degree. It must include 18 units in courses numbered 200 or above. The candidate must have a grade point average (GPA) of 'B' over all course work taken in mathematics, and a GPA of 'B' in the 200-level courses considered separately. Course work for the M.S. degree must be approved during the first quarter of enrollment in the program by the department’s Director of Graduate Studies.

For the degree of M.S. in Computer Science, see the "Computer Science" section of this bulletin.

TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, see the "School of Education" section of this bulletin or address inquiries to Credential Secretary, School of Education.
MASTER OF ARTS IN TEACHING (MATHEMATICS)

In cooperation with the School of Education, the department offers a program leading to a Master of Arts in Teaching (Mathematics). It is intended for candidates who have a teaching credential or relevant teaching experience and wish to strengthen their academic preparation. Detailed requirements are outlined under the “School of Education, Master of Arts in Teaching” section of this bulletin.

DOCTOR OF PHILOSOPHY

The University’s basic requirements for the doctorate (residence, dissertation, examination, and so on) are discussed in the “Graduate Degrees” section of this bulletin. The following are additional department requirements.

To be admitted to candidacy, the student must have successfully completed 27 units of graduate courses (that is, courses numbered 200 and above). In addition, the student must pass qualifying examinations given by the department.

Beyond the requirements for candidacy, the student must complete a course of study of at least 48 units approved by the Graduate Affairs Committee of the Department of Mathematics and submit an acceptable dissertation. The course program should display substantial breadth in mathematics outside the student’s field of application. The student must receive a grade point average (GPA) of ‘B’ or better in courses used to satisfy the Ph.D. requirement. In addition, the student must pass the University oral examination and pass a reading examination in two foreign languages, chosen from French, German, or Russian.

Experience in teaching is emphasized in the Ph.D. program. Each student is required to complete nine quarters of such experience. The nature of the teaching assignment for each of those quarters is determined by the department in consultation with the student. Typical assignments include teaching or assisting in teaching an undergraduate course or lecturing in an advanced seminar.

For the Ph.D. degree in Computer Science, see the “Computer Science” section of this bulletin.

For further information concerning degree programs, fellowships, and assistantships, inquire of the academic associate of the department.

APPLIED MATHEMATICS OPTION

This option differs from the standard Ph.D. program in that qualifying examinations in more applied areas are substituted for the regular qualifying examinations. Also, the courses Mathematics 220 (basic methods in partial differential equations) and Computer Science 237 (numerical methods) are a required part of the curriculum in the first year. Students are required to take 18 units of graduate-level courses in computer science and applied areas such as fluid mechanics, operations research, financial mathematics, or statistics.

Ph.D. MINOR

The student should complete both of the following:*  
1. Mathematics 106, 131, 132
2. Mathematics 113, 114, 120 or 152

These courses may have been completed during undergraduate study, and their equivalents from other universities are acceptable.

In addition, the student should complete 21 units of 200-level courses in mathematics. These must be taken at Stanford and approved by the Department of Mathematics’ Ph.D. minor adviser.

*C A third coherent sequence designed by the student, subject to the approval of the graduate committee, may be considered as a substitute for items 1 or 2.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

INTRODUCTORY AND UNDERGRADUATE

The department offers two sequences of introductory courses in single variable calculus.

1. Mathematics 41, 42 present single variable calculus. Differential calculus is covered in the first quarter, integral calculus in the second.
2. Mathematics 19, 20, 21 cover the material in 41, 42 in three quarters instead of two.

There are options for studying multivariable mathematics:

1. Mathematics 51, 52, 53 cover differential and integral calculus in several variables, linear algebra, and ordinary differential equations. These topics are taught in an integrated fashion and emphasize applications. Mathematics 51 covers differential calculus in several variables and introduces matrix theory and linear algebra, 52 covers integral calculus in several variables and vector analysis, 53 studies further topics in linear algebra and applies them to the study of ordinary differential equations. This sequence is strongly recommended for incoming freshmen with 10 units of Advanced Placement credit.
2. Mathematics 51H, 52H, 53H cover the same material as 51, 52, 53, but with more emphasis on theory and rigor.

The introductory course in modern algebra is Linear Algebra (103 or 113). There are no formal prerequisites for these courses, but appropriate mathematical maturity is expected. The material in 103 is covered in the sequence 51, 52, 53.

19, 20, 21. Calculus—The content is the same as the sequence 41 and 42 described below, over three quarters rather than two.

19. Calculus—GER:2c (DR:4)
   3 units, Aut (Moore)
   Win (Staff)

20. Calculus—Continuation of 19. Prerequisite: 19. GER:2c (DR:4)
   3 units, Win (Moore)
   Spr (Staff)

21. Calculus—Continuation of 20. Prerequisite: 20. GER:2c (DR:4)
   4 units, Spr (Moore)

41, 42—Three large lecture classes per week plus two classes in small sections.

41. Single Variable Calculus—Introduction to differential and integral calculus of functions of one variable. Topics: review of elementary functions including exponentials and logarithms, rates of change, and the derivative. Prerequisites: algebra, trigonometry. GER:2c (DR:4)
   5 units, Aut (Rumelhart)

42. Single Variable Calculus—Continuation of 41. Methods of symbolic and numerical integration, applications of the definite integral, introduction to differential equations. Infinite series. Prerequisite: 41 or equivalent. GER:2c (DR:4)
   5 units, Aut (Elezi)
   Win (Rumelhart)

51, 52, 53. Multivariable Mathematics—Recommended for incoming freshmen with 10 units of Advanced Placement credit, and for those interested in science, engineering, or economics. Provides an integrated treatment of multivariable calculus, linear algebra, and ordinary differential equations involving numerical algorithms and computer experiments. Applications are stressed.

51. Linear Algebra and Differential Calculus of Several Variables—Geometry and algebra of vectors, systems of linear equations, matrices, vector valued functions and functions of several variables, partial derivatives, gradients, chain rule in several variables, vector fields, optimization. Prerequisite: completion of 21, 42, or a score of at least 4 on the BC Advanced Placement Examination or on the A8 Advanced Placement Examination, or consent of the instructor. GER:2c (DR:4)
   5 units, Aut (Carlsson, R. Cohen, Benson, Brock, Etnyre)
   Win (deSilva, Levandosky)
   Spr (Rumelhart)
   Sum (Staff)

52. Integral Calculus of Several Variables—Iterated integrals, line and surface integrals, vector analysis with applications to vector p-
tentials and conservative vector fields, physical interpretations, numerical methods. Similar to 44; makes use of techniques from matrix theory. Prerequisite: 51.

3 units, Aut (Cieliebak)  
Win (Bruunfjel, Kerckhoff)  
Spr (Wang)

53. Ordinary Differential Equations with Linear Algebra—Linear ordinary differential equations, applications to oscillations, matrix methods including determinants, eigenvalues and eigenvectors, matrix exponentials, and solving of systems of linear differential equations with constant coefficients, numerical methods, and Laplace transforms. Similar to 130, integrated with topics from linear algebra (103, 104). Prerequisite: 51.

3 units, Aut (Levandosky)  
Win (Carlton)  
Spr (Einyre, Hutchings)

51H,52H,53H. Honors Calculus—(Formerly 43H, 44H, 45H.) For prospective math majors in the honors program or other areas of science or engineering who have a strong mathematics background. Three-quarter sequence, beginning in Autumn, covers the material of 51, 52, 53, and additional advanced calculus and ordinary and partial differential equations. Provides a unified treatment of multi-variable calculus, linear algebra, and differential equations with a different order of topics and emphasis from standard courses. Students should know one-variable calculus and have an interest in a theoretical approach to the subject. Prerequisite: score of 5 on BC Advanced Placement Exam or consent of the instructor. Recommended: complete at least the first two quarters. 51H satisfies GER:2c (DR:4)  
3 units, Aut, Win, Spr (Staffilani)

80Q. Stanford Introductory Seminar: Capillary Surface Interfaces—Preference to sophomores.  
3 units, Win (Finn)

3 units, Spr (Mazzeo)

82Q. Stanford Introductory Seminar: Surfing Wavelets at Stanford—Preference to sophomores.  
3 units, Aut (Staffilani)

83N. Stanford Introductory Seminar: Paradoxes—Preference to freshmen.  
3 units, Win (Feferman)

3 units, Win (Carlsson)

3 units, Spr (Katznelson)

3 units, Spr (R. Cohen)

UNDERGRADUATE AND GRADUATE

Unless explicitly stated, there are no prerequisites for the courses listed below. Where a prerequisite is stated, it may be waived by the instructor.

103. Matrix Theory and its Applications—Linear algebra and matrices, emphasizing the computational and algorithmic aspects and the scientific problems in which matrix theory is applied. Solution of linear equations. Linear spaces and matrices. Orthogonal projection and least squares. Introduction to eigenvalues and eigenvectors. GER:2c (DR:4)  
3 units, Aut (Elezi, Levandosky, Schlichtkrull)  
Win (Dembo, Benson)  
Spr (Benson, Carlton)  
Sum (Staff)

3 units, Win (Wang)  
Spr (Bump)

106. Introduction to Theory of Functions of a Complex Variable—Complex numbers, analytic functions, Cauchy-Riemann equations, complex integration, Cauchy formula; elementary conformal mappings. Prerequisite: 52 or S2H.  
3 units, Win (Li)  
Spr (Katznelson)

109. Applied Modern Algebra—Applications of the theory of groups. Topics: elements of groups theory, groups of symmetries, matrix groups, group actions, and applications to combinatorics and computing. Applications: rotational symmetry groups, the study of the Platonic solids, crystallographic groups and their applications in chemistry and physics. (WIM)  
3 units, Win (Li)

110. Applied Number Theory and Field Theory—Applications of number theory and finite fields in computing and coding. Topics: divisibility and congruences, costs and operations, finite Fourier transforms, finite fields and applications to error correcting codes and cryptography. (WIM)  
3 units, Spr (K. Liu)

113. Linear Algebra and Matrix Theory—Algebraic properties of matrices and their interpretation in geometric terms. The relationship between the algebraic and geometric points of view and matters fundamental to the study and solution of linear equations. Topics: linear equations, vector spaces, linear dependence, bases and coordinate systems; linear transformations and matrices; similarity; eigenvectors and eigenvalues; diagonalization.  
3 units, Aut (Katznelson)  
Win (Hutchings)

114. Linear Algebra and Matrix Theory—Continuation of 113. Deeper study of 113 topics plus additional topics from invariant subspaces, canonical forms of matrices; minimal polynomials and elementary divisors; vector spaces over arbitrary fields; inner products; Jordan normal forms; Hermitian and unitary matrices; multilinear algebra.  
3 units, Win (Milgram)

3 units, Aut (Katznelson)  
Win (Ornstein)  
Sum (Staff)

120. Modern Algebra I—Basic structures in algebra: groups, rings, and fields. Elements of Group Theory: permutation groups, finite Abelian groups, p-groups, Sylow theorems. Polynomial rings, principal ideal domains, unique factorization domains. (WIM)  
3 units, Aut (J. Li)
121. Modern Algebra II—Continuation of 120. Fields of fractions. Solvable and simple groups. Elements of field theory and Galois theory. Prerequisite: 120.

3 units, Win (Bump)

130. Ordinary Differential Equations—Special, exact, and linear equations; series solutions, numerical solution; Laplace transform; systems of equations. Students with some background in matrix theory should take 53, which integrates linear algebra with differential equations. Pre-or co-requisite: 44 or 52, or consent of instructor.

3 units, Aut (Chou)
Win (Mazzeo)
Spr (Schlichtkrull)

131. Partial Differential Equations I—First order equations, classification of second order equations. Initial-boundary value problems for heat, wave, and related equations. Separation of variables, eigenvalue problems, Fourier series, existence and uniqueness questions. Prerequisite: 53 or 130 or equivalent.

3 units, Aut (T. P. Liu)
Win (Cieliebak)


3 units, Win (T. P. Liu)

134A,B. Honors Analysis—Primarily for students planning graduate work in mathematics of physics who would normally enroll in an honors sequence. Required of honors math majors, but of use and interest to other majors at ease with rigorous proofs and qualitative discussion. Coherent, mathematically sophisticated presentation of the basic areas in classical real analysis. Emphasis is on ordinary and partial differential equations. Prerequisite: 53H or 171, or consent of instructor.

3 units, Win, Spr (Mazzeo)


3 units, Aut (P. Cohen)
Win (Mazzeo)

145. Algebraic Geometry—Affine and projective spaces, plane curves, Bezout’s theorem, singularities and genus of a plane curve, applications of commutative algebra to geometry. Prerequisites: 106 and either 120 or 110.

not given 1999-2000

147. Differential Topology—Smooth manifolds, transversality, Sard’s theorem, embeddings, degree of a map, Borsuk-Ulam theorem, Hopf degree theorem, Jordan Curve Theorem. Prerequisite: 115 or 171.

3 units, Spr (Hutchings)

148. Algebraic Topology—Fundamental group, covering spaces, Euler characteristic, classification of surfaces, knots. Prerequisites: 109 or 120.

not given 1999-2000


3 units, Win (Dembo)

152. Elementary Theory of Numbers—Euclid’s algorithm, fundamental theorems on divisibility; prime numbers, congruence of numbers, theorems of Fermat, Euler, Wilson; congruence of first and higher degrees; Lagrange’s theorem, its applications; residues of power, quadratic residues; introduction to the theory of binary quadratic forms.

3 units, Spr (Carlton)

153. Combinatorics—Topics in Ramsey’s theorem, generating functions, partition functions, and in number theory (sums of integers and van der Waerden’s theorem). Recommended: general background in algebra, analysis, and some number theory.

not given 1999-2000

156. Group Representations—Designed for undergraduates. Expositions, primarily examining symmetries on objects such as vector spaces (“group representations”), geometric objects (“geometric group actions”), and discrete sets (combinatorics). Topics: group representations and their characters, classification of permutation representation using partitions and Young tableaus, group actions on sets and the Burnside ring, and spherical space forms. Prerequisites: basic knowledge of linear algebra (51-53, 103 or 113) and Group Theory (109, 110 or 120).

3 units, Aut (Milgram)

160A. First-Order Logic—(Enroll in Philosophy 160A.)

160B. Computability and Logic—(Enroll in Philosophy 160B.)

161. Set Theory—Informal and axiomatic set theory: sets, relations, functions and set-theoretical operations. The Zermelo-Fraenkel axioms and the special role of the axiom of choice and its various equivalents. Well-ordering and ordinal numbers; transfinite induction and transfinite recursion. Equinumerosity and cardinal numbers; Cantor’s Alephs and cardinal arithmetic. Open problems in set theory.

not given 1999-2000

162. Philosophy of Mathematics—(Enroll in Philosophy 162.)

171. Fundamental Concepts of Analysis—Recommended for math majors and required of honors math majors. Similar to 115 but altered contents and more theoretical orientation. Properties of Riemann integrals, continuous functions and convergence in metric spaces; compact metric spaces, basic point set topology. Prerequisites: either 51, 52, 53, or 51H, 52H, 53H (WIM)

3 units, Aut (Kerckhoff)

173. Analysis on Manifolds—Differentiable manifolds, tangent space, submanifolds, implicit function theorem, differential forms, vector and tensor fields. Frobenius’ theorem, DeRham theory. Prerequisites: 52 and 52H.

3 units, Win (Schlichtkrull)

175. Elementary Functional Analysis—Linear operators on Hilbert space. Spectral theory of compact operators; applications to integral equations. Elements of Banach space theory. Prerequisite: 115 or 171.

3 units, Spr (Cieliebak)


3 units, Spr (Papanicolaou)

181. Topics in the History of Mathematics: From Antiquity to the 17th Century—(Enroll in History and Philosophy of Science 140.)

195. Teaching Practicum—Students assist in an undergraduate course, lead problems sessions, and tutor. Some reading in topics in mathematics education is required.

1 unit, Aut, Win, Spr
197. Senior Honors Thesis
1-6 units, Aut, Win, Spr (Staff)

199. Independent Work—Undergraduates pursue a reading program; topics limited to those not in regular department course offerings. Credit can fulfill the elective requirement for math majors. Approval of Undergraduate Affairs Committee is required to use credit for department’s area requirement. Consult the academic associate for help in finding an adviser.
(Staff)

PRIMARILY FOR GRADUATE STUDENTS

200. Graduate Problem Seminar
not given 1999-2000

205A. Theory of Functions of a Real Variable—Lebesgue measure and integration, LP spaces, and convergence theorems. Prerequisite: 171 or equivalent.
3 units, Aut (Simon)

3 units, Win, Spr (Katznelson)

3 units, Aut (J. Li)

206B. Theory of Functions of a Complex Variable—Riemann mapping theorem, product developments, entire functions, elliptic functions, Dirichlet problem, Picard’s theorem. Prerequisites: 171, 206A.
3 units, Win (Wang)

210A. Modern Algebra—Groups, rings and fields, Galois theory, ideal theory. Prerequisite: 120 or equivalent.
3 units, Win (P. Cohen)

210B, C. Modern Algebra—Introduction to algebraic geometry representation of groups and rings, multilinear algebra. Prerequisites: 210A or equivalent.
3 units, Win, Spr (Bump, Brumfiel)

216A. Introduction to Algebraic Geometry—Algebraic varieties, sheaves, cohomology, and Riemann-Roch theorem. Hodge theory, Lefschetz decompositions, and hyperplane theorem. Curves and surfaces classification theorem. Prerequisite: 120 or equivalent.
not given 1999-2000

3 units, Win, Spr (K. Liu)

220A. 3 units, Aut (T. P. Liu)
220B. 3 units, Win (T. P. Liu)
220C. 3 units, Spr (Chou)

227. Mathematical and Computational Molecular Biology—Emphasis is on concepts and principles, combined with hands-on applications. Topics: probability models for letter sequences, score-based sequence analysis. Amino acid substitution scoring matrices, dynamic programming and other methods for sequence alignment, phylogenetic trees from sequence data, signal search methods, codon usage, exon-intron prediction.
not given 1999-2000

3 units, Aut, Win (Ornstein)

3 units, Aut (Siegmund)

3 units, Win (Dembo)

3 units, Spr (Siegmund)

235A. Selected Topics in Ergodic Theory—Topics from the Kolmogorov-Sinai theory of entropy; the isomorphism theorem for Bernoulli shifts and Bernoulli flows; K-automorphisms applications to mechanical systems, and automorphisms of compact groups.
3 units, Aut, Win, Spr (Ornstein)

3 units, Aut (Mattingly)

3 units, Win (Mattingly)

3 units, Spr (Papanicolaou)

241. Mathematical Finance—(Enroll in Statistics 250.)
3 units, Spr (T. Lai)

244. Riemann Surfaces—Compact Riemann surfaces: topological classifications, Hurwitz’ formula. Riemann-Roch formula, uniformization theorem. Abel’s theorem, Jacobian varieties. Some elements of harmonic analysis are developed with applications. Methods are generally applicable to the algebraic curves highlighted.
3 units, Aut (K. Liu)

246. Asymptotics of Multivariable Generating Functions—Formal power series and generating functions. Asymptotics of one variable generating functions. The theory of oscillating integrals in one and many variables. Asymptotics of multivariable generating functions and complete classification of two-variable, meromorphic non-entire functions. Topological and algebraic-geometric issues in extending this. Derivation of generating functions via symmetric function theory, elliptic functions, and Riemann-Hilbert problems. Applications in combinato-
L-functions, groups and elliptic curves. Connections with Iwasawa theory and p-adic 249. Topics in Representation Theory and Number Theory—Euler forms, including Hecke operators, L-series, twisting, Rankin-Selberg undergraduates. Differential equations and vector fields. Exam-
tors on singular and noncompact spaces, the microlocal theory of elliptic theorem for Dirad operators). Possible topics: pseudodifferential opera-
259. Microlocal Analysis—The basic calculus of pseudodifferential and mechanics. Contact geometry and contact manifolds. Relations be-
3 units, Spr (Bump)
254A,B. Ordinary Differential Equations—Qualitative theory of ordi-
nary differential equations, analytic and geometric methods. Topics from the stability and perturbation theory of dynamical systems; Hamilton-
yon systems; applications to the theory of oscillations and celestial me-
not given 1999-2000
256A,B,C. Partial Differential Equations—Introduction to the theory of linear and non-linear partial differential equations, beginning with linear theory involving use of Fourier transform and Sobolev spaces. Topics: Schauder and L2 estimates for elliptic and parabolic equations; De Giorgi-Nash-Moser theory for elliptic equations; non-linear equations, e.g., the minimal surface equation, geometric flow problems, and non-
3 units Aut, Win, Spr (Simon, Mazzeo)
258. Topics in Geometric Analysis not given 1999-2000
259. Microlocal Analysis—The basic calculus of pseudodifferential operators, focusing on the parametrix construction for elliptic operators, and leading to various applications in geometry (Hodge theorem, index theorem for Dirad operators). Possible topics: pseudodifferential opera-
tors on singular and noncompact spaces, the microlocal theory of elliptic boundary value problems, Atiyah-Patodi-Singer index theorem. not given 1999-2000
260A,B. Mathematical Methods of Classical Mechanics—Open to undergraduate students. Differential equations and vector fields. Exa-
264A. Number Theory—Introduction to algebraic number theory: the arithmetic of local and number fields, and a brief introduction to class field theory. Prerequisite: 210A or equivalent. not given 1999-2000
264B. Number Theory—Modular forms. The basic theory of modular forms, including Hecke operators, L-series, twisting, Rankin-Selberg method, and the Eichler-Shimura theory relating modular forms of weight two to elliptic curves. 3 units, Spr (Bump)
253. Regularity of Sets and Mappings—For students interested in any area of analysis. Topics: Lipschitz functions; $C^r$ functions; Sobolev functions; various regularity and extension theorems including Radamacher, Kirzbraun, Whitney, Sard, $C^r$-Sard. Critical sets of real-analytic, complex analytic functions. Affine approximation properties of subsets of $R^n$, including a discussion of rectifiability and non-rectifiability, structure theorem, and Reifenberg's topological disc theorem. 3 units, Spr (Simon)
270. Geometry and Topology of Affine Complex Manifolds—Geometric introduction to the theory of plurisubharmonic functions and pseudoconvex hypersurfaces. Affine (Stein) manifolds and their character-
ization in terms of plurisubharmonic functions (Grauert's theorem). Topology of Stein manifolds. Lefschetz's theorem and its converse a complex dimensions greater than two. Rigidity properties of two-dimen-
stein manifolds. Symplectic geometry of Stein manifolds. Morse-Smale type theory for plurisubharmonic functions. not given 1999-2000
272A,B. Topics in Partial Differential Equations—Introduction to PDE methods in an intrinsic geometric setting. Topics: Schauder and DeGiorgi-Nash theory in a geometric setting, Sobolev, Poincare, and isoperimetric inequalities. Discussion of nonlinear methods: Leray-
Schauder fixed point, and degree and variational methods. Geometric examples introduce basic nonlinear PDEs of geometry (the harmonic map, Yang-Mills, and mean curvature equations) and equations arising from scalar and Ricci curvature. Prerequisite: knowledge of the elements of Fourier analysis. not given 1999-2000
277. Mathematical Theory of Relativity—Ricci calculus; variational principles and covariance properties; differential geometry of spacetime; Cauchy's problem for the differential equations of gravitation and electromagnetism; relativistic hydrodynamics; unified field theories. not given 1999-2000
281A,B. Introduction to Algebraic and Differential Topology—Fundamental group, covering spaces, embeddings and immersions of manifolds, transversality, homotopy theory, homology and cohomolog
of complexes, differential forms, fiber and vector bundles, and their
characteristic classes.

3 units, Aut (Kerckhoff)
Win (R. Cohen)

283. Topics in Topology
3 units, Spr (R. Cohen)

284. Topics in Geometric Topology
3 units, Aut (Milgram)

285A. Geometric Measure Theory—Hausdorff measures and dimen-
sions, area and co-area formulas for Lipschitz maps, integral currents and
flat chains, minimal surfaces and their singular sets.
not given 1999-2000

286. Topics in Differential Geometry
3 units, Spr (Schoen)

290A. Model Theory—(Enroll in Philosophy 290A.)
3 units, Aut (Mints)

290B. Model Theory—Kripke (possible world) semantics of intuition-
istic and modal logics. Completeness results and strategies in automated
deduction. Algebraic models. Second order systems. May be taken
independently of 290A. Prerequisites: 160A,B or equivalent.
3 units, Win (Mints)

291A,B- Recursion Theory—Theory of recursive functions and recur-
sively enumerable sets. Turing machines and alternative approaches.
Diophantine definability. Definability in formal systems. Gödel’s in-
completeness theorems. Recursively unsolvable problems in mathemat-
is and logic. Introduction to recursive ordinals and hierarchies. Prereq-
isites: 160A,B and 162, or equivalents.
not given 1999-2000

292A,B- Set Theory—The basics of axiomatic set theory; the systems of
Zermelo-Fraenkel and Bernays–Gödel. Topics: cardinal and ordinal
numbers, the cumulative hierarchy and the role of the axiom of choice.
Models of set theory, including the constructible sets and models
constructed by the method of forcing. Consistency and independence
results for the axiom of choice, the continuum hypothesis and other
unsettled mathematical and set-theoretical problems. Prerequisites:
160A,B and 161, or equivalents.
3 units, Win, Spr (Feferman)

293A,B- Proof Theory—Gentzen’s natural deduction and/or sequential
calculi for first-order predicate logic. Normalization respectively cut-
elimination procedures. Extensions to infinitary calculi; ordinal com-
plexity of proof trees. Subsystems of analysis and their reduction to
constructive theories. Prerequisites: 160A,B and 162, or equivalents.
not given 1999-2000

294. Topics in Logic—Hilbert’s program and its modern modifications.
Brouwer-Heyting-Kolmogorov interpretation, realizability, extraction
of programs from proofs. Normalization of proofs as computation of
programs. Stability of program extraction. Intensional and extensional
identity of programs. Continuous cut-elimination and its use for the study
of finite proofs and programs. Prerequisites: 160A,B or equivalent.
3 units, Spr (Mints)

297. Algebraic Logic—(Enroll in Computer Science 353.)

350. Directed Reading
any quarter (Staff)

351. Seminar Participation—Participation in a student-organized gradu-
te seminar under the general supervision of a faculty member.
any quarter (Staff)

360. Advanced Reading and Research
any quarter (Staff)

361. Seminar Participation—Participation in a faculty-led seminar
which has no specific course number.
any quarter (Staff)

380. Seminar in Applied Mathematics
by arrangement

381. Seminar in Analysis
by arrangement

383. Seminar in Function Theory
by arrangement

385. Seminar in Abstract Analysis
by arrangement

386. Seminar in Geometry and Topology
by arrangement

387. Seminar in Algebra and Number Theory
by arrangement

388. Seminar in Probability and Stochastic Processes
by arrangement

389. Seminar in Mathematical Biology
by arrangement

391. Seminar in Logic and the Foundations of Mathematics
by arrangement

MEDIEVAL STUDIES

Chair: Philippe Buc

Committee in Charge: George Brown, Philippe Buc, Hester Gelber,
William Mahrt, Jennifer Summit

Affiliated Faculty: George H. Brown (English), Philippe Buc (History),
Brigitte Gazelles (French and Italian, Comparative Literature),
Sara S. Poor (German Studies), Orrin W. Robinson (German Studies),
Jeffrey Schnapp (French and Italian, Comparative Literature),
Jennifer Summit (English)

The Medieval Studies Program is administered through Interdiscipli-
ary Studies in Humanities, but the degree is conferred by the Dean of
Undergraduate Studies’ Advisory Committee on Individually Designed
Majors. The committee has approved the program as listed below. Stu-
dents interested in pursuing the Medieval Studies major or minor should
consult the Chair of Medieval Studies. Students who are members of the
Humanities Honors Program may petition to major in Medieval Studies.
See the “Interdisciplinary Studies in Humanities” section of this bulle-
tin. The major is normally declared by the beginning of the student’s third
year.

The major combines interdisciplinary breadth with a disciplinary
focus. The interdisciplinary emphasis is provided by 165, Introduction
to Medieval Culture, by upper-level interdisciplinary colloquia, and by
the requirement that students take courses in three different areas. Depth
is ensured by the requirement that students take at least four courses in
one area. A faculty adviser helps each student choose courses that integ-

Affiliated Faculty:
George H. Brown (English), Philippe Buc (History),
Hester Gelber (Religious Studies), William Mahrt (Music), Jeffrey P. Mass (History),
Kathryn Miller (History), Sara S. Poor (German Studies), Orrin W. Robinson (German Studies),
Jeffrey Schnapp (French and Italian, Comparative Literature)

Chair: Philippe Buc

Committee in Charge: George Brown, Philippe Buc, Hester Gelber,
William Mahrt, Jennifer Summit

Affiliated Faculty: George H. Brown (English), Philippe Buc (History),
Brigitte Gazelles (French and Italian, Comparative Literature),
Sara S. Poor (German Studies), Orrin W. Robinson (German Studies),
Jeffrey Schnapp (French and Italian, Comparative Literature),
Jennifer Summit (English)
The requirements of breadth and depth. To that end, the following

guidelines are provided.

The student should take a minimum of ten courses dealing directly
with the Middle Ages and distributed as follows:

1. The introductory course, Medieval Studies 165, Introduction to
   Medieval Culture.

2. Two upper-division courses, ideally with an interdisciplinary com-
   ponent, in any field.

3. Four courses in one of the following categories:
   a. Literature: English, French, German and Scandinavian, Italian,
      Latin, Slavic, Spanish
   b. History
   c. Art history, drama, music
   d. Humanities, philosophy, religious studies (certain Humanities
      courses may fulfill requirements within other categories)

4. Two courses in a second category from the above list.

5. One course in a third category from the above list.

In addition to the ten courses, a language proficiency equal to two
years of college-level study is suggested in Latin or one of the follow-
ing: French, German, Italian, or Spanish.

MINORS

An undergraduate minor in Medieval Studies is available through the
program. Students interested in completing the minor should inquire
about enrollment procedures at the office of Interdisciplinary Studies in
Humanities.

Requirements:

1. Language: in addition to the University foreign language requirement,
at least a one-quarter course in a classical and/or medieval vernacular
language is recommended, which may count as one of the five
required courses for the minor listed under item 2a.

2. The minor consists of six courses, which include:
   a) Medieval Studies 165, Introduction to Medieval Culture (core
course, given annually)
   b) An additional five courses dealing directly with the Middle
   Ages. If the student’s major department or program offers
   medieval courses, he/she should take two of them for the
   Medieval Studies minor, but those courses may not also count
   for the major. At least three courses must be taken outside the
   student’s major, selected from two or more of the following
categories:
      1) Language and literature
      2) History
      3) Art history, drama, music
      4) Humanities, philosophy, religious studies
      5) From among the Medieval Studies faculty listed above, the stu-
         dent chooses an adviser, who assists in the selection of courses and
         the design of the program.

All courses counted toward the minor in Medieval Studies must be
taken for a letter grade. No course counted toward the minor can also count
 toward a student’s major or another minor.

COURSES

165. Introduction to Medieval Culture—(Same as English 165A, His-
tory 105A.) Introduction to the development of medieval culture through
religious, philosophical, literary, artistic, social, and political sources,
with emphasis on the interrelationships among them. Lectures by facul-
ty from various departments. GER:3a (DR:7 or 8)
5 units, Win (Brown, Miller)

RELATED AREAS

Courses suitable for self-designed majors in Medieval Studies are
listed below. More detailed course descriptions are found under the vari-
ous department headings. See quarterly Time Schedule for changes in
listings.

ART AND ART HISTORY
105/205. Sites and Images of Power in 12th-Century Europe
206D. Colloquium: Multiculturalism and Image Appropriation—Early Medieval Art and Architecture

COMPARATIVE LITERATURE
218. Latinity and Vernacularity

ENGLISH
81Q. Authority and Women in the Early Middle Ages
10/110. Masterpieces of English Literature I: Chaucer, Shakes-
peare, Milton, and their Contemporaries
165E. The Invention of Middle English Literature, 1330-1400
171. Chaucer

209. Introduction to Paleography and Codicology

211. Readings in Middle English

370. Seminar: Suffering History—Exemplary Lives in Medieval

FRENCH AND ITALIAN

FRENCH
108N. Stanford Introductory Seminar: Female Saints
130. Middle Ages and Renaissance France

ITALIAN
127. Framing Italian History
190E. The Decameron and the 1001 Nights
233E. Dante’s Divine Comedy
320E. The Avant-Gardes of the Middle Ages

GERMAN STUDIES
255. Middle High German

HISTORY
13. The Emergence of Modern Medicine
185. Introduction to Islamic Civilization
189B. The Ottoman Empire

208. Undergraduate Colloquium: The Conversion of Europe
209A/309A. Undergraduate/Graduate Colloquium: Law, Society, and Identity in Christianity and Islam, 500-1500
209B/309B. Undergraduate/Graduate Colloquium: Crusaders, Pilgrims, and Merchants—The Mediterranean World, 700-1600
210A/310A. Undergraduate/Graduate Colloquium: The Language of Politics in the Middle Ages
214A/314A. Undergraduate/Graduate Colloquium: Universities in Medieval Europe
299/399. Undergraduate/Graduate Colloquium: Japan in the Age of Courtiers and Warriors, 1180-1333
MODERN THOUGHT AND LITERATURE

Chair: David Palumbo-Liú
Affiliated Faculty: Lanier Anderson (Philosophy), Anthony Antonio (Education), Joel Beinin (History), Russell Berman (German Studies, Comparative Literature), Brett Bourbon (English), Scott Bukatman (Art and Art History, Comparative Literature), Rudy Busio (Religious Studies), Albert Camarillo (History), Terry Castle (English), George Dekker (English), Paulla Ebron (Cultural and Social Anthropology), Harry Elam (Drama), Jay Fliegelman (English), Claire Fox (Spanish and Portuguese), George Fredrickson (History), Theodore Glasser (Communication), Hans U. Gumbrecht (French and Italian, Spanish and Portuguese, Comparative Literature), Akhil Gupta (Cultural and Social Anthropology), Janet Halley (Law), David Halliburton (English), Elisabeth Hansot (Political Science), Shirley Heath (English, Linguistics), Miyako Inoue (Cultural and Social Anthropology), Pamela Lee (Art and Art History), Timothy Lenoir (History), Herbert Lindenberger (English, Comparative Literature), Purnima Mankekar (Cultural and Social Anthropology), Diane Middlebrook (English), Paula Moya (English), Valentin Mudimbe (French and Italian, Comparative Literature), David Palumbo-Liú (Comparative Literature), Robert Polhemus (English), Mary Pratt (Spanish and Portuguese, Comparative Literature), Arnold Rampersad (English), Renato Rosaldo (Cultural and Social Anthropology), Ramón Saldívar (English, Comparative Literature), Debra Satz (Philosophy), Jeffrey Schnapp (French and Italian, Comparative Literature), Peter Stansky (History), Michael Thompson (History), Elizabeth Traugott (Linguistics, English), Robert Weisberg (Law), Sylvia Yanagisako (Cultural and Social Anthropology), Yvonne Yarbro-Bejarano (Spanish and Portuguese), Richard White (History)

The Program in Modern Thought and Literature is administered through the office of Interdisciplinary Studies in Humanities. The program admits students for the Ph.D. and a very limited number for a coterminal A.M. Program.

UNDERGRADUATE PROGRAMS

Although Modern Thought and Literature has no formal undergraduate degree-granting program, undergraduate students who are interested in completing a major in this field may do so through the undergraduate major in Interdisciplinary Studies in Humanities (see that section of this bulletin). This undergraduate program is designed for students with a strong commitment to interdisciplinary study in the various humanities. Students may devise majors that incorporate modern literature (since the 18th century), cultural history, and critical theory. Students may also create majors in cultural studies, film studies, performance studies, popular culture, history of representation, politics and literature, etc. For specific course guidelines, see the undergraduate Handbook for the Major in Interdisciplinary Studies in Humanities. Students wishing to declare the major in Interdisciplinary Studies in Humanities must apply for admission to the Humanities honors program and for graduation with honors in Humanities.

COTERMINAL PROGRAM

Each year, one or two undergraduate students, who are exceptionally well-prepared in literature and at least one foreign language and whose undergraduate course work includes a strong interdisciplinary component, may petition to be admitted to the program for the purpose of completing a coterminal A.M. degree. Admission to this program is granted only on condition that in the course of working on their master's degree they do not apply to enter the Ph.D. program in Modern Thought and Literature. The deadline for application is March 1.

To apply, applicants submit:
1. An unofficial grade transcript from AXESS.
2. A "Petition for Admission to the Coterminal Program" from Degree Progress, in the Registrar's Office.
3. A statement giving the reasons the student wishes to pursue this program and its place in his or her future plans. This statement should pay particular attention to the reasons why the student could not pursue the studies he or she desires in some other way.
4. A plan of study listing, quarter by quarter, each course by name, units, and instructor to be taken in order to fulfill the requirements for the degree, including 361, at least 20 units of advanced work in one liter-}

REQUIREMENTS

The candidate for the A.M. must complete at least 45 units of graduate work, to be divided in the following manner:
1. The introductory seminar, 361, The Modern Tradition (5 units).
2. Twenty units of advanced course work in literature, to be approved by the chair.
3. Twenty units of course work in a coherent and individually arranged interdisciplinary program, to be approved by the chair.

By the end of the course of study, each candidate must also demonstrate a reading knowledge of at least one foreign language.

GRADUATE PROGRAMS

The Ph.D. in Modern Thought and Literature is an interdisciplinary program combining work in modern literary/cultural studies with work in one or more other modern disciplines.
The Ph.D. program is designed specifically for students who have a strong interest in literature or culture, but whose approach or focus requires an interdisciplinary program—for example, students interested in anthropological or philosophical approaches to literature and culture, gender studies; ethnic studies; or in topics such as legal humanities, popular culture, and social or cultural theory.

Modern Thought and Literature is intended for students who plan to teach and write in literature departments or in interdisciplinary programs in the humanities, cultural studies, or humanistic social sciences, or for students intending to formulate cultural policy.

Course work in the program is divided about evenly between advanced courses in literature departments and advanced courses in non-literary departments.

MASTER OF ARTS
The Master of Arts is available to students who are admitted to the doctoral program. Students are not admitted into the program for the purpose of earning a terminal Master of Arts degree. Candidates for the Ph.D., who satisfy the committee of their progress and satisfactorily complete 45 units of course work forming a coherent program of study, may apply for an A.M. in Modern Thought and Literature.

DOCTOR OF PHILOSOPHY
University requirements for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

A candidate for the Ph.D. degree in Modern Thought and Literature must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the A.B. degree. He or she is expected to complete at least 18 courses of graduate work in addition to the dissertation. At least three consecutive quarters of graduate work must be taken at Stanford. Students may spend one year of graduate study abroad.

Requirements for the Ph.D. in Modern Thought and Literature are:

2. Nine courses of advanced work in literary studies in one language. Of the nine courses, at least six must be regularly scheduled courses in literary studies focused on the period from 1750 to the present, of which at least two must be regularly scheduled seminars. Courses in the teaching of composition (English 396, 397), ad hoc graduate seminars (395), research courses (398), and thesis registration (802) may not be counted among these six courses; 396, 397, 399, 802 may not be counted toward these requirements under any circumstances.
3. Eight courses of advanced work in non-literature departments, the core of which is completion of either a departmental minor or an interdepartmental concentration, typically consisting of six courses. Department minors are available from the departments of Anthropology, Art and Art History, Communication, History, Philosophy, Political Science, Religious Studies, and Sociology (see information in those sections of this bulletin). Approved interdepartmental concentrations have been established in popular culture, ethnic studies, feminist and gender studies, and science and technology studies (specific course requirements are available from the program office). Individually designed concentrations may be approved by petition to the director. In addition to the required six courses in a minor or a concentration, two additional courses from non-literature departments are chosen in consultation with each student's academic adviser. Course restrictions noted above in item 2 also apply.
4. Qualifying Paper: this certifies that students are likely to be able to undertake the quality of research, sustained argumentation, and cogent writing demanded in a doctoral dissertation. Qualifying papers should embody a substantial amount of independent research, develop an intellectual argument with significant elements of original thinking, and demonstrate the ability to do interdisciplinary work. Each paper is evaluated by two or three readers (designated before the end of the first year of graduate study), one of whom must be a member of the Committee in Charge. Qualifying papers must be submitted to the program office no later than the end of the third week of the fifth quarter of enrollment, normally, winter of the second year.
5. Teaching, an essential part of the program, is normally undertaken in conjunction with the Department of English. Candidates are required to demonstrate competence in teaching.
6. Students must demonstrate, by the end of the third quarter of the first year, a reading knowledge of one foreign language and, by the beginning of the first quarter of the third year, a reading knowledge of one other foreign language. Reading knowledge means the ability to make a genuine scholarly use of the language: that is, to read prose of ordinary difficulty.

Students may not take the University oral examination before completion of the foreign language requirement.

7. Candidacy: at the end of the second year, students apply for candidacy. The following qualifications are required before candidacy can be certified: the earlier submission of a satisfactory qualifying paper, demonstration of a reading knowledge of one foreign language; satisfactory progress in course work; a list of courses applicable to the degree, distinguishing between courses appropriate to the literary component and courses appropriate to the interdisciplinary component; and the submission of a statement outlining the scope and coherence of the interdisciplinary component of the program in relation to the literary component and noting the relevance of the course work to that program.
8. Annual Review: the program and progress of each student must be approved by the Committee-in-Charge at the end of each academic year.
9. University Oral Examination: this examination, covering the student's areas of concentration, normally is taken in the third year of graduate study. It is a two-hour oral examination administered by four faculty members specializing in the student's areas of concentration, and a chair from another department. The exam is based on a substantial reading list prepared by the student in conjunction with the faculty committee and designed to cover the areas of expertise pertinent to the student's dissertation project.
10. Colloquium on the Dissertation Proposal: several weeks after the University oral examination, or in conjunction with that examination, the dissertation committee assembles for up to one hour to discuss the dissertation proposal with the student. Prior to this meeting, the student should have consulted each member of the committee to discuss the proposal and compile a bibliography.
11. Dissertation: the fourth year is devoted to the dissertation, which should be a substantial and original contribution acceptable to the Committee on Modern Thought and Literature. The subject is drawn from the literature of specialization and the area of nonliterary studies.

HUMANITIES
The program participates in the Graduate Program in Humanities leading to a joint Ph.D. degree in Modern Thought and Literature, and Humanities. For a description of the Humanities program, see "Interdisciplinary Studies in Humanities" section of this bulletin.

COURSES
The courses listed below are specifically sponsored by the Program in Modern Thought and Literature or are required for the doctoral program. For literature courses, students should consult the listings of the various literature departments at Stanford. For other offerings, students should consult listings in the individual departments of interest. Consent of instructor is often required.

Students in the doctoral program in Modern Thought and Literature are advised to read through the offerings in the Department of English (or in their foreign literature of choice) as well as offerings of the non-literature departments in which they wish to concentrate: for example, courses dealing with culture listed under Cultural and Social Anthropology, courses dealing with film under Communication or Art and Art History, courses in intellectual and cultural history under History. If the area of nonliterary interest is thematic rather than disciplinary, doctoral students should look under various program listings, such as Feminist
175. Individual Work—Directed reading or research for undergraduates. Individual work does not count towards unit requirements for the undergraduate major in Interdisciplinary Studies in Humanities.

2-5 units, any quarter (Staff)

193S. Space, Place, and Culture—(Same as Cultural and Social Anthropology 170S.) The ways cultures are embedded in spaces and places, how geography effects identity, how communities make and negotiate places, and the connections between space, power, and knowledge. The ways "space" has been theorized by cultural geographers and used as a trope in cultural theory. Interdisciplinary readings in cultural geography, political economy, critical theory, and literature. Feminist geography, cartography and imperialism, race and space, and the politics of landscape.

5 units, Spr (Stein)

361. Graduate Colloquium: The Modern Tradition—Globalization and Modernity—(Same as Cultural and Social Anthropology 261.) Rather than assume one modern tradition, the colloquium encourages the analysis of the (uneven) appearance of a number of possible "modernities" in various geopolitical spaces, their cultural and historical formations, and their inter-relations. Can modernity be seen as a uniquely "western" achievement? By examining such diverse topics as trade and finance, colonialism, ecological transformations, immigration and forced migration, nationalism and postcolonialism, the complicated history of modernity is understood as a global phenomenon. Prerequisite: consent of instructor.

5 units, Aut (Gupta, Palumbo-Liu)

361B. Modern Thought and Literature Colloquium—(Undergraduates register for 261B.) Required of first-year graduate students in the program; others by consent of instructor. Weekly meeting of students in the program discusses current scholarship and issues. Presentations by affiliated faculty and by student panels.

1 unit, Win (Gupta, Palumbo-Liu)

395. Ad Hoc Graduate Seminars—Graduate students (three or more) who wish to study a subject or an area not covered by regular courses and seminars may plan an informal seminar and approach a suitable member of the faculty to supervise it.

Any quarter

396L. Laboratory in Pedagogy—(Enroll in English 396L.) Required for first-year Ph.D. students in English, Modern Thought and Literature, and Comparative Literature (except for Comparative Literature students doing their teaching in a foreign language). Preparation for TA in undergraduate literature courses. Focus is on leading discussions and grading papers.

2 units, Aut (Cormack, Rebholz)

398. Research Courses—Students pursue a special subject of investigation under supervision of a member of the committee or another faculty member. Thesis work is not to be registered under this number.

Any quarter

AFFILIATED DEPARTMENT OFFERINGS

The following courses, offered in 1999-2000 by faculty on the Committee in Charge of Modern Thought and Literature, may be of interest to students in the program. Course descriptions can be found in the sponsoring department’s section of the Stanford Bulletin. This is not by any means an inclusive list of courses that can be applied to Modern Thought and Literature. The list is merely intended to provide information about the breadth of interest of faculty who are on the Committee in Charge, thereby showing the interdisciplinary nature of the program.
EDUCATION

346. Research Seminar in Higher Education
   (Antonio)

381. Multicultural Issues in Higher Education
   (Antonio)

HISTORY

33A. The Rise of Scientific Medicine
   (Lenoir)

150A. African-American History to the 20th Century
   (Thompson)

255A/355A. Undergraduate/Graduate Colloquium: Culture and Ideologies of Race
   (Thompson)

262S/462. Undergraduate/Graduate Research Seminar: Science and High Technology in Silicon Valley, 1930-1980—(Same as History and Philosophy of Science 147.)

274A/374A. Undergraduate/Graduate Colloquium: Body Works—Medicine, Technology, and the Body in Late 20th-Century America
   (Lenoir)

304A. Graduate Colloquium: Critical Studies—Science, Language, and Culture
   (Lenoir)

LAW

293. Family Law
   (Halley)

PHILOSOPHY

5B. Reason, Passion, and Reality
   (Anderson, Taylor)

125/255. Kant’s Critique of Pure Reason
   (Anderson)

132/232. Existentialism
   (Anderson)

SPANISH AND PORTUGUESE

190. Fiction and Political Imagination
   (Prafft)

357. Latin American Fiction of the 1990s
   (Prafft)

MUSIC

Chair: Stephen Hinton
Professors: Karol Berger, Albert Cohen (Autumn), Jonathan Harvey (Winter)
Assistant Professors: Heather Hadlock, Melissa Hui, Tobias Plebich, Stephen Sano
Professor (Research): Max V. Mathews (on leave 1999-2000)
Associate Professor (Performance): Karla Lemon (Director of Orchestras)
Associate Professor (Teaching): George Barth (Piano; on leave Winter, Spring)
Senior Lecturers: Judith Bettina, Stephen Harrison (Violoncello), Gennady Kleyman (Violin, Viola), Jennifer Lane (Voice), Gregory A. Wait (Voice), Frederick R. Weldy (Piano)
Lecturers: Giancarlo Aquilanti (Theory, Symphonic Band), Talyn Berge (Theory), Fredrick Berry (Jazz Ensemble), Frances Blaisdell (Flute), Mark Brandenburg (Clarinet), Marjorie Chauvel (Harp), Robe Claire (Baroque Flute), Floyd O. Cooley (Tuba), Laura Dahl (Resident Accompanist), John Dornenburg (Viola da Gamba), Charles A. Ferguson (Guitar), Susan Freier, Claire Giovannetti (Voice), Dawn Harms (Violin), Elizabeth Harrison (Organ), Alexandra Hawley (Flute), Robert Hubbard (Oboe), Joyce Johnson-Hamilton (Trumpet), Jay Kadiis (Audio Recording), McDowell Kenley (Trombone), Fernando Lopez-Lezcano (Computer Research in Music and Acoustics), Janet Maestre (Flute), Anthony Martin (Baroque Violin), Jaime Matheson (Oboe), John McGinn (Theory, Piano), Herbert Myen (Early Winds), James O. Nadel (Jazz), Karen Nagy (Bibliography), Rufus Olivier (Bassoon), Larry S. Ragent (French Horn), Gary Scavone (Computer Research in Music and Acoustics), Malcolm Slane (Computer Research in Music and Acoustics), Ronald Bruce Smith, Harold Stein (Saxophone), Frank Sumares (Jazz Piano), Elaine Thornburgh (Harpsichord), Linda Uyechi (Taiko), Mark Veregg (Percussion), Timothy Zerlang (Piano)
Artists in Residence (St. Lawrence String Quartet): Geoff Nuttall (Violin 1), Barry Shifman (Violin 2), Lesley Robertson (Viola), Maria Hoovr (Cello)
Consulting Professors: Marina Busi (Computer Research in Music and Acoustics), Walter Hewlett (Computer Assisted Research in the Humanities), Eleanor Selfridge-Field (Computer Assisted Research in the Humanities)
Visiting Professor: John R. Pierce (emeritus)
Mellon Fellow: David Code

The Department of Music’s aims are to provide specialized training for those who plan careers in music as composers, performers, teachers, and research scholars; and to promote the understanding and enjoyment of music in the University at large.

Varied opportunities for instrumental and vocal study, and performance, are available to majors and nonmajors alike. Students wishing to obtain individual instruction, to participate in chamber music, or to perform in department ensembles should note that auditions are held during registration week in Autumn Quarter; while there may be openings in some private studios for qualified students during other quarters, it is to the student’s advantage to audition in autumn.

The department is housed in Braun Music Center, Dinkelspiel Auditorium, and The Knoll, including two theaters for concert and recital productions, two rehearsal halls, and a small chamber hall. Pianos, organs, harpsichords, and a variety of early stringed and wind instruments are available for student use. In addition, advanced students may use first old stringed instruments and bows from the Harry R. Lange Historical Collection.

The Music Library contains a comprehensive collection of complete editions, scores, books, and recordings. Supplementing this is the Stanford Memorial Library of Music, an invaluable collection of musical manuscripts and first editions, and the Archive of Recorded Sound.

For more information on the Department of Music, see the Music homepage (http://www.stanford.edu/group/Music).

The Doreen B. Townsend Center for Computer Research in Music and Acoustics (CCRMA) provides one of the top-rated facilities for digital sound research in the world. It includes a large distributed computing facility, recording, and editing studio; MIDI-based small systems studios and work areas with audio-related peripherals. CCRMA software consists of a vast set of programs and system tools for editing, viewing, synthesizing, and analyzing sound. For a detailed and up-to-date description of the hardware and software available, contact the CCRMA office, or see their homepage (http://ccrma-www.stanford.edu).
UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The undergraduate major in Music is built around a series of foundation courses in theory, musicianship, and music history, in addition to performance and proficiency requirements outlined below. Because of the sequence of courses, it takes more than two years to complete the requirements for the major. Prospective majors are urged to consult one of the major advisers in the department as early as possible in order to plan a program which allows sufficient time for major course work, practice, and University requirements outside the major. Early planning is especially important for students wishing to double-major, for those planning an overseas study during their undergraduate years, for those wishing to do an in-depth concentration in the music major, and for those with particular musical talents and interests. All required courses for the A.B. in Music and in the Music, Science, and Technology specialization must be taken for a letter grade. Electives may be taken credit/no credit, but any courses taken towards concentration requirements must also carry a letter grade.

1. Students are required to include the following foundation courses in their programs:
   a) Theory: Music 21, 22, 23
   b) History: Music 40, 41, and three from the series 140-145
   c) Analysis: Music 121 and two from 122A,B,C

2. Additionally, music majors must fulfill the following two performance requirements:
   a) Individual studies in performance: five quarters.
   b) Ensemble: five quarters of work in one or more of the department's organizations or chamber groups. Music 157 (Mariachi Band) does not satisfy this requirement.

3. Majors are required to pass a Piano Proficiency examination as a prerequisite for all higher-level theory and analysis courses (Music 121, 122A,B,C) and the 140 series. Offered at the end of the Autumn and Spring Quarters or at other times by arrangement, it consists of scales and arpeggios, performance of a simple tune (to be set by the examiner), sight reading, and the performance of prepared pieces (consult the Music office for details). Remedial skills are taught in Music 12A,B,C.

4. Majors must also pass an Ear Training Proficiency examination, which is part of the requirements to complete Music 23 or can be taken by arrangement, demonstrating a student's ability to hear music accurately and to perform it at sight. The successful completion of the examination is a prerequisite for all higher-level theory and analysis courses (Music 121, 122A,B,C).

RECOMMENDED SCHEDULE FOR THE MUSIC MAJOR

The following sample schedule shows how a student may include substantial work on a major in music while also fulfilling the University General Education Requirements during the freshman and sophomore years. The schedule also includes foreign language study, which is strongly recommended for all music majors and especially for those expecting to continue into graduate work in any area of music.

FIRST YEAR

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>A</th>
<th>W</th>
<th>S</th>
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</thead>
<tbody>
<tr>
<td>Freshman English</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Music 19 (if needed), 21, 22</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Individual Instruction and/or Ensemble</td>
<td>1-4</td>
<td>1-4</td>
<td>1-4</td>
</tr>
<tr>
<td>Introduction to the Humanities</td>
<td>3-5</td>
<td>3-5</td>
<td>3-5</td>
</tr>
<tr>
<td>Choice of Foreign Language, General Education Requirement, or Stanford Introductory Seminar</td>
<td>3-5</td>
<td>3-5</td>
<td>3-5</td>
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</table>

SECOND YEAR

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>A</th>
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<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 23, 40, 121-41</td>
<td>4</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Individual Instruction and/or Ensemble</td>
<td>4-4</td>
<td>4-4</td>
<td>4-4</td>
</tr>
<tr>
<td>General Education Requirement, or Stanford Introductory Seminar</td>
<td>3-5</td>
<td>3-5</td>
<td>3-5</td>
</tr>
<tr>
<td>Elective</td>
<td>3-5</td>
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THIRD AND FOURTH YEARS

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>A</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three from Music 140-145 and two from 122A, B, or C</td>
<td>4-8</td>
<td>4-8</td>
<td>4-8</td>
</tr>
<tr>
<td>Elective</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
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</tbody>
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MUSIC, SCIENCE, AND TECHNOLOGY

The specialization in Music, Science, and Technology is designed for those students with a strong interest in the musical ramifications of rapidly evolving computer technology and digital audio, and in the acoustic and psychoacoustic foundations of music. The program entails a research project under faculty guidance and makes use of the highly multidisciplinary environment at CCRMA. This program can serve as a complementary major to students in the sciences and engineering.

1. Students in the program are required to include the following foundation courses in their studies:
   a) Theory: Music 21, 22, 23, 121, 151 (4 units), 220A,B,C,D (4 units each); one-quarter course in Physics (14, 150, or equivalent)
   b) History: Music 40, 41, 154
   c) Applied: individual studies in performance (two quarters) or Music 192A,B; and Ensemble or 192C (five quarters)

2. Students in Music, Science, and Technology must also pass the Piano and Ear-training Proficiency examinations required of all Music majors.

MINORS

Minors in Music and in the Music, Science, and Technology specialization provide the student with a core of essential music courses in the disciplines which establish both a foundation for informed appreciation of music and a basis for more advanced study, should the student wish to pursue it.

MUSIC

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 21, 22, 23. Elements of Music</td>
<td>12</td>
</tr>
<tr>
<td>Music 40, 41. Music-History Survey</td>
<td>8</td>
</tr>
<tr>
<td>Choice of one (writing-intensive courses):</td>
<td></td>
</tr>
<tr>
<td>Music 140-145. Studies in Music History</td>
<td>4</td>
</tr>
<tr>
<td>Two quarters: Music 158-171. Ensemble</td>
<td>2</td>
</tr>
<tr>
<td>Music 172-177. Individual Instruction</td>
<td>6</td>
</tr>
<tr>
<td>Academic Elective in Music</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
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</tbody>
</table>

MUSIC, SCIENCE, AND TECHNOLOGY

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 21, 22, 23. Elements of Music</td>
<td>12</td>
</tr>
<tr>
<td>Music 151. Psychophysics and Cognitive Psychology for Musicians</td>
<td>4</td>
</tr>
<tr>
<td>Music 154. History of Electroacoustic Music</td>
<td>4</td>
</tr>
<tr>
<td>Music 220A. Fundamentals of Computer-Generated Sound</td>
<td>4</td>
</tr>
<tr>
<td>Two quarters: Music 192A,B. Theory and Practice of Audio Recording</td>
<td>6</td>
</tr>
<tr>
<td>Music 192C. Session Recording</td>
<td>2</td>
</tr>
<tr>
<td>Academic Elective in Computer Music</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

CONCENTRATIONS

Concentrations are offered in performance, conducting, composition, or history and theory. In each concentration, 6 additional course units in the area of concentration beyond the basic requirements for the major are required. In addition, each concentrator registers for an independent project (4 units) in the senior year under faculty supervision, leading to a senior recital, a composition, a conducting project, or a senior research paper. Specific guidelines and information on the concentration tracks are available from the Department of Music office.
HONORS PROGRAM

Honors in music is awarded by the faculty to concentrators who have produced an independent project of exceptional quality and meet certain department standards in musicianship, scholarship, and academic standing. The conferral of honors is done solely through faculty consultation. Students do not petition for honors.

OVERSEAS STUDIES

Courses in music are often available at overseas Stanford programs, especially in Berlin and Moscow. See the Overseas Studies Program section of this bulletin immediately following this section for this year's listings. Music majors and minors should talk to the Department of Music undergraduate administrator prior to going overseas.

GRADUATE PROGRAMS

University requirements for the A.M., D.M.A., and the Ph.D. are described in the "Graduate Degrees" section of this bulletin. The following statements apply to all the graduate degrees described below, unless otherwise indicated.

Admission—Applicants are required to submit evidence of accomplishment (scores, tapes, and/or research papers, according to the proposed field of concentration) when they return the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the December 31 application deadline. All applicants, except those applying for the A.M. in Music, Science, and Technology (A.M./MST), are also required to submit a departmental entrance test in theory and musicianship, which is sent along with the application. All components of the application are due by December 31.

Department Examinations—All entering graduate students except those in the A.M./MST program are required to take: (1) a diagnostic examination testing the student in theory (counterpoint, harmony, and analysis) and the history of Western music, and (2) a proficiency examination in sight-singing and piano sight-reading given at the beginning of study in the department (usually the week before school begins). None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of 'A,' 'B,' or 'Satisfactory' (a passing grade in an instructor-mandated pass/no credit course) in music courses taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

MUSIC

MUSIC

Foreign-Language Requirement—Reading knowledge of a language other than English, and the ability to translate into idiomatic English, must be demonstrated at the beginning of graduate study.

Study Program—Students may concentrate in composition, history, or performance practice. To be recommended for the A.M. degree, a candidate must complete a program of 36 units of graduate course work. Depending on the concentration, the A.M. project will be an investigatory essay, a composition, or a demonstration of performance supported by a written commentary on the performance practice involved.

Required are:

Course No. and Subject Units
Music 320. Introduction to Digital Audio Signal Processing and MIDI-Based Systems 4
Music 322. Compositional Algorithms, Psychoacoustics, and Spatial Processing 4
Music 323. Computer-Music Research 4
Music 324. Seminar in Computer-Music Research 4
Total 36

DOCTORAL PROGRAMS

Residence—The candidate must complete a minimum of three years of full-time (12 units or more per quarter) work. Generally, it takes more than three years due to part-time study during the second, third, and fourth years, when the student also acts as a Teaching Assistant or Predoctoral Research Affiliate for each concentration (see Residency under the "Graduate Degrees" section of this bulletin). Doctoral candidates working on Ph.D. dissertations or Doctor of Musical Arts (D.M.A.) final projects that require consultation with faculty members continue enrollment in the University under Terminal Graduate Registration (TGR), after they have reached the required residency units for that category.

Foreign Language Requirement—At the time of advancement to candidacy, all D.M.A. and Ph.D. students in the Computer-Based Theory and Acoustics program are required to have demonstrated a reading knowledge of a language other than English and the ability to translate into idiomatic English. Ph.D. candidates in Musicology are required to demonstrate proficiency in German and a similar competence in a second language, chosen from French, Italian, or Latin (or, on a case-by-case basis, another language, if it has significant bearing on the candidate's field of study).

Qualifying Examination—A written and oral examination for admission to candidacy is given just prior to the fourth quarter of full-time residence for D.M.A. and Ph.D. students in the Computer-Based Music Theory and Acoustics programs; for Ph.D. students in Musicology, the exams are given just prior to the seventh quarter of full-time residence. This exam tests knowledge of history, theory, repertory, and analysis.

Teaching—All students in the Ph.D. or D.M.A. degree programs, regardless of sources of financial support, are required to complete six quarters of their supervised teaching at half time. Music 280 is a required course for Teaching Assistants.

Basic Requirements—Doctoral programs in the Department of Music do not require the A.M. degree as a prerequisite. All students entering with only a bachelor's degree are required to take the following course (which is, however, required of all students in musicology, regardless of entering degree level):

Course No. and Subject Units
Music 321. Signal Processing Methods in Musical Acoustics 4
Total 4

All doctoral candidates must take:

301 A,B,C Music Analysis: Modal, Tonal, and Post-Tonal 12

DOCTOR OF MUSICAL ARTS IN COMPOSITION

The Doctor of Musical Arts (D.M.A.) degree in Composition is given breadth through collateral studies in other branches of music and a
relevant studies outside music as seems desirable. A minimum of 72 units of credit is required for the degree.

Examinations—A written examination in the candidate’s special area of concentration is given no later than the seventh quarter after passing the qualifying examination. A public lecture-demonstration is given during the last quarter of residence. It should be one hour in length, treating aspects of the final project.

Requirements—Besides those requirements listed above, candidates are expected to produce a number of works demonstrating their ability to compose in a variety of forms and for the common media: vocal, instrumental, and electronic music. If possible, the works submitted are presented in public performance prepared by the composer. Annual progress is reviewed by the composition faculty. The final project in composition is an extended work for instruments, voices, electronic media, or a combination of these. Music 323, Doctoral Seminar in Composition (16 units) is a required course.

DOCTOR OF PHILOSOPHY
The Ph.D. in Music can be pursued in two concentrations: Musicology or Computer-Based Music Theory and Acoustics.

Examinations—
1. Special Areas: a written and oral examination testing the student’s knowledge of music and research in the area of special concentration is given no later than the seventh quarter after passing the qualifying examination. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.

2. Ph.D. Orals: the University oral examination, taken once the dissertation is substantially underway, is an oral presentation and defense of dissertation research methods and results.

Requirements—Besides those requirements listed above, Music 221A and B, History of Music Theory (8 units), is a required course for both concentrations. Other requirements by concentration are:

MUSICOLOGY
Course No. and Subject  Units
269A. Seminar in Performance Practices  4
300A,B. History of Notation  8
310. Research Seminars in Musicology  24-40
312A,B. Aesthetics and Criticism of Music  8

* The requirement is for eight seminars of 3-5 units each. Students may petition to take up to two graduate seminars in other departments, in consultation with their adviser.

COMPUTER-BASED MUSIC THEORY AND ACOUSTICS
220A,B,C. Computer-Generated Music Seminars  12
220D. Research in Computer Music  12
320. The Discrete Fourier Transform  4

JOURNAL PH.D. IN MUSIC AND HUMANITIES
The department participates in the Graduate Program in Humanities leading to a joint Ph.D. degree in Music and Humanities. For a description of the program, see the “Interdisciplinary Studies in Humanities” section of this bulletin.

COURSES
(WIM) indicates that the course meets the Writing in the Major requirements.
(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).
Many Department of Music courses have pages on the World Wide Web, which are linked to the Music home page (see above). Courses with Web pages at press time are noted in their entries below.

GENERAL
1. Introduction to Music—Techniques of active listening for an enhanced understanding of various musical styles. A awareness of the basic elements of music is applied to the appreciation of Western art music from the Middle Ages to the present, and to traditions of popular and non-Western music. Questions of musical form, style, expression, and meaning in different historical and cultural contexts. GER:3a (DR:7) 3 units, Spr (Hadlock)

2A. The Symphony  3 units, not given 1999-2000
2B. The Concerto  3 units, not given 1999-2000
2C. Opera—See web site.  3 units, not given 1999-2000
3C. Medieval Music  3 units, not given 1999-2000
3E. Franz Liszt and the Music of the Romantic Era  3 units, not given 1999-2000
4A. The Music of J. S. Bach  3 units, not given 1999-2000
4B. The Music of Mozart  3 units, not given 1999-2000
4C. The Music of Beethoven  3 units, not given 1999-2000
4E. Fantasies and Nightmares: Turn-of-the-Century Music and Culture in Paris and Vienna—Fin de siècle decadence and anarchy in Europe’s most vibrant capital cities. The era of Freud, WW I. Musicians, writers, and artists reflect the breakdown of earlier values. From the dreamworld of Debussy’s Pelléas et Mélisande (1902) to the alienation of Alban Berg’s Wozzeck (1923), via Ravel’s exotic fantasies, Schoenberg’s psychosexual nightmares, Stravinsky’s primitive violence, Satie’s irony. The context: expressionist, fauvist, and cubist painting; symbolist poetry and drama; the manic dancing of the Ballets Russes. An exploration of the birth pangs of the century that has just ended. 3 units, Spr (Code)

4F. The Music of Stravinsky  3 units, not given 1999-2000
4G. The Operas of Richard Wagner  3 units, not given 1999-2000
5A. Music in America  3 units, not given 1999-2000
7B. Explorations in World Music  3 units, not given 1999-2000
performers, and patrons. Women’s music in traditional cultures, such as Finnish and Greek lamenters; composers of Western art music from Hildegard von Bingen in the Middle Ages to Libby Larsen in the present; the “mystique” of performers from cloistered nuns to operatic divas like Maria Callas; self-made women in pop music from Bessie Smith to Madonna. GER:3a,4c (DR:7f)

3 units, Win (Hadlock)

14Q. Stanford Introductory Dialogue: Singing Gregorian Chant—Preference to sophomores. Singing a wide range of Gregorian chants from memory and notation is the basis for experimentation and reflection on the nature of music, singing, memory, pure melody, and the relation between music and words. The beginnings of music writing are experienced by testing historical notations and correlating them with the history of writing in general. Readings from medieval writers on music and from modern scholars who address the oral transmission of music, poetry, and musical cognition.

2 units, Win (Mahr)

15N. Stanford Introductory Seminar: Richard Wagner and The Ring of the Nibelung—Preference to freshmen. Introduction to the four “music dramas” that make up Wagner’s Ring cycle. Their mythological and literary sources, the role of music (and “leitmotif”) in projecting the structure and meaning of the drama, and their influence on musicians and other artists. Interpretations of the Ring from psychoanalytic, religious, and other perspectives. Selected critical readings, recordings, and videotapes of recent productions are a basis for discussion of musical, historical, and interpretive issues. Recommended: some ability to read music. GER:3a (DR:7)

3 units, Spr (Grey)

15Q. Stanford Introductory Seminar: The Music of J. S. Bach and his Time—Preference to sophomores. Study of the music of J. S. Bach, whose crowning achievements cap a revolutionary period of discovery, self-expression, and diversity in Western art of the early modern age (now called the Baroque era). The nature of the artistic revolution of the time; influences on the nature of Bach’s works. The quality and breadth of expression in his musical style. Careful listening to representative works, seminar discussions, class projects. Prerequisites: some acquaintance with Bach’s music, a willingness to develop listening skills. Recommended: musical training or knowledge. GER:3a (DR:7)

3 units, Win (Cohen)

16N. Stanford Introductory Seminar: Contemporary Music—Preference to freshmen. Critical listening of new music, focusing on varying conceptions of time and cross-cultural influences. Emphasis is on understanding composers’ intents and developing new listening strategies for the diverse musical languages of today. GER:3a (DR:7)

3 units, Spr (Hui)

16Q. Stanford Introductory Seminar: Ki ho’alu—The New Renaissance of Hawaiian Musical Tradition—Preference to sophomores. The Hawaiian tradition of Slack-Key Guitar, Hawaiian history and the culture surrounding its development, and subsequent evolution. Hands-on experience, reading, discussion, and workshops. Recommended: guitar-playing abilities. GER:3a,4b (DR:3 or 7)

3 units, Aut (Sano)

17N. Stanford Introductory Seminar: The Operas of Mozart—Preference to freshmen. Four of Mozart’s mature operas have held the stage uninterrupted since their premieres, the earliest works in the operatic repertoire never to go out of fashion. What accounts for this extraordinary staying power? Close reading of selected operas, with attention to the history of their composition, performance, and reception, and to their changing significance from Mozart’s time to ours. GER:3a (DR:7)

3 units, Win (K. Berger)

18. Jazz History

18A. Ragtime to Bebop (1900-1940)—From the beginning of jazz to the war years.

3 units, Win (Staff)
by harmonic and melodic dictation, sight singing, and other practical skills. See web site. Prerequisite: 21 or consent of instructor. GER:3a (DR:7)

4 units, Win (Grey)
Spr (Aquilanti)

23. Elements of Music III—Chromatic harmony, complex forms. Satisfactory passage of ear-training proficiency exam is a requirement for course completion. Passage of piano proficiency exam is strongly recommended at this time to continue in the theory sequence. See web site. Prerequisite: 22 or consent of instructor. GER:3a (DR:7)

4 units, Aut (Aquilanti)
Spr (McGinn)

40, 41. Music History—The history of Western art music from Gregorian chant to the present, stressing major styles and genres in their intellectual and institutional settings.

40. Music History to 1750—Prerequisite: 23. GER:3a (DR:7)

4 units, Win (Hadlock)

41. Music History since 1750—Prerequisite: 40. GER:3a (DR:7)

4 units, Spr (Grey)

121. Analysis of Tonal Music—Complete movements, or entire shorter works of the 18th and 19th centuries, are analyzed in a variety of theoretical approaches. Prerequisites: 23, successful completion of the ear-training and piano-proficiency examinations. GER:3a (DR:7)

4 units, Win (Hui)

122A. 18th-Century Counterpoint—Analysis and composition of two- and three-part inventions and three- and four-voice fugues. Use of keyboard, ear training, and sight singing underlies all written work. Prerequisites: 23, successful completion of the ear-training and piano-proficiency examinations.

4 units, Win (Hui)

122B. Harmonic Materials of the 19th Century—Analysis of 19th-century music, with compositional exercises based on 19th-century models. Prerequisites: 121 or consent of instructor, successful completion of the ear-training and piano-proficiency examinations.

4 units, Spr (Hui)

122C. Introduction to 20th-Century Composition—Projects in free composition based, at first, on 20th-century models analyzed in class. Final projects are performed in an informal setting. Prerequisites: 121 or consent of instructor, successful completion of the ear-training and piano-proficiency examinations.

4 units, Aut (Hui)

120. Introduction to Music Composition and Programming using MIDI Based Systems—Composition projects demonstrate participant’s own software for voicing and controlling MIDI synthesis. Extensive individual lab time required during week days. See web site. Prerequisite: consent of instructor. GER:3a (DR:7)

4 units, Spr (J. Berger)

123. Undergraduate Seminar in Composition—Weekly discussion on current trends in composition. May be repeated for credit. Prerequisite: 23 or consent of instructor.

3 units, Aut, Win, Spr (Aquilanti)

125. Individual Undergraduate Projects in Composition—Individual projects in creative work. May be repeated for credit. Prerequisites: music major, and at least one quarter of 123.

1-3 units, Aut, Win, Spr (Staff)

127. Instrumentation and Orchestration—Prerequisite: 23.

3 units, alternate years, given 2000-01

128. Advanced Musicianship—Prerequisite: 23, 127.

2 units, alternate years, given 2000-01

220. Computer-Generated Music

220A. Fundamentals of Computer-Generated Sound—Techniques for digital sound synthesis, effects, and reverberation. Topics: summary of digital synthesis techniques (additive, subtractive, non-linear, waveable, spectral-modeling, and physical-modeling); digital effects algorithms (phasing, flanging, chorus, pitch-shifting, and vocoding); and techniques for digital reverberation. Prerequisite: 22 or equivalent, or consent of instructor. Majors (undergraduate or graduate) must take for 4 units.

2-4 units, Aut (Chafe)

220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing—The use of high-level programming language as a compositional aid in creating musical structures. Studies in the physical correlates to auditory perception and a review of psychoacoustic literature. Simulation of a reverberant space and control of the position of sound within the space. Prerequisite: 220A.

4 units, Win (Lopez-Lecanzo)

220C. Seminar in Computer-Music Research—Individual projects in composition, psychoacoustics, or signal processing. See web site. Prerequisite: 220B.

4 units, Spr (Chafe)

220D. Research—Independent research projects in composition, psychoacoustics, or signal processing. May be repeated for credit. Prerequisite: 220C.

1-4 units, any quarter (Staff)

228. Advanced Musicianship—For graduate students. See 128.

2 units, alternate years, given 2000-01

HISTORY AND LITERATURE

140, 141, 142, 143, 144, 145. Seminars in Music History—Specialized topics in music history are each offered at least once within any two-year period. Topics vary each year. May be repeated for credit.

140. Studies in Medieval Music—Prerequisite: 40.

4 units, given 2000-01

141. Studies in Renaissance Music—Prerequisite: 40.

4 units, given 2000-01

142. Studies in Baroque Music—Prerequisite: 40.

4 units, given 2000-01

143. Studies in Classic Music—Prerequisite: 41. (WIM)

4 units, Aut (K. Berger)

144. Studies in Romantic Music—Prerequisite: 41. (WIM)

4 units, Win (Code)

145. Studies in Modern Music—Prerequisite: 41. (WIM)

4 units, Spr (Hui)

146. Keyboard Fantasias of the 17th and 18th Centuries—See web site.

3 units, not given 1999-2000

147. Hindemith

3 units, not given 1999-2000

148. Shakespeare in 19th-Century Music

3 units, not given 1999-2000

149. Instrumental Music with Electronics

3 units, not given 1999-2000

based lab. Prerequisites: music performance/composition experience, basic algebra, and physics. GER:3a (DR:7)
3 units, Aut (Scavone)

151. Psychophysics and Cognitive Psychology for Musicians—Basic concepts and experiments relevant to the use of sound, especially synthesized, in music. Introduction to elementary concepts. Listening to sound examples. Emphasis is on salience and the importance of various auditory phenomena in music. Prerequisite: some basic knowledge of music. GER:3a (DR:7)
4 units, Win (J. Berger)

154. History of Electroacoustic Music—Survey of recent works and computer-based techniques. See web site. (WIM)
4 units, Spr (J. Berger)

240,241,242,243,244,245. Seminars in Music History—For graduate students. Topics as in 140-145. Participation in upper-class seminars, with additional in-depth research. Specialized topics in music history are each offered at least once within any two-year period. Topics vary each year.

243. Studies in Classic Music
4 units, Aut (K. Berger)

244. Studies in Romantic Music
4 units, Win (Code)

245. Studies in Romantic Music
4 units, Spr (Hadlock)

PERFORMANCE

GROUP INSTRUCTION

Note—Special fee of $85 per quarter (subject to revision) for 12A,B,C (non-majors); 65A,B,D; 72, 73, 74, 75, 76, 77.

12A,B,C. Piano Class (Beginning)—(A=level 1; B=level 2; C=level 3)
Preference given to music majors.
1 unit, Aut, Win, Spr (Zerlang)

65A,B. Voice Class I, II—Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2).
1 unit, Aut, Win, Spr (Giovannetti)

65C. Voice Class—For music majors and non-majors who are members of departmental choral ensembles.
1 unit, Aut, Win, Spr (Wait)

72,73,74,75,76,77. Small-Group Intermediate-Level Instruction—Minimum enrollment required. May be repeated for credit.
1 unit, Aut, Win, Spr

72A. Piano Class—For intermediate students. Prerequisites: 12C or equivalent, audition.
1 unit, Win, Spr (Zerlang)

72B. Organ Class—For beginning organ students who have keyboard skills.
1 unit, Win, Spr (E. Harrison)

72C. Harpsichord Class—For beginning harpsichord students who have keyboard skills.
1 unit, Win, Spr (Thornburgh)

72D. Jazz Piano Class—By invitation only; priority to majors and jazz-ensemble participants.
1 unit, Win, Spr (Sumares)

73. Voice Class—For intermediate students. Admission by audition.
1 unit, Win, Spr (Giovannetti)

74A. Flute Class
1 unit, Win, Spr (Ferguson)

74B. Renaissance Wind Instruments Class
1 unit, Win, Spr (Sumares)

76. Brass Instruments Classes
1 unit, Win, Spr (Code)

77. Percussion Class
1 unit, Win, Spr (Veregge)

INDIVIDUAL INSTRUCTION

172/272, 173/273, 174/274, 175/275, 176/276, 177/277. Individual Vocal and Instrumental Instruction—Special fee of $165 per quarter for majors and $330 for non-majors (subject to revision). Prospective students must demonstrate, by audition with the appropriate teacher, a minimum proficiency on instrument. Minimum proficiency requirements for each instrument are available at department office. 270-level courses are for advanced students. May be repeated for credit.
3 units, Aut, Win, Spr

172/272. Keyboard Instruments
172A/272A. Piano
172B/272B. Organ
172C/272C. Harpsichord
172D/272D. Jazz Piano
172E/272E. Early Piano

173/273. Voice
174/274. Stringed Instruments
174A/274A. Violin
174B/274B. Viola
174C/274C. Violoncello
174D/274D. Contrabass
174E/274E. Guitar
174F/274F. Harp
174G/274G. Baroque Violin
174H/274H. Baroque Violin

175/275. Woodwind Instruments
175A/275A. Flute
175B/275B. Oboe
175C/275C. Clarinet
175D/275D. Bassoon

175E/275E. Renaissance Wind Instruments
ENFORCE

An audition is required for admission to any University musical ensemble; auditions are announced during the registration period in Autumn Quarter. Audition is by appointment in Winter and Spring Quarters: contact the ensemble director. Membership is open to all students including those who do not register for credit, although these courses may be repeated for credit.

157. Introduction to Mariachi Ensemble—Introduction to the practice of mariachi music, tradition, and history. Focus is on learning traditional sones, rancheras, huapangos, and boleros. Requirements: ability to play, and access to instruments—violin, trumpet, guitar, vihuela, and guitarron. (AU)

1 unit, Aut, Win, Spr (Rodriguez)

158. Contemporary Performance Ensemble—Alea II. A workshop for performance of works by Stanford and contemporary composers. Rehearsals arranged according to performance requirements. One concert per quarter.

1 unit, Aut, Win, Spr (Lemon)

159. Early Music Singers—Small choir specializing in medieval, Renaissance, and early Baroque vocal music. One major concert per quarter.

1 unit, Aut, Win, Spr (Mahrt)

160. University Orchestra—70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter.

1 unit, Aut, Win, Spr (Lemon)

161. University Bands

161A. Symphonic Band—40- to 50-member ensemble performing transcriptions of symphonic, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter.

1 unit, Aut, Win, Spr (Aquilanti)

161B. Jazz Orchestra—Big-band format. Repertoire drawn primarily from the contemporary jazz-ensemble literature. One formal concert per quarter.

1 unit, Aut, Win, Spr (Berry)

Note—The Leland Stanford Junior University Marching Band is now under the aegis of the Department of Athletics. See the “Athletics, Physical Education, and Recreation” section in this bulletin.

162. Symphonic Chorus—100- to 150-voice ensemble, performing major choral masterworks with orchestra. One concert per quarter.

1 unit, Aut, Win, Spr (Sano)

163. University Choir—Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar.

2 units, Aut, Win, Spr (Wait)

165. Stanford Chamber Chorale—Select 24-voice chamber ensemble, specializing in virtuoso choral repertoire from all periods of Western classical music.

1 unit, Aut, Win, Spr (Sano)

167. University Singers—Mixed-repertoire chorus, performing a variety of choral repertoire from all periods of Western classical music and from other world cultures.

1 unit, Aut, Win, Spr (Sano)

169. Stanford Taiko—Select North-American taiko ensemble, performing traditional and contemporary repertoire for Japanese drums. Multiple performances in Winter and Spring Quarters, also touring; instrument construction and maintenance.

1 unit, Aut, Win, Spr (Sano)
170. Collaborative Piano—Performance class in a workshop setting. Techniques of collaboration with vocalists and instrumentalists in repertoire ranging from songs and arias to sonatas and concertos. Prerequisite: private-lesson proficiency level in piano, or consent of instructor.
   1 unit, Aut (Dahl)

171. Chamber Music—Open to students at the private-lesson-proficiency level to hone ensemble skills, preferably while also taking private lessons. Small combinations for strings, winds, and keyboard instruments. Admission by audition.
   1 unit, Aut, Win, Spr (Staff)

RECORDING

192. Theory and Practice of Audio Recording
192A. Foundations of Sound Recording Technology—Preference given to music majors with MST specialization. Topics: elementary electronics, physics of sound transduction and microphone operation, selection and placement; mixing consoles; connectors and device interconnection; grounding and shielding; principles of analog magnetic recording; operation maintenance of recording equipment; basic principles of recording engineering. Enrollment limited. Prerequisites: 151; algebra, physics basics.
   3 units, Aut (Kadis)

192B. Advanced Sound Recording Technology—Topics: noise reduction techniques; dynamics and time-delay audio effects; principles of digital audio; disk- and tape-based digital recorders; digital audio workstations and editing; advanced multitrack techniques; SMPTE and MIDI time code and device synchronization; MIDI sequencing and synchronization. Prerequisite: 192A.
   3 units, Win (Kadis)

192C. Session Recording—Independent engineering of recording sessions. May be repeated for credit. Prerequisites: 192A,B.
   1-2 units, Aut, Win, Spr (Kadis)

DIRECTED READING AND RESEARCH

198. Concentrations Project—For concentration-program participants only. Must be taken in senior year.
   4 units, Aut, Win, Spr (Staff)

199. Independent Study—For advanced undergraduates and graduate students who wish to do work outside the regular curriculum. Before registering, student must present specific project and enlist a faculty sponsor.
   1-4 units, Aut, Win, Spr (Staff)

GRADUATE RESEARCH AND SPECIAL STUDIES

200. Graduate Proseminar—Required of first-year graduate students in music. Introduction to research in music, bibliographical materials, major issues in the field, philosophy, and methods in music history. Guest lecturers and individual research topics.
   4 units, Aut (K. Berger, Nagy)

   221A. 4 units, Win (Hinton, Plebuch)
   221B. 4 units, Spr (Hinton, Plebuch)

252. Seminar: Topics in Computer Music—See web site.
   3 units, Aut (C. Chafe) (enroll in Comp. Sci. 377A)
   1-3 units, Win (J. Berger)

253. Musical Information: An Introduction—The kinds of musical information used in sound, graphical, and analytical applications. Emphasis is on independent concepts and principles in music representation and research objectives (repertory analysis, performance analysis, theoretical models, similarity, and stylistic simulation). Examples from Western art music. Prerequisites: one year of music theory or equivalent; "methods" courses in such fields as musical analysis, symbolic systems, information processing, sound engineering, or intellectual property issues.
   1-4 units, Win (Selfridge-Field)

254. Seminar: Musical Representation and Computer Analysis—Participants explore the issues introduced in 253 in greater depth and take initiative for research projects related to a theoretical or methodological issue, a software project, or a significant analytical result. Prerequisite: 253 or consent of instructor.
   1-4 units, Spr (Selfridge-Field)

269A. Seminar in Performance Practices—Performance techniques, theoretical principles, aesthetics, and musical resources of various historical periods.
   4 units, Spr (Plebuch)

269B. Research in Performance Practices—Directed reading and research.
   1-5 units, Aut, Win, Spr (Staff)

280. TA Training Course—Required for doctoral students serving as Teaching Assistants. Orientation to resources at Stanford, guest presentations on the principles of common teaching activities, supervised teaching experience. Students should take this course in the second year, as they begin teaching. See web site.
   1 unit, Aut (Falk)

299. Master of Arts Project
   4 units, Aut, Win, Spr (Staff)

300A, B. Seminar in Notation—Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.
   300A. Medieval Notation
   4 units, not given 1999-2000
   300B. Renaissance Notation
   4 units, Aut (Mahrt)

   301A. Modal Analysis
   4 units, Spr (Mahrt)
   301B. Tonal Analysis
   4 units, Aut (Barth)
   301C. Post-Tonal Analysis
   4 units, Win (Staff)

302. Research in Musicology—Directed reading and research.
   1-5 units, Aut, Win, Spr (Staff)

310. Research Seminar in Musicology—Specialized topics vary each quarter.
   3-5 units, Aut (Plebuch)
   Win (Berger)
   Spr (Mahrt)

312A, B. Aesthetics and Criticism of Music—Selected primary text focusing on the nature, purposes, and uses of music and other arts.
   312A. Ancients and Moderns: Plato to Nietzsche
   4 units, not given 1999-2000
   312B. Contemporaries: Heidegger to Today
   4 units, not given 1999-2000

319. Research Seminar on Computational Models of Sound Perception
   1-3 units, Aut, Win, Spr (Slaney)

478
320. Introduction to Digital Audio Signal Processing and the Discrete Fourier Transform (DFT)—Introduction to the mathematics of digital signal processing and spectrum analysis for music and audio research. Topics: complex numbers, sinusoids, spectra, aspects of audio perception, the DFT, and basic Fourier time-frequency relationships in the discrete-time case. See web site.

2-4 units, Aut (Scavone)

321. Readings in Music Theory
1-5 units, Aut, Win, Spr (Staff)

323. Doctoral Seminar in Composition—Illustrated discussions of compositional issues and techniques. Students present their own work to the class, and individually to the instructor.
4 units, Aut, Spr (Staff)

Win (Harvey)

325. Individual Graduate Projects in Composition
1-5 units, Aut, Win, Spr (Staff)

341. Ph.D. Dissertation
1-9 units, Aut, Win, Spr (Staff)

399. D.M.A. Final Project
1-9 units, Aut, Win, Spr (Staff)

420. Applications of the Fast Fourier Transform (FFT) in Digital Audio Signal Processing—Spectrum analysis and signal processing using the FFT, with emphasis on audio applications. Topics: FFT windows; cyclic and acyclic convolution; zero padding and other spectrum analysis parameters; FIR filter design; phase and channel vocoders; the overlap-add and filter-bank-summation methods for short-time Fourier analysis, modification, and synthesis; tracking sinusoidal peaks across FFT frames; modeling time-varying spectra as sinusoids plus filtered noise; FFT-based sound synthesis, brief overviews of and introductions to transform coders (as used in MPEG audio compression), perfect-reconstruction filter banks, and wavelet transforms. See web site. Prerequisite: 320 or Electrical Engineering 261, or equivalent. Recommended: Electrical Engineering 264.
2-4 units, Win (Boix)

421. Signal Processing Methods in Musical Acoustics—Computational models of musical instruments, primarily in the wind and string families, based on physical models implemented using signal processing methods. The models are designed to capture only the “audible physics” of musical instruments using computationally efficient algorithms. Topics: mass-spring systems and their discrete-time simulation, sampled traveling waves, lumping of losses and dispersion, delay-line interpolation methods, applications of allpass filters and lattice/ladder digital filters in acoustic models, models of winds and strings using delay lines, scattering junctions, digital filters, and nonlinear junctions implementing oscillation sources such as bow-string and reed-bore couplings. See web site. Prerequisites: 150 or equivalent; Electrical Engineering 264.
2-4 units, Spr (Smith)

422. Perceptual Audio Coding
1-3 units, not given 1999-2000

423. Graduate Seminar in Signal Processing Research—See web site.
1-4 units, not given 1999-2000

OVERSEAS STUDIES

The following courses are taught overseas at the campus indicated. Students are encouraged to discuss with their major advisers on campus which courses would best meet individual educational needs. Descriptions can be found in the “Overseas Studies Program” section of the bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

BERLIN

3M. Musik, Kultur, Gesellschaft
4 units, Win (Lucchesi)

MOSCOW

178/278. Individual Vocal and Instrumental Instruction
3 units, Aut (Orbelian)

OVERSEAS STUDIES PROGRAM

Director of the Program: Russell A. Berman

Stanford Program in Berlin
Director: Karen Kramer
Associate Director: Maria Biege
Faculty: David Beach, Hildegard Bedarff, Ulrich Brückner, Jane Daf-fy, Dubravka Friezel-Kopecki, Therese Hörmiger, Cord Jakobeit, Wolf-D. Junghans, Ingo Klein, Joachim Lucchesi, Franz Necken-ig, Orrin Robinson, Andreas Ryll, Sylke Tempel, Jochen Wohlfel

Stanford Program in Buenos Aires
Faculty: Sergio Berenzstein, Alfredo Canavesi, Ezequiel Gallo, Jorge Liernur, Diego Petrecolla, Roberto Russell

Stanford Program in Florence
Director: Ermelinda Campani
Faculty: Riccardo Bruscagli, Antonello La Vergata, Giuseppe Mammarella, Leonardo Morino, Roy King, Valdo Spini, Timothy Ver-don

Stanford Center for Technology and Innovation (SCTI)—Kyoto

Kyoto Center for Japanese Studies (KCJS)
Director: Terry MacDougall
Faculty: Monica Bethe, Patricia Fister, Charles Fox, Koichiro Fujikura, Toshiko Fujiwara, Johannes Gumbrecht, Fujiko Hotta, Takemori Inoki, Ikuo Kume, Larry Leifer, Takayuki Marakami-Yokota, Shuji Matsumo, Junko Minamoto, William Rapp, Henry D. Smith II, Haru-ka Ueda, Mariko Uemiya, Chihhiro Yamaoka

Stanford Program in Moscow
Director: Maxim Bratersky
Associate Director: Alexander Abashkin
Faculty: Tatiana Boldyrev, Terence Emmons, Zinaida Kuznetsova, Vladimir Mau, Constantine Orbelian, Kirill Rogov, Inn Shiman-skaya

Stanford Program in Oxford
Director: Geoffrey Tyack
Faculty: George Brown, John Darwin, Paul David, Philip Davies, Michael Gearin-Tosh, Theodore L. Glasser, Ruth Mateer, Tina Miller, Susan Treggiari, Stewart Wood, Jonathan Wordsworth

Stanford Program in Paris
Director: Estelle Halevi
Faculty: Corinne Balleix, John Bender, Frédéric Charrillon, John Felstiner, Mary Felstiner, Chantal Georgel, Isaac Getz, Alexandra Giraud, Marie Grèé, Marc Lazar, Todd Lubart, Nonna Mayer, Florence Mercier, Isabelle Tarde

Stanford Program in Puebla
Dean of International Affairs: Ofelia Cervantes
Faculty: Enrique Cárdenas, Gonzalo Castañeda, Timothy Knab, Isidro Morales,

Stanford Program in Santiago
Director: Edmundo Fuenzalida
Faculty: Ricardo F'erench-Davis, Ernesto Hajek, Jorge Heine, Gilbert Masters, Michael McWilliams, Oscar Muñoz, Francisco Rojas, Bernardo Subercaseaux, Teresa Valdés

Stanford University encourages students to explore the opportunities of study abroad and to achieve cultural literacy through living, learning, and working in another country. Overseas Studies maintains centers in Berlin, Buenos Aires, Florence, Kyoto, Moscow, Oxford, Paris, Pueb-
la, and Santiago. Students may enroll for one or two quarters at most centers and for three quarters in Berlin, Kyoto–KCJS, Oxford, and Santiago. Course offerings from engineering, humanities, sciences, and social sciences provide full Stanford credit. Most courses are also reviewed by specific departments and count toward major requirements. Courses that fulfill General Education Requirements in Area 3 or Distribution Requirements in Areas 7 and 9 are usually offered at every center. Academic or paid internships are available at the Berlin, Florence, Kyoto–SCTI, Moscow, and Paris centers. Research opportunities are available in various formats at different centers. Minimum required language preparation varies among centers: Moscow offers a first-year intensive language course for those without prior Russian study; Berlin requires two quarters; Kyoto–SCTI requires two quarters for students in technical majors and five quarters for those in non-technical majors; Florence, Paris, and Santiago require three quarters for Autumn Quarter entry and four quarters for Winter Quarter entry; Buenos Aires, Kyoto–KCJS, Puebla, and Santiago (Spring Quarter) require more advanced language preparations. Depending on language proficiency, students may attend local universities in Berlin, Florence, and Paris.

Students remain registered at Stanford and pay regular tuition, along with the Overseas Studies fee which is based on Stanford room and board rates. Regular financial aid applies, and may be increased to cover additional costs. At most centers, students live in a homestay in the host culture, or with local students. Overseas Studies, located on the first floor of Sweet Hall, has a full-time staff and peer advisers to assist students in planning their programs abroad. The information following, while accurate at the time of printing, is subject to change. Consult the Overseas Studies Program web site at http://www-osp.stanford.edu for updated information.

**COURSES**

(AU) indicates that the course is subject to the University Activity Unit limitations (8 units maximum).

International Relations has approved a number of Overseas Studies courses for major credit; these are listed in the "International Relations" section of this bulletin.

**BERLIN**

3M. Musik, Kultur, Gesellschaft—(Same as Music 3M.) The musical legacies of the last 200 years in Berlin in its changing cultural and political contexts. The appropriation of music for ideological purposes in the Nazi period, lost traces of performance spaces, music cultures of Real Socialism. Berlin provides unparalleled opportunities to begin or deepen an appreciation of performance music. Language credit for advanced German students. GER:3a (DR:7)
4 units, Win (Lucchesi)

30. Berlin vor Ort: A Field Trip Module—The cultures of Berlin as preserved in museums, monuments, and architecture. Berlin's cityscape as a narrative of its history from baroque palaces to vestiges of E. German communism, from 19th-century industrialism to grim edifices of the Sachsenhausen concentration camp. Competing political agendas and the criteria of historical selection in monument-alteration and removal, renaming streets, and structuring the capital city. Focus is on the interface between sociopolitical life and artistic expression. (In German) (AU) 1 unit, Aut, Win, Spr (Neckenig)

37. Web Projects—Plan and develop a multimedia web project based on academic work associated with a concurrent course. Prerequisite: knowledge of web design or preparation on home campus.
1 unit, Aut, Win, Spr (Kramer)

38. Research Module—Continuation of 177A, below. Research is under the guidance of a local specialist and may be in libraries, archives, research institutes and/or in the field. Prerequisite: German Studies 177A.
3-4 units, Spr (Kramer)

46. The German Economy: Past and Present—The history of the German economy in the five different states systems: the Wilhelmian Empire, the Weimar Republic, the Third Reich, the post-war "empire" of the GDR, and the free market economy of the FRG. The processes of economic transition since unification and the current challenges faced by united Germany as Europe's first economic power and the world's second largest export nation. GER:3b (DR:9)
4.5 units, Aut (Klein)

47. Individualized Readings in German—Directed reading in the fields of students' choice. Potential disciplines include economic, political science, international relations, and business, especially as it is reflected in German newspapers, magazines, and television. 1-3 units, Aut (Robinson)

53. Seminar in Manufacturing Processes: Technology, History, Commerce
Spr (Beach)

57. Gender and Cultural Discourses in Modern German Literature—Analysis of literary texts based on the hypothesis that gender identity is a culturally shaped category, susceptible to historical development and subject to change. How gender identity varies as a cultural and social role, and how it is discussed and/or undermined in German literature of the past 30 years. GER:4c (DR:7)
4 units, Spr (Hörnigk)

58. Contemporary German Political Economy—Recent reform trends and debates in Germany and Continental Europe: the welfare state, private vs. public management, mandatory vs. voluntary membership EU, insurance vs. redistribution. Health care policy, social security, welfare, labor market flexibility. GER:3b (DR:9)
4-5 units, Spr (Ryll)

101A. Contemporary Theater—(Same as Drama 101A, German Studies 195.) Texts of plays are supplemented by theoretical writings of respective playwrights and background reading in theater history and theory. Weekly theater trips, a tour of backstage facilities, attendance at a rehearsal, and discussions with actors, directors, or other theater professionals. (In German) GER:3a (DR:7)
5 units, Spr (Kramer)

103. Manufacturing and Design—(Same as Mechanical Engineering 103.)
4 units, Spr (Beach)

117V. The Industrial Revolution and its Impact on Art, Architecture, and Theory—(Same as Science, Technology, and Society 117V. Art and Art History 173Y.) The interlinking of architecture and painting with technological and scientific development. In a period of industrial revolution, the dominance of positivist thinking and empirical method promotes in the cultural and artistic realm a response of euphoric acceptance or emphatic rejection. Artwork as a social, cultural, spiritual "symbol" is a response to scientific and technological development, yet claims timeless validity. Topics: relationships between Idealism and Realism, photography and painting, Historicism and Functionalist Expression and Dadaism, Futurism and New Sobriety, Functionalism and Nazi Classicism. GER:3a (DR:7)
5 units, Aut (Neckenig)

120V. Industry, Technology and Culture, 1780-1945—(Same as History 105V; Science, Technology, and Society 120V.) Technological innovations of the past 200 years have defined the modern world; human inventions have left indelible marks on culture and civilization. The dialectical relationship between material, intellectual, and social cultures on, e.g., modern materials, transport and communications systems, micro- and macrocosms discovered in physics, chemistry, and astrophys.
my, and the revolutionizing influence of photography, film, and television. GER:3a (DR:7)

4 units, Win (Neckenig)

12P. Environmental Policy in Europe—(Same as Public Policy 122P, Human Biology 125X.) Introduction to the actors, ongoing negotiations, and institutions created in Europe after the beginning of the 1970s to stem the tide of environmental degradation. Environmental problems and politics in: Germany, the nation states of the EU, and between East and West in Europe. The central aspects of international environmental affairs in a regional setting. GER:3b (DR:9)

4-5 units, Spr (Iakobiet)

123. The Brothers Grimm and their Fairy Tales—(Same as German Studies 123.) Readings of 15-20 fairy tales and theoretical treatments of the Grimms’ fairy tales. Sources for and authenticity of the tales, their reception at different times and in different cultures, the values represented in the tales, portrayals of gender roles, family values, etc. Material in other media (film and visual arts). (In German) GER:3a (DR:7)

4 units, Aut (Robinson)

129X. One Market, One Money, One Europe?—(Same as Economics 129X.) Insight into the European Monetary Union (EMU), started in the late 90s. The theoretical background and historical path from a single market to a common currency. The impact of the EMU on the financial, social, and political aspects at the European and the member states level. Empirical data is analyzed. The role of new institutions and frameworks for decision making in the European Union (EU). GER:3b (DR:9)

4-5 units, Win (Brückner)

143U. Architecture and the City, 1871-1990: Berlin as a Nucleus of Modernity—(Same as Science, Technology, and Society 119V; Urban Studies 143U; Art and Art History 174; History 229V.) Urban Berlin since the Gründerzeit. Architectural “corrections” attempted in post-Communist E. Berlin and on the drawing boards. The dual perspective of the major architectural movements of the century and the shifting roles of Berlin during the unifications of 1871 and 1990. GER:3a (DR:7)

4 units, Spr (Neckenig)

145. Multiculturalism in Comparative Perspective: Germany and Israel—(Same as Sociology 145.) Despite the reality of multicultural Germany, the adjective “German” continues to refer not to formal citizenship, but to “Kulturation,” expressing the common culture, language, and history of the nation. In contrast, Israel explicitly defines itself as an immigration land. Since its founding, hundreds of thousands of immigrants have become Israelis under the “Re-immigration Law,” which grants automatic citizenship to Jews. The history of the two countries, comparing their self-definitions and the challenges posed by modern migration. New conceptions of multi-culturalism emerging in these contexts.

4 units, Win (Tempe)

174. Sport-Frei! Sports and Modernity in Comparative Perspective—(Same as German Studies 174.) Introduction to the theory and history of mass spectator sports and their role in modern societies, especially in Germany. Comparisons with U.S. and Britain highlight the peculiarities of sports in German culture and create a vantage point to understand German culture, past and present. Concepts of competing and fighting, rule observance, and the role of sports in W. and E. Germany before and after unification. The relationship between sports and politics, including analysis of 1936 Berlin Olympic Games.

4-5 units, Aut (Junghanns)

177A. Culture and Politics in Modern Germany—(Same as German Studies 177A.) Key paradigms of modern Germany: German romanticism, the belated state and national identity, National Socialism and the Holocaust, Germany divided and unified. Literary, analytical, and theoretical texts; newspaper articles; film/TV, oral history. GER:3b (DR:9)

4-5 units, Win (Kramer)

179B. German Film and its European Context—(Same as German Studies 179B.) Cinema, as a mass-reception form of art, emerged in a Europe torn by “the Great War” and the revolutions of 1917-1918. The representations of the salient socio-political conflicts and discourses of the century in German and European film of the period. GER:3a (DR:7)

4 units, Aut (Kramer)

MULTISITE COURSES

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.) Experimental course taught simultaneously at several different sites with instructor based at Stanford. Institutional structures and contexts for literature in different cultures. How literature is presented to its public at various levels; literary criticism, presentation, and choice of texts in schools and universities; national literature. Students work in project groups in local sections while communicating with the instructor and students at distant sites through electronic discussion groups. Group projects include comparison of literary institutions in different cultures.

4 units, Win (Berman)

108R. Religion in Culture: A Comparative Approach—(Same as Religious Studies 108R.) Experimental course taught simultaneously at several different sites with instructor based in Florence. The different ways religion forms culture and is formed by it. Theoretical approaches to the subject are followed by projects in the context of different cultures. Possible topics: the relation of religion to the state or depictions of sacred themes in art and architecture. Students work individually or in groups at local sites while communicating with instructor and other students at distant sites via the electronic discussion groups.

4 units, Aut (Reichard)

GERMAN LANGUAGE PROGRAM

3B. German Language and Culture—(Same as German Studies 3B.) Grammar, composition, and conversation. Increases students’ fluency in German as rapidly as possible to help students take advantage of the many opportunities in Berlin. Corequisite: German Studies 100B.

4 units, Aut, Win, Spr (Staff)

22B. Berliner Geschichte(n), Second Year German—(Same as German Studies 22B.) Knowledge of German is improved by reading texts in history, literature, politics, and economics.

4 units, Aut, Win, Spr (Staff)

100B. Aktives Deutsch—(Same as German Studies 100B.) Required for students enrolled in German Studies 3B; open to students in other German language classes. Active usage of German, including vocabulary from a variety of fields and disciplines, and discussion on current issues.

2 units, Aut, Win, Spr (Staff)

ON VIDEO_TAPE

See the “School of Engineering” section of this bulletin for course descriptions.

40B. Introductory Electronics—(Same as Engineering 40B.) GER:2b (DR:6)

5 units, Aut, Win, Spr (Masters)

50B. Introductory Science of Materials—(Same as Engineering 50B.) GER:2b (DR:6)

4 units, Aut, Win, Spr (Brandt)

BUENOS AIRES

1. Contemporary Political History of Argentina—The themes and problems of the contemporary political history of Argentina. Students select topics to investigate throughout the term.

units to be announced, Spr (Bersenbein)
2. Argentina's Foreign Policy—Interdisciplinary analysis of Argentina's foreign policy from historic perspective: continuities and ruptures. Structural ties between Argentina and its principle international partners throughout the 20th century. The connection between foreign policy and the type of government and/or political regime. The relation between foreign policy and the dominant political culture and belief systems of decision-makers. Analysis of present-day foreign policy in Argentina and its political and economic agreements. Institutional plans for constitutional control of foreign policy. Bilateral and multilateral relations and alignments in historical perspective.

units to be announced, Spr (Russell)

3. Themes in the Political Economy of Argentina—The problems of the contemporary political economy in Argentina. Students select topics to investigate throughout the term.

units to be announced, Spr (Petrecolla, Canavese)

4. Politics and Society in Argentina in the 19th and 20th Centuries—The conservative republic. Economic growth and rebellion and the question of universal suffrage. The Catholic Church and politics in Argentina. The formation of contemporary political parties and the crisis of the conservative order. Politics between 1930-43 and the military coup of 1943. The rise of Peronism, his government (1946-55), and political difficulties in the post-Peronist period. The experience of development. The government of the UCRP. The Argentine Revolution and its original origins of the politically key mental health de-institutionalization move—Important psychosocial differences in psychiatric treatment between the American and Italian mental health delivery systems. The psychoanalytic and the U.S. to understand the resulting Italian system within a more realistic understanding. Major and new rules chosen. Comparisons with other European democracies and the U.S. to understand the resulting Italian system within a more consensual or majoritarian direction. The main features of the crisis are analyzed and the changes and choices assessed. (In Italian) GER:3a (DR:7)

5 units, Win (Campagnoli)

5. Art and Architecture of Argentina—Theories in urban development in the 20th century, heritage preservation, public and commercial architecture.

units to be announced, Spr (Gallo)

FLORENCE

11. Italy: Crisis, Change, and Choice—Recent changes in the traditional parties, the breakdown and disappearance of the Christian Democratic and the Socialist parties, establishment of new actors, and the stronger role of unions have been complemented by a new electoral system and a leftist cabinet. Important changes to the constitution have been decided and new rules chosen. Comparisons with other European democracies and the U.S. to understand the resulting Italian system within a more consensual or majoritarian direction. The main features of the crisis are analyzed and the changes and choices assessed. (In Italian) GER:3b (DR:9)

5 units, Win (Molino)

34. Italian Psychiatry: Contrasts with the U.S. Mental Health System—Important psychosocial differences in psychiatric treatment between the American and Italian mental health delivery systems. The origins of the politically key mental health de-institutionalization movement in Italy. Main issues: the existential-phenomenological school of psychiatry. Works: Jaspers, Laing, Ruesch. Visit local psychiatric clinics in Florence and Pisa. GER:3b (DR:9)

4 units, Aut (King)

35. Aesthetics, Style, and Psychopathology—Theories of Benedetto Croce and their application in understanding the relationship between the process of artistic creation and affective expression in visual artists. Psychobiological material of Italian Renaissance artists such as Fra Angelico, Botticelli, Michelangelo illustrate how personality and affect can be reflected in visual style. Croce's theories of art expression are contrasted to neoclassical and romantic models of art production. GER:3a (DR:7)

4 units, Aut (King)

36. Modernist Italian Cinema—Cinema is the embodiment of modernity. It develops in the wake of modernism proper, but can be understood as one of its technological and aesthetic expressions. Topics: cinema's archeology in Futurist texts and theories with their nationalistic politics, and their iconoclastic, radical, and interdisciplinary re-thinking of the language and form of all the arts (Marinetti, Pisanelli, D'Annunzio).

GER:3a (DR:7)

4 units, Aut (Campagnoli)

52. Realism, Utopia, Myth, and Society in Italian Cinema: Bernardo Bertolucci, Pier Paolo Pasolini, and Federico Fellini—(Same as Communication 52, Italian 190F.) Major films in the careers of Bertolucci, Pasolini, and Fellini are used to assess the ways in which realism, myth, utopia, and society are theorized and problematized. Topics: ideology and representation, class and specificity of intellectual labor, canonicity, the creation of a personal mythology of imagination, memory, and reality. (In Italian) GER:3a (DR:7)

5 units, Win (Campagnoli)

106V. Italy: From an Agrarian to a Post-Industrial Society—(Same as History 106V, Political Science 158X.) Italian history from the Risorgimento to the present. Italian society, crises, evolution, values, and the relation to the political institutions existing in different periods. Ideologies and political doctrines, and historical events which contributed to the formation of modern Italy's predominant subcultures: Catholic and Socialist. (In Italian) GER:3b (DR:9)

4 units, Aut (Mammarella)

111Y. From Giotto to Michelangelo: Introduction to the Renaissance in Florence—(Same as Art and Art History 111Y.) Lectures, site visits, and readings reconstruct the circumstances that favored the flowering of architecture, sculpture, and painting in Florence and Italy, late 13th to early 16th century. Emphasis is on the classical roots; the particular relationship with nature; the commitment to human expressiveness; and the rootedness in real-world experience, translated in sculpture and painting as powerful plasticity, perspective space, an interest in movement and emotion. GER:3a (DR:7)

4 units, Win (Verdon)

112Y. The Duomo and Palazzo della Signoria: Symbols of a Civilization—(Same as Art and Art History 112Y.) The history, history of art and symbolism of the two principal monuments of Florence: the cathedral and the town hall. Lectures, site visits, and readings grasp the point of common meaning and ideological difference between the religious and civic symbols of Florence's history from the time of Giotto and its first Guelph republic to Bronzino and Giovanni da Bologna and the Grand Duchy. GER:3a (DR:7)

4 units, Win (Verdon)

160F. The Making of Literary Identity: From Dante to Machiavelli—(Same as Italian 160F.) Italian Renaissance literature is placed in the context of the Renaissance culture by relating texts and authors to their historical and ideological issues: Petrarch, Boccaccio, Machiavelli, Guicciardini, Castiglione, Ariosto, and Tasso. Main issues: the peculiar relation in Italy between geography, language, and literary genre; the foundation of fundamental modes of writing such as lyric poetry, political-historiographic discourse, chivalric romance; the polycentric nature of Italian Renaissance literature; and the status of the writers with regard to questions of gender. (In Italian) GER:3a (DR:7)

4-5 units, Win (Bruscagli)

178F. The Integration of Europe—(Same as Italian 178F.) The historical, political, economic, and cultural aspects of the process of European integration from a general perspective and from the specific point of view of Euro-U.S. relations. The euro, the EMU, and what it means for the nations which have accepted it. Questions of the future enlargement of the EU to E.-Central European countries. The role of NATO, WEU, and the construction of a common European foreign and security policy in the wake of the Amsterdam Treaty. A forecast for the election of the next
European Parliament and appointment of the European Commission. GER:3b (DR:9) 4-5 units, Aut (Spinelli)

215V. The Scientific Revolution: From the Renaissance to the 18th Century—(Same as Science, Technology, and Society 125V; Philosophy 145P; History 215V.) Focus is on crucial changes in man’s view of nature and himself, ca. 1400 to 1750. The interplay between ideas and the ways of thinking across disciplinary boundaries. Scientific developments as major intellectual changes. Topics: Renaissance man, the new attitude toward machines and technology, the birth of a new physics, medicine and natural history, the artist and the scientist. GER:3a (DR:8) 4-5 units, Win (La Vergata)

MULTISITE COURSES

See the “Berlin” section of Overseas Studies Program for course descriptions.

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.) 4 units, Win (Berman)

108R. Religion in Culture: A Comparative Approach—(Same as Religious Studies 108R.) 4 units, Aut (Reichard)

ITALIAN LANGUAGE PROGRAM

The Italian language program has the goal of engaging all students in scholarly work in Italian. Students choose from the following alternatives:

1. Enroll in one of the courses conducted primarily in Italian.
2. Enroll in directed reading conducted primarily in Italian.
3. Enroll in a course at the University of Florence. (These courses typically run from October to mid-March, so this option is available only to two-quarter students.)
4. Complete a term paper (for any course) that is written in Italian and draws extensively on Italian-language sources. Students writing papers in Italian for English-language courses must discuss their decision with the director and the professor teaching the course by the end of the fourth week of the quarter.

All students are encouraged to work with the language resource person offering group and individualized support for language issues.

ON VIDEOTAPE

50F. Introductory Science of Materials—(Same as Engineering 50F.) GER:2b (DR:6) 4 units, Aut, Win (Bravman)

KYOTO

The Stanford Japan Center in Kyoto houses two separate academic programs: the Kyoto Center for Japanese Studies (KCJS) and the Stanford Center for Technology and Innovation (SCTI). KCJS is administered by Stanford for a consortium of American universities. For current information on KCJS, consult the web site at http://www-osf.stanford.edu/KCJS or contact Overseas Studies for a brochure. The courses listed below are offered by the SCTI program.

17R. Religion and Japanese Culture—(Same as Religious Studies 17R.) Introduction to the importance of religion in Japanese culture, covering the major traditions of the country. Visits to relevant religious centers for observation of current religious practices and participation where appropriate (e.g., meditation session). Topics: the relation between religion and culture; ancient Japanese religion and Shinto; Buddhist schools of Heian Japan; Zen Buddhism as it flourished in the Kamakura period; Confucianism, as originally conceived in ancient China, and as transmitted to Japan in the Edo period in its Neo-Confucian form; some characteristic modern practices. GER:3a,4a (DR:2 or 8) 4-5 units, Spr (Staff)

21. Research Project—Independent research projects on significant aspects of Japanese culture, society, or public policy. Students interested in developing the project as a web page should take a home campus class on creating web pages or have equivalent experience.

2-3 units, Spr (MacDougall)

110K. Introduction to Team-Based Product Design-Development in Japan—(Same as Mechanical Engineering 110K.) Multidisciplinary experience with three product design challenges of deepening complexity, stressing cross-cultural issues and undertaken within the surrounding community. Interaction with “coaches” support Japanese technology access, language, and culture.
4 units, Spr (Leifer)

121K. The Asian Others of Western Culture—(Same as Comparative Literature 121K.) Since the appearance of Edward Said’s book on “Orientalism,” it has become an obligation for Western intellectuals to acknowledge the problematic and often scandalous projections of their own culture onto Far Eastern (and Japanese) culture. Goals: to reconstruct the history of problematic “othering,” based on original texts (in English translation) from Classical Antiquity to the first half of the 20th century; and to discover that these “well-intentioned otherings” are less aggressive, yet no more problematic than their long Western prehistory.

GER:3a (DR:7) 3-5 units, Spr (Gumbrecht)

122K. Western Permutations in Thinking Technology—(Same as Comparative Literature 122K.) The denaturalization of some recurrent premises and conditions under which western culture has thought and indeed created our concept of “technology.” If “technology” has been understood as a human addition to the cosmos, it becomes important to think of the non-intentional impact of these practices on nature and human life.

3-5 units, Spr (Gumbrecht)

215X. The Political Economy of Japan—(Same as Political Science 215X) Institutions and processes in the political organization of economic activity in modern Japan. The interaction of public and private sector institutions in the growth of Japan’s postwar economy. The organization and workings of key economic ministries and agencies of the government, private sector business groupings, government interaction, and public policy making. The transformation of Japanese industrial policy from the rapid growth of heavy and chemical industries to the promotion of high technology and communications industries. The international, political, and economic ramifications of the structure and importance of Japanese capitalism. GER:3b (DR:9) 4-5 units, Spr (Kume)

JAPANESE LANGUAGE PROGRAM

3K. First-Year Modern Japanese—(Same as Asian Languages/Japanese 3K.) 5 units, Spr (Fujiwara, Ueda)

21K. Second-Year Modern Japanese, First Quarter—(Same as Asian Languages/Japanese 21K.) 5 units, Spr (Uemiya)

23K. Second-Year Modern Japanese, Third Quarter—(Same as Asian Languages/Japanese 23K.) 5 units, Spr (Yamaoka)

100K. Advanced Japanese—(Same as Asian Languages/Japanese 100K.) 5 units, Spr (Hotta)
SCHOOL OF HUMANITIES AND SCIENCES

103K. Upper Advanced Japanese—(Same as Asian Languages/Japanese 103K.)
   5 units, Spr (Yamaoka)

ON VIDEOTAPE
   See the “School of Engineering” section of this bulletin for course descriptions.

40K. Introductory Electronics—(Same as Engineering 40K.) GER:2b (DR:6)
   5 units, Spr (Masters)

50K. Introductory Science of Materials—(Same as Engineering 50K.)
   GER:2b (DR:6)
   4 units, Spr (Braivan)

113. Electronic Circuits—(Same as Electrical Engineering 113.)
   3 units, Spr (Flynn)

182. Computer Organization—(Same as Electrical Engineering 182, Computer Science 112.)
   4 units, Spr (Flynn)

15. Academic Internship—Placements in areas such as journalism, health care, education, international ventures, and technology are an introduction to Russian society and work experience. Regular meetings with a mentor develop an in-depth evaluation of observations. Findings and analysis are summarized in an academic paper.
   4-5 units, Aut, Win (Bratersky)

16. Tutorial—Meet with tutors individually or in very small groups on a chosen topic.
   3-5 units, Aut, Win (Bratersky)

21. Ethnic Moscow—Readings on ethnicity in Russia are synthesized in the context of visits to Armenian, Jewish, Georgian, Tatar (Muslim), and Russian communities, places of worship, and cultural events.
   3 units, Aut (Abashkin)

27. Modernist Composers in Russian Music—Indepth study of the most important composers of the early 20th century, focusing on the changing trends and harmonic evolution that came with the dramatic changes and upheavals at the start of the century. Works: Prokofiev, Shostakovitch, Stravinsky, Bartok, Hindemith, Berg, Scriabijn, Debussy, Ravel. GER:3a (DR:7)
   3-4 units, Aut (Orbelian)

28. Music Internship with the Moscow Chamber Orchestra—Advanced student musicians (strings and woodwinds only) may play with one of the world’s great orchestras. Rehearse with the Moscow Chamber Orchestra with private lessons and coaching. Depending on individual ability and scheduling limitations, students perform with the orchestra. Prerequisite: selection by audition.
   5 units, Aut (Orbelian)

119X. Russian Politics—(Same as Political Science 119X.) Introduction to the political, cultural, social, and historical background of Russian domestic life and foreign politics; the major issues in Russian political life; and the political forces currently playing a role in the Russian arena. Emphasis is on an understanding of major interest groups and the political concepts affecting the struggle in Russia; the inter-relationship among politics, economic issues, ethnic-territorial problems; and security matters in Russia itself, in the countries of the former Soviet Union, and on an international level. GER:3b (DR:9)
   5 units, Aut (Bratersky)

120X. Economic Reform and Economic Policy in Modern Russia—(Same as Economics 120X.) Problems in economic policy in modern Russia. Topics: Russian economic history; the reasons and logic of economic transformation; and the major components of post-communist economic transformation doctrine. The mechanism of economic policy decision making in modern Russia, realistic patterns and alternatives of economic development, and the logic and direction of the transformation of the elements in the Russian economic system. Discussions with politicians involved in economic decision making. GER:3b (DR:9)
   5 units, Aut (Mau)

121V. Russia in the Age of Nobility 1700-1840: State, Society, and Culture—(Same as History 121V.) Insight into a period of Russian history and culture where Russians produced achievements in literature and the arts, but failed to resolve the social and institutional problem created by rapid transformation. The reforms of Peter the Great through the Slavophile-Westernizers controversy established the paradigms of Russia’s historic development and raised issues still determining the intellectual agenda today. GER:3a (DR:7)
   5 units, Aut (Rogov)

146X. Contemporary Issues of Russian Society—(Same as Political Science 146X.) Forum addresses the major issues of Russian society today. The problems facing an individual in Russia, issues confronting Russia, issues confronting Russian society, and the main aspects of multiple crises evolving after the collapse of the Soviet Union. Prerequisite: some background in Russian studies.
   4 units, Win (Bratersky)

178/278. Individual Vocal and Instrumental Instruction—(Same as Music 178/278.) Private lessons with outstanding music teachers in Moscow for voice and most instruments. Prerequisite: minimum proficiency on instrument demonstrated by audition.
   3 units, Aut (Orbelian)

225V. Aspects of Soviet Political History—(Same as History 225V.)
   GER:3b (DR:9)
   4 units. Aut (Emmons)

226V. History of Moscow through its Architecture—(Same as History 226V.) Weekly field trips examine monuments of Moscow architecture in historical sequence, beginning with medieval church and fortification architecture and ending with Stalinist baroque. GER:3a (DR:7)
   4 units, Aut (Emmons)

MULTISITE COURSES
   See the “Berlin” section of Overseas Studies Program for course descriptions.

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.)
   4 units, Win (Berman)

   4 units, Aut (Reichard)

RUSSIAN LANGUAGE PROGRAM

10M. Intensive First-Year Russian—(Same as Slavic Languages 10M.)
   10 units, Aut (Staff)

51M. Second-Year Russian I—(Same as Slavic Languages 51M.)
   6 units, Aut (Kuznetsova)

52M. Second-Year Russian II—(Same as Slavic Languages 52M.)
   6 units, Win (Kuznetsova)

111M. Third-Year Russian I—(Same as Slavic Languages 111M.)
   6 units, Aut (Boldyreva)

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The poetry, prose, and drama of the period is placed in its literary, cultural, and historical contexts, and key texts are read closely.

112M. Third-Year Russian II—(Same as Slavic Languages 112M.) 6 units, Win (Boldyrev)

117M. Fourth-Year Russian I—(Same as Slavic Languages 177M.) 6 units, Aut (Shimanskaya)

118M. Fourth-Year Russian II—(Same as Slavic Languages 178M.) 6 units, Win (Shimanskaya)

OXFORD

31. Media Accountability in Britain and the U.S.—(Same as Communication 31.) The principles and practice of media accountability in the U.S. and Britain during the second half of 20th century. The balance between press freedom and accountability, comparing the role of British Press Council, now defunct, and its legacy, the Press Complaints Commission, with the National News Council (1974-1984) and various local news organizations in the U.S. Why and how Western democracies try mechanisms for press accountability without implicating the state (government), and why the efforts seldom achieve their stated goal. GER:3b (DR:9)

4 units, Aut (Glasser)

33. Mass Media in the Tradition of British Cultural Studies—(Same as Communication 33.) The contributions of “British Cultural Studies,” emphasizing its analysis and critique of mass media and popular culture. The origins and development of the tradition of British Cultural Studies at the Centre of Contemporary Cultural Studies at University of Birmingham in early 1970s. Works: Raymond Williams and Stuart Hall. GER:3b (DR:9)

4 units, Aut (Glasser)

64. Modern British Politics and Government—The 1980s marked the beginning of a period of transformation in British politics. Two decades of constitutional and political evolution under Margaret Thatcher have followed by the election of Tony Blair and his program of constitutional reforms. The status quo during the post-war period, specific themes and institutions, and agendas of constitutional reform of the present government. The prospects for success and likely consequences. GER:3b (DR:9)

4-5 units, Win (Wood)

114Z. English Literature 1509-1642—(Same as English 114Z.) Open only to students majoring in English and related subjects. Taught jointly for Stanford students and second-year St. Catherine’s undergraduates. English literature from the beginning of Henry VIII’s reign to the onset of the Civil War, excluding Shakespeare. The poetry, prose, and drama of the period is placed in its literary, cultural, and historical contexts, and key texts are read closely.

5 units, Aut (Gearin-Tosh)

116Z. English Literature 1642-1740—(Same as English 116Z.) Open only to students majoring in English and related subjects. Taught jointly for Stanford students and second-year St. Catherine’s undergraduates. English literature from the middle of the 18th century. The poetry, prose, and drama of the period is placed in its literary, cultural, and historical contexts, and key texts are read closely.

5 units, Win (Gearin-Tosh)

117W. Social Change in Modern Britain—(Same as Sociology 117W.) Changes in the social institutions, attitudes, and values in Britain over the past 20 years. Social changes occurring as a consequence of the Thatcher years of government. Changes to the British economy, the Welfare State, National Health Service, the education system, the criminal justice system, gender relations, marriage, divorce, reproduction, and the family. The consequences in terms of British competitiveness, income distribution, wealth and poverty, social class, health and illness, educational attainment and skills development, crime, and family life. GER:3b (DR:9)

4.5 units, Aut (Davies)

127X. A New Europe: Conflict and Integration since 1980—(Same as Political Science 127X.) The acceleration of European integration in the West, and the collapse of the state-socialism and Russian hegemony in the East have fundamentally altered relations between the states of Europe. The nature and implications of these changes for transnational relations between European nations, and for their domestic politics. Issues: European Union before and after Maastricht, the new Germany in the new Europe, political union and sovereignty, migration and the return of extremist politics, European security after the Cold War, the return to war in late 1990s in Eastern Europe. GER:3b (DR:9)

4-5 units, Win (Wood)

139V. The European City: 1600-2000—(Same as History 139V.) Over the past 400 years, cities in Europe have been transformed under impact of population growth, technological change, and revolutionary social and architectural ideologies. How and why transformation occurred through key texts and the physical fabric of the cities themselves. Topics: the effects of Baroque patronage in 17th and 18th centuries, rebuilding the city centers in 19th century, the growth of suburbs; the impact of mass transportation; the influence of modernist doctrines in the 20th century; and ongoing attempts by governments to tackle endemic problems of slums, poverty, etc. Comparisons with U.S. cities where relevant. GER:3b (DR:9)

4-5 units, Spr (Tyack)

141V. European Imperialism and the Third World, 1870-1970—(Same as History 141V. Political Science 148X.) European imperialism from its zenith in the late 19th century to the era of decolonization after WW II. The effects of western imperialism in different parts of the Third World. The legacy of imperialism and decolonization to the modern world. GER:3b (DR:9)

5 units, Spr (Darwin)

154Z. English Literature 1540-1832—(Same as English 154Z.) Open only to students majoring in English and related subjects. Taught jointly for Stanford students and second-year St. Catherine’s undergraduates. Survey of English romantic literature. The poetry, prose, and drama of the period is placed in its literary, cultural, and historical contexts, and key texts are read closely.

5 units, Spr (Wordsworth)

160. Changing Health Care Delivery in Britain—(Same as Human Biology 160.) The delivery of health care in Britain is explored through three related areas: health and illness behavior, contemporary health issues, and health policy. During the last 15 years, health care delivery in Britain has been the focus of reviews and legislative changes, challenging one of the founding principles of the National Health Service (NHS): free health care for all at the point of delivery, irrespective of pay. How far this principle can be upheld in the face of increasing financial restraint and technological advancements. GER:3b (DR:9)

4 units, Win (Miller)

165B. Arthurian Literature—(Same as English 165B.) Arthurian legend in literature, as it appears in British historical chronicle, in narrative romance, and in erotic and religious texts and illustrations. The moral ambiguities of chivalry and courtly love. Focus is on medieval versions of the Arthurian tales, tracing its development in our century in literature, art, film, and popular culture. Visits to Oxford’s collections of Arthurian pre-Raphaelite art in the Ashmolean Museum and possibly other collections. (English major Area:B) GER:3a (DR:7)

5 units, Spr (Brown)

168X. Path Dependence of Science and Technology since the Industrial Revolution—(Same as Economics 168X.) The methods and concepts for studying the historical development of scientific and technological knowledge and practice in the West since the Industrial Revolution. Applied analysis of path dependent dynamical systems; uses and limitations of "counterfactual history," perspectives of "evolutionary economics," "evolutionary epistemology," and models of technological and
173X, Y, Z. Shakespeare—(Same as English 173X, Y, Z.) Open only to students majoring in Drama, English, and related subjects. Taught jointly for Stanford students and second-year St. Catherine’s undergraduates. A study of the complete dramatic oeuvre of Shakespeare. Focus is on the sources of the plays, historical and dramatic content, and use of language.

173X. The Comedies  
5 units, Aut (Gearin-Tosh)

173Y. The Tragedies  
5 units, Win (Gearin-Tosh)

173Z. The Late and Problem Plays  
5 units, Spr (Gearin-Tosh)

176Y. Architecture in Britain and Europe 1800 to the 1900s—(Same as Art and Art History 176Y.) European architecture in the last 200 years in the context of social, cultural, and technological changes. Topics: neoclassical and Gothic Revival movements of 19th century; Beaux Arts, Arts and Crafts and “free-style” derivatives; the origins and subsequent development of architectural modernism; post-modernism and neomodernism of present day. GER:3a (DR:7)  
5 units, Aut (Tyack)

185. Ancient Roman Society—(Same as Classics 185, History 102V.) Social life in the Roman world 100 B.C. to 200 A.D. Demographic patterns and the interaction of cultures in areas controlled by Roman Empire. Topics: citizenship; Roman private law; freedom and slavery; manumission and position of freed slaves; the family, marriage, concubinage, and slave quasi-marriage; work; houses and living conditions. Visits to sites and museums. GER:3b (DR:9)  
5 units, Win (Treggiari)

186. Horace, Kipling, and Imperialism: Songs and Law—(Same as Classics 186, History 143V.) British thinking about empire in the 19th century, when admission to the army and the Indian Civil Service depended heavily on success in examination in Latin, was naturally influenced by ideas in prescribed school texts. Horace’s Odes (in translation) and a selection of Kipling’s writings in prose and verse, and their views of defeat, victory, and right conduct. GER:3a (DR:7)  
5 units, Win (Treggiari)

209. Medieval Books—(Same as English 209.) Examination of the manuscripts, facsimiles, and incunabula in Oxford libraries. Topics: survey of scripts, layouts, illustrations and illuminations, bindings, and types of medieval books; developments of medieval book production to literacy, education, culture, ideology, and social class. Works: earliest manuscripts surviving in the British Isles up to the Renaissance. GER:3a (DR:7)  
5 units, Spr (Brown)

221Y. Art and Society in Britain—(Same as Art and Art History 221Y, History 244V.) Themes in 18th-, 19th-, and 20th-century British art. Painting, sculpture, and design and a comparison of the British experience and that of Europe and the U.S. Readings: problems relating to the role of art, and the artist in modern society. Visits to relevant collections. GER:3a (DR:7)  
5 units, Win (Tyack)

254Z. Drama in Britain Today—(Same as English 254Z, Drama 158D.) The classics of world drama and some contemporary plays. The meanings of the works and theatrical techniques used to complete them on stage. Weekly visits to the theater. GER:3a (DR:7)  
4 units, Spr (Mateer)

MULTISITE COURSES

See the “Berlin” section of Overseas Studies Program for course descriptions

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.)  
4 units, Win (Berman)

4 units, Aut (Reichard)

PARIS

35. Building the European Economy: Economic Policies and the Challenges Ahead—The main issues and challenges of European Economic construction. The European Economic Union at the end of 1950s; various European economic policies (industrial, agricultural, social, and monetary). Topics: wider definitions of Europe, Europe’s relations with industrial and developing countries, Europe’s challenge in confronting global economic crises. GER:3b (DR:9)  
5 units, Aut (Balletx)

40. Europe: Integration and Disintegration of States, Politics, and Civil Societies—European integration is now an economic, social, and political reality. This integration has a history of mutation and a transformation of its very foundation. Topics: evolution of welfare state, elites, political parties; and systems in Europe; lobbies, trade unions, voluntary associations, social movements, popular protest, citizenship, democracy. GER:3a (DR:9)  
4 units, Win (Lazar)

111. Health Systems and Health Insurance: France and the U.S.—A Comparison—(Same as Public Policy 111, Human Biology 152X.) The role of the state in the delivery of health care. The evolution of the health profession in France and the U.S.; developments in health policy and reform; Clinton health reform, the Oregon plan; measures restraining professional autonomy and their implications for the medical profession. (In French and English) GER:3b (DR:9)  
4 units, Win (Giraud)

120X. French Painting from 1780-1900—(Same as Art and Art History 120X.) Changes in artistic aims and the interaction between artist and society throughout the period. Weekly field trips to Paris museums holding paintings of David, Ingres, Delacroix, Courbet, Daumier, Manet, Renoir, Monet, Degas, and others. (In French and English) GER:3a (DR:7)  
4 units, Win (Halevi)

130P. Paris: 1200-2000—(Same as Comparative Literature 130P, History 130V.) The history of Paris through an analysis of art, architecture, city planning, and literature. Paris of the high middle ages; absolutism in Paris from Louise XIV’s Invalides and its quarter to the city planning, private house development, and court projects that took place under Louis XV and XVI; Haussmann’s total remaking of Paris in the later 19th century; state monuments of past 30 years. GER:3a (DR:7)  
4 units, Win (Bender)

131I. The Holocaust in France and Beyond—(Same as History 131I, English 164Z.) Topics: what definitions of “holocaust” and “genocide” have emerged in recent years? What precedents for modern genocide can be traced from the past? What attitudes towards race, gender, and class contributed to persecution? What systems of terror, co-optation, and deception turned persecution into mass murder? What forms of resistance and rescue developed? What political, moral, and psychological effects of the Holocaust persist today? GER:3a (DR:7)  
5 units, Aut (J. Felstiner, M. Felstiner)

131X. France, Africa, and Global Politics—(Same as Political Science 131X.) Global interdependence and military, diplomatic, economic...
humanitarian, religious, and cultural issues are linked, as are the domestic and external fields. The postcolonial link between France and Africa. The role of French firms in Africa, Islam in France, migrations, NGOs, smuggling, etc. in the French-African relationship. This test case illuminates one of the theoretical stalemates of today’s world politics. (In French and English) GER:3b (DR:9)

4-5 units, Win (Charillon)

132V. The Memory of a Nation: The Birth of Museums in France—
(Same as History 132V, Art and Art History 121 Y.) The role of museums as institutions which preserve and communicate national memory and identity. In addition to collecting objects for exhibit, museums tell stories that can raise questions and structure experience. Major museums in Paris and their relationship to France’s self-perception. (In French and English) GER:3a (DR:7)

4 units, Aut (Georgel)

158F. Theater in France—(Same as Drama 158F.) The myth of Don Juan, and its representation in literature. Analysis of French authors and comparative literature. Comparison with other French theatrical presentations. Frequent visits to the theater. GER:3a (DR:7)

4 units, Aut (Mercier)

184B. Art and Science of Creativity—(Same as Psychology 184B.) Theories of creativity, case studies of eminent creators, laboratory studies, and introduction to techniques to foster creative thinking. Is talent innate or developed? What are the personal traits for a person to be creative? Which processes lead to a creative product? (In French and English) GER:3b (DR:9)

4 units, Aut (Getz, Lubart)


5 units, Aut (Felstiner)

211X. Political Attitudes and Behavior in Contemporary France—
(Same as Political Science 211X.) The institutions of the Fifth Republic, the main political forces and their evolution. Electoral behavior, taking into account other forms of political action such as the demonstrations for the defense of schools (1984) and the “lycee” students (1990), or the protest that followed the desecration of the Jewish cemetery in Carpentras. Attitudes and values are linked to voting choice. (In French and English) GER:3b (DR:9)

4-5 units, Aut (Mayer)

274A. Bodyworks—(Same as Comparative Literature 274A, History 274, History and Philosophy of Science 153.) Thesis: that dramatic new ways of imaging, controlling, intervening, remaking, and possibly even choosing bodies have participated in a complete reshaping of the notion of the body in the cultural imaginary and a transformation of our experience of actual human bodies. Works: Judith Butler, Elaine Scarry, Donna Haraway. Films: Blade Runner, Paris is Burning.

5 units, Win (Bender)

MULTISITE COURSES

See the “Berlin” section of Overseas Studies Program for course descriptions

91. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 91, German Studies 126A.)

4 units, Win (Berman)


4 units, Aut (Reichard)

FRENCH LANGUAGE PROGRAM

22P. Intermediate French I—(Same as French 22P.)

5 units, Aut (Mercier)

23P. Intermediate French II—(Same as French 23P.)

5 units, Aut (Tarde)

24P. Intermediate French III—(Same as French 24P.)

5 units, Win (Gree)

ON VIDEOTAPE

50P. Introductory Science of Materials—(Same as Engineering 50P.)

GER:2b (DR:6)

4 units, Aut, Win (Bravman)

PUEBLA

The Puebla program has distinct academic focal points: development economics, cultural studies, and studio art. Students are expected to have completed significant prerequisite course work.

15. Research Project—Students may enroll in an individual research project and work one-on-one with an UDLA faculty member.

2-3 units, Win (Staff)

16. Writing Workshop—Preparation for writing academic papers in Spanish.

2 units, Win (Staff)

20. Art History and Studio Art—By arrangement with the Department of Art and Art History at Stanford. Select from specified Art History and Studio Art courses offered through the Universidad de las Americas. (In Spanish)

Win (Staff)

104X. Cholula: The Workings of a Sacred City—(Same as Latin American Studies 104X.) Cholula is perhaps the oldest living city in the Americas. The social, ethnic, religious, historic, economic, and political factors that give it its identity as a part of the Mexican nation. Practical hands-on program requires student participation in social welfare programs, planning and development, town festivals, and ongoing research. Goal is to explore Cholula’s role in rural and urban Mexico, the agricultural and industrial economies, the social and religious systems, and its cultural and historical heritage in relation to the regional, national, and global systems of which Cholula is a part. (In Spanish) GER:3b (DR:9)

5 units, Win (Knab)

105X. Mexico: Explaining Change in an Era of Globalization—
(Same as Latin American Studies 105X.) Political, social, and cultural changes in Mexico in the 1990s. The roots of these changes, focusing on the external force of globalization. Globalization and internal change. The relationship between government and political figures. (In Spanish) GER:3b (DR:9)

5 units, Win (Morales)

112X. Economics of Emerging Financial Markets—(Same as Economics 112X, Latin American Studies 113X.) Issues related to emerging financial markets: institutions, behavior of economic agents, and evolution. Analytical overview with regard to the relationship of financial development and growth. Firms typical of developing countries; their financial and control structure. The nature of emerging stock markets, causes and consequences of financial crises, and links between monetary policy and economic activity. (In Spanish) GER:3b (DR:9)

5 units, Win (Castañeda)
114X. Development Macroeconomics: The Mexican Case—(Same as Latin American Studies 114X, Economics 118X.) Issues relevant in developing economies and the structures which make them different to the industrialized world. A thorough analysis in relation to the Mexican economy. Recent stabilization programs are analyzed by means of traditional tools and adjusted to the institutional framework of Mexico. Literature on growth, political economy, and structural reforms is applied to the Mexican case. (In Spanish) GER:3b (DR:9) 5 units, Win (Cárdenas)

SANTIAGO

5. Director's Seminar—Weekly seminar with presentations on current issues and events in Chilean political and cultural life.
   2 units, Aut, Spr (Fuenzalida)

11W. Research Methods—Open only to students enrolled in the Research Module. Preparatory seminar on research methods is offered by the person who is the primary research supervisor for the students. Students develop project topics and research designs. Corequisite: 12W.
   2 units, Win (Staff)

12W. Research Tutorial—Open only to students enrolled in the Research Module. Independent research with a research supervisor in Chile develops an extended paper associated with the central topic of the research module. Corequisite: 11W.
   5 units, Win (Staff)

37. Geology of the Andes—The Andes are used as the principal example of plate tectonics and other basic concepts of geology: the subduction of Nazca Plate, active volcanism along the Andean chain, the occurrence of some of largest earthquakes, and the development of some of richest copper deposits in the world. GER:2a (DR:5)
   5 units, Win (McWilliams)

38. Geology and Environment Seminar—Mining/environment seminar focusing on Chile's copper industry. Why is copper in Chile, what it takes to mine it, the market forces driving copper prices, and the ultimate environmental price.
   Win (McWilliams)

106H. Man-Environment Interactions: Case Studies from Central Chile—(Same as Human Biology 106H, Biological Sciences 106Z, Latin American Studies 122X.) Problems in rural and urban areas (pollution, over-exploitation of resources, and deterioration of the landscape) are all closely linked to social problems. The consequences of human action on the environment and possible actions to reverse the situation. GER:2b (DR:6)
   5 units, Aut (Hajek)

111. Social Heterogeneity in Latin America—(Same as Sociology 111, Latin American Studies 121X.) Latin America is characterized by social heterogeneity and inequality. An interpretation of these phenomena, focusing on the social, ethnic, gender, political, and economic dimensions. Their historical roots and unfolding during the periods of industrialization, the '60s, '70s, and '80s, and the contemporary situation. GER:3b (DR:9)
   5 units, Aut (Valdés)

118X. Cultural Modernization: The Case of Chile—(Same as Latin American Studies 118X.) The cultural changes that have taken place in Chile under conditions of economic liberalization and political democratization at all three levels of culture: elite, mass-media, and popular or folk. The reception of cultural meanings from the world social system (the U.S., EU, and Japan), its reformulation to respond to local conditions, and its export under the shape of cultural artifacts that can be understood by the non-Latin American members. Innovative elements rooted in the regional-local culture. GER:3b (DR:9)
   5 units, Win (Fuenzalida)

120X. Modernization and Culture in Latin America—(Same as Latin American Studies 120X, Spanish 290Z.) The intellectual and cultural expressions of Latin America against the background of modernization. Latin American modernization as a constant tension between: rationalization and subjectification, change and identity preservation, and the logic of economic development and the logic of the culture. GER:3a (DR:7)
   5 units, Aut, Spr (Subercaseaux)

129X. Latin America in the International System—(Same as Latin American Studies 129X, Political Science 137X.) Analysis of Latin America's role in world politics, with emphasis on U.S.-Latin America relations: the history of U.S.-Latin American interactions, national interest in the definition, and models for explaining U.S.-Latin America relations. Important themes in Latin America's evolving relationship with the international system. GER:3b (DR:9)
   4-5 units, Win (Rojas)

130X. Latin American Economies in Transition—(Same as Latin American Studies 130X, Economics 165X.) Introduction to the major debates and approaches developed to understand and analyze the economies of Latin America. Recent processes of transition to market economies. Common characteristics among countries of the region; the differences and special traits of individual countries. Historical, analytical, and empirical perspectives on topics at the center of controversy and specific policy problems over several decades. Recommended: Economics 1, 51, and 52. GER:3b (DR:9)
   5 units, Aut (Muñoz)

162X. Core Seminar: Ecology-Policy Studies—(Same as Latin American Studies 162X.) Students are provided the intellectual depth and background to carry on research in the field, exposing them to the environment of functioning research groups.
   5 units, Win (Hajek)

163X. Latin America in the International Economy—(Same as Economics 163X, Latin American Studies 119X.) The external economic relations of Latin American countries. Similarities and differences among countries, focusing on the last 15 years. Analytical and empirical elements for interpretation of policies and the outcome. Trade, external debt, capital flows, and the inter-relationships between domestic economy and overall growth. Recommended: Economics 1, 51, and 52. GER:3b (DR:9)
   5 units, Win (Ffrench-Davis)

176S. Energy for Development—(Same as Civil and Environmental Engineering 176S.) Introduction to the technologies and issues associated with rapid energy growth in developing countries, with emphasis on Chile. Topics: energy and environment, demand and supply sides, electric power development and regulation in Chile, Chile as case study for Latin America. Parallels between restructuring of Chile's electricity industry and the restructuring of utilities in California.
   Aut (Masters)

179S. Workshop on Solar Cooking—(Same as Civil and Environmental Engineering 179S.) The environmental and economic impact of the current means of cooking in developing nations. A variety of solar cookers are built, tested, and evaluated as to their usefulness in Latin America for traditional diets, availability of local materials and expertise, and potential impacts on the social fabric of rural villages.
   Aut (Masters)

221X. Political Transition and Democratic Consolidation: Chile's Comparative Perspective—(Same as Political Science 221X.) The dynamics of the Chilean transition, considered by many observers among the most analytically interesting. Topics: the challenges faced by democratic governments in 1990s, framed by the legacy of military rule (1973-1990); the country's political culture; institutional traditions of...
democracy in Chile; and Chilean process within broader context of Latin American political development. GER:3b (DR:9)
5 units, Spr (Heine)

MULTISITE COURSES
See the “Berlin” section of Overseas Studies Program for course descriptions

9R. Literary Institutions: A Comparative Approach—(Same as Comparative Literature 9R, German Studies 126A.)
4 units, Win (Berman)

108R. Religion in Culture: A Comparative Approach—(Same as Religious Studies 108R)
4 units, Aut (Reichard)

PHILOSOPHY
Emeriti: (Professors): Fred Dretske, Stuart Hampshire, Georg Kreisel, David S. Nivison, Patrick Suppes, James O. Urmson
Chair: John Etchemendy
Director of Graduate Study: Michael Bratman
Director of Undergraduate Study: Kenneth Taylor
Professors: Michael Bratman, John Etchemendy, Solomon Feferman, Dagfinn Fjeldstad (Autumn), Grigori Mints, Julius Moravcsik, John Perry, Johan van Benthem (Spring), Thomas Wasow
Associate Professors: Mark Crimmins, Peter Godfrey-Smith, Debra Satz, Kenneth Taylor
Assistant Professors: Lanier Anderson, Chris Bobonich, Yair Guttmann, Agnieszka Jaworska, Krista Lawlor, Michael Stevens, David S. Nivison, Patrick Suppes, James O. Urmson
Courtesey Assistant Professor: Reviel Netz
Lecturers: David Barker-Plummer, Roger Florka, Lori Gruen
Acting Assistant Professor: Jennifer Rosner
Visiting Professor: Keith Stenning

Philosophy concerns itself with fundamental problems. Some are abstract and deal with the nature of truth, justice, value, and knowledge; others are more concrete and their study may help guide our conduct or enhance our understanding of other subjects. In addition, philosophy examines the efforts of past thinkers to understand the world and our experience of it.

Although it may appear to be an assortment of different disciplines, there are features common to all philosophical enquiry. These include an emphasis on methods of reasoning and the way in which our judgments are formed, on criticizing and organizing our beliefs, and on the nature and role of fundamental concepts.

Students of almost any discipline can find something in philosophy which is relevant to their own specialties. In the sciences, it provides a framework within which the foundations and scope of a scientific theory can be studied, and it may even suggest directions for future development. Since philosophical ideas have had an important influence on human endeavors of all kinds (artistic, political, even economic), students of the humanities will find their understanding deepened by some acquaintance with philosophy.

Philosophy is an excellent major for those planning a career in law, medicine, or business. It provides analytical skills and a breadth of perspective helpful to those called upon to make decisions about their own conduct and the welfare of others. Philosophy majors who have carefully planned their undergraduate program have an excellent record of admission to professional and graduate schools.

The Special Program in the History and Philosophy of Science enables students to combine interests in science, history, and philosophy. Students interested in this program should see the special adviser.

The joint major in Philosophy and Religious Studies combines courses from both departments into a coherent theoretical pattern.

The Tanner Memorial Library of Philosophy contains an excellent working library and ideal conditions for study.

Graduate students and undergraduate majors in philosophy have formed associations for discussion of philosophical issues and the reading of papers by students, faculty, and visitors. These associations elect student representatives to department meetings.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

There are two ways of majoring in philosophy: the “General Program” and the “Special Program in the History and Philosophy of Science.” A student completing either of these receives an A.B. degree in Philosophy. There is also a major program offered jointly with the Department of Religious Studies. To declare a major, a student must consult with the Director of Undergraduate Study. The student is assigned an adviser to work out a coherent plan. The department strongly urges proficiency in at least one foreign language.

GENERAL PROGRAM

1. Course requirements, minimum 55 units:
a) Preparation for the major: an introductory course (under 100) and 80.
b) The core: 24 additional philosophy units as follows.
1) Logic: one from 57, 159, 160A, 169
2) Philosophy of Science: any course from 60, 61, 156, 163-168
3) Moral and Political Philosophy: one from 170-173
4) Metaphysics and Epistemology: one from 180-188
5) History of Philosophy: two history of philosophy courses numbered 100 or above
c) One undergraduate philosophy seminar from the 194 series.
d) Electives: courses numbered 10 or above, at least 15 units of which must be in courses numbered above 99.
2. Units for Tutorial, Directed Reading, or The Dualist (Philosophy 196, 197, 198) may not be counted in the 55-unit requirement. No more than 10 units completed with grades of “Satisfactory” may be counted in the 55-unit requirement.
3. Transfer units must be approved by the Director of Undergraduate Studies, in writing, at the time of declaring a major. In general, transfer courses cannot be used to satisfy the five area requirements or the undergraduate seminar requirement.

SPECIAL PROGRAM IN HISTORY AND PHILOSOPHY OF SCIENCE

Undergraduates may major in Philosophy with a degree field in History and Philosophy of Science under the Department of Philosophy. Each participating student is assigned an adviser who approves the course of study. A total of 61 units are required for the sub-major, to be taken according to requirements 1 through 5 below. Substitutions for the listed courses are allowed only by written consent of the undergraduate adviser for History and Philosophy of Science. Students are encouraged to consider doing honors work with an emphasis on the history and philosophy of science. Interested students should see the description of the honors thesis in Philosophy and consult their advisers for further information.

1. Three science courses (for example, biology, chemistry, physics) for 12 units.
2. The following Philosophy core courses must be completed with a letter grade by the end of the junior year:
a) one from 57, 159, 160A, 169
b) 60
c) 80
3. Three history of science courses.
4. Three philosophy of science courses, of which one must be Philosophy 164.
5. Three additional courses related to the major, in philosophy or history, to be agreed on by the adviser.
6. At least six courses in the major must be completed at Stanford with a letter grade. Units for Tutorial, Directed Reading, or The Dualist (196, 197, 198) may not be counted in the requirement. No more than 10 units completed with grades of "Satisfactory" may be counted in the requirement.

7. Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring a major. Transfer courses are strictly limited when used to satisfy major requirements.

MINORS

A minor in Philosophy consists of at least 30 units of philosophy courses satisfying the following conditions:

1. Introduction to the Humanities Program 23A and 23B (Reason, Passion and Reality) may be counted for a maximum of 5 units.
2. At least 10 units must be from courses numbered 100 or above.
3. The 30 units must include one of:
   a) A history of philosophy course numbered 100 or above
   b) Two quarters of Area 1 (only 5 of the 10 units can count towards 30-unit requirement)
4. One course from any two of the following three areas:
   a) Philosophy of science and logic: 60, 61, 156, 163-168; 57, 59, 160A, 169
   b) Moral and political philosophy: 20, 30, 170-172
   c) Metaphysics and epistemology: 10, 80, 180-188
5. Units for tutorials and directed reading may not be counted.
6. Transfer units must be approved in writing by the Director of Undergraduate Studies at the time of declaring. The number of transfer units is generally limited to a maximum of 10.
7. No more than 6 units completed with grades of "Satisfactory" count towards the 30-unit requirement.

As with the Philosophy major, these courses need not be taken in any particular order.

Students must declare their intention to minor in Philosophy in a meeting with the Director of Undergraduate Studies. This formal declaration must be made no later than the last day of the quarter two quarters before degree conferral. The Permission to Declare a Philosophy Minor (signed by the Director of Undergraduate Studies) lists courses taken and to be taken to fulfill minor requirements. This permission is on file in the department office. Before graduation, a student's record is checked to see that requirements have been fulfilled, and the results are reported to the University Registrar.

HONORS PROGRAM

Students who wish to undertake a more intensive and extensive program of study, including seminars and independent work, are invited to apply for the honors program during Winter Quarter of the junior year. Admission is selective on the basis of grade point average (GPA), demonstrated ability in philosophy, and progress towards satisfying the requirements of the major.

With their application, candidates should submit an intended plan of study for the remainder of the junior and the senior years. It should include at least 5 units of Senior Tutorial (196) during Autumn and/or Winter Quarter(s) of the senior year. In the quarter preceding the tutorial, students should submit an essay proposal to the Philosophy undergraduate director and determine an adviser.

In the senior tutorial, students write an essay on some philosophical problem. This essay is usually about 7,500 words for those taking one quarter of the tutorial, and about 12,500 for those taking two quarters of the tutorial. Length may vary considerably depending on the problem and the approach. The tutorial essay may use work in previous seminars and courses as a starting point.

A completed draft of the essay is submitted to the adviser at the end of the Winter Quarter. If rewriting is necessary, the student may enroll in 2 units of the Spring Quarter senior tutorial. Three copies of the essay must be given to the department by the end of the fifth full week of the Spring Quarter.

The honors tutorial represents units in addition to the 55-unit requirement.

The Department of Philosophy cooperates with the honors component of the "Interdisciplinary Studies in Humanities" as described in the section of this bulletin.

JOINT MAJOR IN PHILOSOPHY AND RELIGIOUS STUDIES

The joint major in Philosophy and Religious Studies consists of 6 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

CORE REQUIREMENTS

1. Philosophy courses:
   a) 80
   b) 16 units, including at least one Philosophy course from each of the following areas:
      1) Logic and philosophy of science: 57, 60, 61, 156, 159, 160A, 162-169
      2) Ethics and value theory: 170-173
      3) Epistemology, metaphysics, and philosophy of language: 180-188
      4) History of philosophy: 100-103

2. Religious Studies courses: 20 units, including at least two courses in diverse religious traditions (for example, an Eastern and a Western or a literate and a preliterate tradition) and including at least one seminar.

   General Major Requirements—Five additional courses (approximately 20 units) divided between the two departments. No more than 10 units of these may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

   Special Concentration—With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

   Directed Reading and Satisfactory/No Credit Units—Units of directed reading for fulfilling requirements of the joint major are allowed only with special permission. No more than 10 units of work with a grade of "Satisfactory" count toward the joint major.

HONORS PROGRAM

Students pursuing a joint major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

COTERMINAL DEGREE

It is possible to earn an A.M. in Philosophy while earning an A.B. or B.S. This can usually be done by the end of the fifth undergraduate year, although students whose degree is not in philosophy may require an additional year. Standards for admission to, and completion of, this program are the same as for A.M. applicants who already have the bachelor's degree when matriculating. Applicants for the coterminal program are not, however, required to take the Graduate Record Exam. Information about application is available from Degree Progress in the Registrar's Office.

GRADUATE PROGRAMS

The department is prepared to direct and supervise individual study and research to supplement instruction offered in the courses listed below. In addition, advanced seminars not listed in the catalog are frequently
organized in response to student interest. Candidates for advanced degrees are urged to discuss their entire program of study with their department advisers as early as possible.

Applications to graduate programs in the Department of Philosophy can be obtained from Graduate Admissions, the Registrar’s Office. Applicants must take the Graduate Record Examination by October of the year the application is submitted.

**MASTER OF ARTS**

University requirements for the A.M. are discussed in the “Graduate Degrees” section of this bulletin.

Four programs lead to the A.M. in Philosophy. One is a general program providing a grounding in all branches of the subject. The others provide special training in one branch.

**Admissions**—All prospective master’s students, including those currently enrolled in other Stanford programs, must apply for admission to the program. The application deadline is April 1 of the academic year preceding entry into the program. In exceptional circumstances, consideration may be given to applications received after the April 1 deadline but before April 30. No fellowships are available. Entering students must meet with the director of the master’s program and have their advisers’ approval, in writing, of program proposals. The master’s program should not be considered a stepping-stone to the doctoral program; these two programs are separate and distinct.

**Unit Requirements**—Each program requires a minimum of 36 units in philosophy. Students in a special program may be allowed or required to replace up to 9 units of philosophy by 9 units in the field of specialization. Although the requirements for the A.M. are designed so that a student with the equivalent of a strong undergraduate philosophy major at Stanford might complete them in one year, most students need longer. Students should also keep in mind that although 36 units is the minimum required by the University, quite often more units are necessary to complete department requirements. Up to 6 units of directed reading in philosophy may be allowed. There is no thesis requirement, but an optional master’s thesis or project, upon faculty approval, may be countable as equivalent of up to 8 units. A special program may require knowledge of a foreign language. At least 36 units in courses numbered 100 or above must be completed with a grade of ‘B-’ or better at Stanford. Students are reminded of the University requirements for advanced degrees, and particularly of the fact that for the A.M., students must complete three full quarters as measured by tuition payment.

**GENERAL PROGRAM**

The General Program requires a minimum of 36 units in Philosophy courses numbered above 99. These courses must be taken for a letter grade and the student must receive at least a ‘B-’ in the course. Courses taken to satisfy the “undergraduate core” may not be counted in the 36 units. The requirement has three parts:

1. **Undergraduate Core:** students must have when they enter, or complete early in their program, the following undergraduate courses (students entering from other institutions should establish equivalent requirements with a master’s adviser upon arrival or earlier):
   a) Logic 57, 159, or 160A
   b) Philosophy of science: any course from 60, 61, 163-167
   c) Moral and political philosophy: one from 170-173
   d) Metaphysics and epistemology: one from 80, 180-188
   e) History of philosophy: two history of philosophy courses numbered 100 or above

2. **Graduate Core:** students must take at least one course numbered over 105 from three of the following five areas (courses used to satisfy the undergraduate core cannot also be counted toward satisfaction of the graduate core). Crosslisted and other courses taught outside the Department of Philosophy do not count towards satisfaction of the core.
   a) Logic and semantics
   b) Philosophy of science and history of science
   c) Ethics, value theory, and moral and political philosophy
   d) Metaphysics, epistemology, and philosophy of language
   e) History of philosophy

Each master’s candidate must take at least two courses numbered above 200 (these cannot be graduate sections of undergraduate courses). One may be a graduate core seminar (260, 270, 280, 281), but no student is admitted to a core seminar before completing undergraduate requirements in the area of the seminar and securing the approval of the instructor.

3. **Specialization:** students must take at least three courses numbered over 105 in one of the five areas.

**SPECIAL PROGRAM IN THE HISTORY AND PHILOSOPHY OF SCIENCE**

Only students with substantial preparation in philosophy or in the history of science in one of the natural or social sciences are admitted. Entering students whose primary preparation has been in science may be required to satisfy all or part of the undergraduate core requirement as described in the General Program. Students whose preparation has not been in science may be required to take additional science courses.

**Course Requirements**

1. At least four courses in the Department of Philosophy in the history or philosophy of science. At least one of these must be graduate-level courses, or graduate sections of undergraduate courses, and at least one of the four must be in the philosophy of science and one in the history of science.

2. In most cases, one upper division or graduate course outside the Department of Philosophy in the natural or social sciences or in history.

3. Remaining courses are to be chosen in consultation with and approved by an adviser.

**SPECIAL PROGRAM IN SYMBOLIC SYSTEMS**

Students should have the equivalent of the Stanford undergraduate major in Symbolic Systems. Students who have a strong major in one of the basic SSP disciplines (philosophy, psychology, linguistics, computer science) may be admitted, but are required to do a substantial part of the undergraduate SSP core in each of the other basic SSP fields. This must include the following three philosophy courses or their equivalents: 80; 160A; and one from 181, 183, 184, 186. This work does not count towards the 36-unit requirement.

**Course Requirements**

1. Four courses in philosophy at the graduate level (numbered 200 or above), including courses from three of the following five areas:
   a) Philosophy of language
   b) Logic
   c) Philosophy of mind
   d) Metaphysics and epistemology
   e) Philosophy of science

At most two of the four courses may be graduate sections of undergraduate courses numbered 100 or higher.

2. Three courses numbered 100 or higher from outside Philosophy, chosen in consultation with an adviser. These courses should be from two of the following four areas:
   a) Psychology
   b) Linguistics
   c) Computer Science
   d) Education

Remaining courses are to be chosen in consultation with and approved by an adviser.

**SPECIAL PROGRAM IN THE PHILOSOPHY OF LANGUAGE**

Admission is limited to students with substantial preparation in philosophy or linguistics. Those whose primary preparation has been in linguistics may be required to satisfy all or part of the undergraduate core requirements as described in the General Program. Those whose preparation is primarily in philosophy may be required to take additional courses in linguistics.
DOCTOR OF PHILOSOPHY

The University's basic requirements for the Ph.D. degree (residence, dissertation, examination, and so on) are discussed in the "Graduate Degrees" section of this bulletin. The requirements detailed here are department requirements.

There are six basic areas (philosophy of science, ethics, metaphysics and epistemology, philosophy of language, logic, and history) in which students should have proficiency in order to obtain a Ph.D. Demonstrating proficiency takes the form of course work, intensive seminars, and papers, as detailed below.

All courses used to satisfy proficiency requirements must be passed with a grade point average (GPA) of 'B-' or better (no satisfactory/no credit).

At the end of the first year, the department reviews the progress of each first-year student to determine whether the student may continue in the program.

Any student in one of the Ph.D. programs may apply for the A.M. when all University and department requirements have been met.

PROFICIENCY REQUIREMENTS

1. Course requirements, to be completed during the first two years:
   a) Seven of the eight items listed below:
      1) Four "core" graduate courses and seminars in philosophy of language (281); philosophy of mind, metaphysics, and epistemology (280); value theory (270); and philosophy of science (260). To enroll, the student must be a Ph.D. student in Philosophy or have special permission of the instructor.
      2) Three history courses, each consisting of an approved graduate-level course in the history of philosophy. Courses satisfying this seven-out-of-eight requirement must include at least one history course in ancient philosophy, one in modern.
      3) Philosophy 160A
      b) Philosophy 159 or the equivalent.
      c) Breadth requirement: a course in Eastern or Continental philosophy, or some other course establishing breadth.
   d) A total of at least 39 units of course work in the Department of Philosophy, numbered above 110, but not including Teaching Methods (Philosophy 239). Units of Individual Directed Reading (Philosophy 240) may be included only with the explicit approval of the Director of Graduate Studies.

2. Teaching assistance: a minimum of four quarters of teaching assistance at 25 percent time, usually during the second and third years.

3. Candidacy: to continue in the Ph.D. program, each student must be approved for candidacy during the sixth academic quarter (normally the Spring Quarter of the student's second year). Students may be approved for candidacy on a conditional basis if they have only one or two outstanding deficiencies, but are not officially advanced to candidacy until these deficiencies have been removed. Approval for candidacy indicates that, in the department's judgment, the student can successfully complete the Ph.D. In reaching this judgment, the department considers both the student's work and the overall quality of the student's work during the first six years of the program.

4. During the third year of graduate study, and after advancement to candidacy, a Ph.D. student should successfully complete at least three graduate-level courses/seminars, at least two of which must be in philosophy. Courses required for candidacy are not counted toward satisfaction of this requirement. Choice of courses/seminars outside philosophy is determined in consultation with a student's adviser.

5. During the summer of their second year, students are eligible to attend a Dissertation Development seminar given by the department.

6. Dissertation work and defense: the third and fourth (and sometimes fifth) years are devoted to dissertation work.
   a) Dissertation Proposal: by Spring Quarter of the third year, students select a dissertation topic, a reading committee, and some possible thesis relative to that topic. The topic and thesis should be sketched in a proposal of three to five pages, plus an annotated bibliography indicating familiarity with the relevant literature. The proposal should be approved by the reading committee before the meeting on graduate student progress in Spring Quarter.
   b) Departmental Oral: during Autumn Quarter of the fourth year, students take an oral examination, called the "Departmental Oral," based on at least 30 pages of written work, in addition to the proposal. The aim of the exam is to help the student arrive at an acceptable plan for the dissertation and to make sure that the student, thesis, topic, and advisor make a reasonably fit. In cases where such an exam is deemed inappropriate by the reading committee, the student may be exempted by filing a petition with the Director of Graduate Studies, signed by the student and the members of the reading committee.
   c) Fourth-Year Colloquium: no later than the Spring Quarter of the fourth year, students present a research paper in a seminar open to the entire department. This paper should be on an aspect of the student's dissertation research.
   d) University Oral Exam: Ph.D. students must submit a complete draft of the dissertation to the three-person reading committee at least one month before the student expects to defend the thesis in the University oral exam. If the student is given permission to go forward, the University orals take place approximately two weeks later. A portion of the exam consists of a student presentation based on the dissertation and is open to the public. A closed question period follows. If the draft is ready by Autumn Quarter of the fourth year, the student can request that the University oral count as the department oral.

SPECIAL GRADUATE PROGRAMS

The department recognizes that some students may need to spend a large amount of time preparing themselves in some other discipline related to their philosophical goals, or in advanced preparation in some area within philosophy. In such circumstances, the department is willing to waive some of the Ph.D. requirements. Such an exemption is not automatic; a program must be worked out with an adviser and submitted to the department some time in the student's first year. This proposal must be in writing and must include:

1. The areas to be exempted (see below).
2. A program of additional courses and seminars in the special area (usually at least 12 units).
3. A justification of the program that considers both intellectual coherence and the student's goals.

The department believes there is plenty of room for normal specialization within the program as it stands, and that all students will specialize to some extent. Thus, the intent is not to exempt courses on a one-to-one basis, but only to grant exemptions when a student plans an extensive and intensive study of some relevant area.

Special-program students may be exempted from two of the following:
1. One additional item from the items listed above in requirement 1(b)
2. Philosophy 159 (but then they must take Philosophy 57)
3. The breadth requirement

If a student's special program involves substantial course work outside of philosophy then, with the approval of the adviser, the student may petition the department to reduce requirement 1(d) (the Philosophy unit requirement for the first two years). Normally this requirement is not reduced below 32 units.
PH.D. MINOR

To obtain a Ph.D. minor in Philosophy, students must follow these procedures:
1. Consult with the Director of Graduate Studies to establish eligibility, and select a suitable adviser.
2. Give to the department academic assistant a signed copy of the program of study (designated with the adviser) which offers:
   a) 30 units of courses in the Department of Philosophy with a letter grade of 'B-' or better in each course. No more than 3 units of directed reading may be counted in the 30-unit requirement.
   b) At least one course or seminar numbered over 99 to be taken in each of these five areas:
      1) Logic
      2) Philosophy of science
      3) Ethics, value, theory, and moral and political philosophy
      4) Metaphysics, epistemology, and philosophy of language
      5) History of philosophy
   c) Two additional courses numbered over 199 to be taken in one of these five areas.
3. A faculty member from the Department of Philosophy (usually the student's adviser) serves on the student's doctoral oral examination committee and may request that up to one third of this examination be devoted to the minor subject.
4. Paperwork for the minor must be submitted to the department office before beginning the program.

INTERDEPARTMENTAL PROGRAMS

GRADUATE PROGRAM IN HUMANITIES

The Department of Philosophy also participates in the Graduate Program in Humanities leading to the joint Ph.D. degree in Philosophy and Humanities. It is described in the "Interdisciplinary Studies in Humanities" section of this bulletin.

GRADUATE PROGRAM IN COGNITIVE SCIENCE

Philosophy participates with the departments of Computer Science, Linguistics, and Psychology in an interdisciplinary program in Cognitive Science. It is intended to provide an interdisciplinary education, as well as a deeper concentration in philosophy, and is open to doctoral students. Students who complete the requirements within Philosophy and the Cognitive Science requirements must receive a special designation in Cognitive Science along with the Ph.D. in Philosophy. To receive this designation, students must complete 30 units of approved courses, 18 of which must be in two disciplines outside of philosophy. The list of approved courses can be obtained from the Cognitive Science program located in the Department of Psychology.

SPECIAL TRACK IN PHILOSOPHY AND SYMBOLIC SYSTEMS

Students interested in interdisciplinary work relating philosophy to artificial intelligence, computer science, linguistics, or logic may pursue a Ph.D. degree in the major.

PREREQUISITES—Ideally, admitted students have covered the equivalent of the core of the undergraduate Symbolic Systems Program requirements as described in this bulletin, including courses in philosophy, logic, artificial intelligence (AI), computer science, and linguistics. The graduate program is designed with this background in mind. Students missing part of this background may need additional course work. Aside from the required course work below, the Ph.D. requirements are the same as for the regular program.

COURSES

See the quarterly Time Schedule for revised listings.

INTRODUCTORY

These acquaint the student with some of the most important problems, positions, and methods in philosophy. Some are designed to give general preparation for further work in philosophy. Some apply the philosopher's approach to particular problems and subjects encountered in other areas of study. In conjunction with the Introduction to Humanities Autumn Quarter course, courses 5A and B form an Area 1 sequence, sponsored by the Department of Philosophy as part of the Introduction to the Humanities Program. Either 5A or B may count as the introductory philosophy course requirement for the major.

5A. Reason, Passion, and Reality—(Enroll in Introduction to the Humanities 23A,B.)
5A.—GER:1 (DR:1)
5 units, Win (Moravcsik)
5B.—GER:1 (DR:1)
5 units, Spr (Anderson, Taylor)

10. God, Self, and World: An Introduction to Philosophy—Basic philosophical problems are introduced through the writings of classical and contemporary authors. Problems considered are: our knowledge of the external world; induction and causation; minds, machines, brains, and bodies, freedom and determinism, the meaning of life. Authors: Descartes, Hume, Russell, Nagel, Turing, Searle, etc. GER:3a (DR:8)
5 units, Aut (Perry)

12N. Stanford Introductory Seminar: Identity and the Self—Preference to freshmen. In what does the identity of a thing over time consist? The question is especially pressing when the thing in question is oneself. ("I worry more about my own dentist appointment tomorrow than I worry about yours. Why?") Physical, psychological, and mixed criteria of identity produce distinct answers to the question. Is it rational to care as much as we do about personal identity? GER:3a (DR:8)

3 units, Win (Lalor)

13N. Stanford Introductory Seminar: Free Will and Moral Responsibility—Preference to freshmen. What is it to be a free agent? What is it to be a morally responsible agent? What is it to act of one's own free will? Can there be free, morally responsible agents in a world of physical causes? What happens, or should happen, to our understanding of people as morally culpable and/or morally praiseworthy when we see their actions as embedded in a causal process that began before their birth? The efforts by a number of philosophers, historical and contemporary, to respond to these questions about our agency and how it fits, or fails to fit, into a world of physical causes. GER:3a (DR:8)

3 units, Win (Braman)

14N. Stanford Introductory Seminar: Consciousness—Preference to freshmen. The nature of consciousness from several different perspectives. The main philosophical question that arises within the Western philosophical tradition: whether consciousness can be understood as a physical process, or requires postulation of a non-physical aspect of mind. What philosophers such as Descartes, Dennett, Searle have said about this issue. The works of neuroscientists and issues such as split brain patients and blindsight keep the philosophizing grounded in contemporary knowledge about the structure and function of the brain. GER:3a (DR:8)

3 units, Aut (Perry)

15N. Stanford Introductory Seminar: Mind and World—Preference to freshmen. Does the mind apprehend reality as it really is? Does the mind apprehend reality at all? Does the mind "create" reality? Readings from classic philosophical texts and recent cognitive science, leading to the question: Which of the many venerable philosophical views of the relationship between mind and world fits best with our modern understanding of the mind? GER:3a (DR:8)

3 units, Spr (Strevens)

20. Introduction to Moral Theory—What is the basis of our moral judgments? What makes right actions right, and wrong actions wrong? (Existing social rules? The consequences of human happiness? Conformity to a rule of reason?) What sort of person is it best to be? The answers to these classic questions about ethics are examined in the works of traditional and contemporary authors. GER:3a (DR:8)

5 units, Spr (Rosner)

30. Introduction to Political Philosophy/Theory—(Same as Political Science 51D, Public Policy 103A.) Critical introduction to issues of state authority, justice, liberty, and equality. The issues are approached through major works in political philosophy. Topics: human nature and citizenship, the obligation to obey the law, democracy and economic inequality, equality of opportunity and affirmative action, religion and politics. Readings: Aristotle, Locke, Rousseau, Mill, Marx, Rawls, the U.S. Constitution, some Supreme Court cases. GER:3a (DR:8)

5 units, Aut (Okin)

57. Logic, Reasoning, and Argumentation—Study of propositional and predicate logic, emphasizing translating English sentences into logical symbols and constructing derivations of valid arguments. GER:2c (DR:4)

5 units, Spr (Staak)

60. Introduction to the History and Philosophy of Science—(Same as History and Philosophy of Science 60.) Survey of 20th-century views on the nature of scientific knowledge. Logical positivism and Popper; the problem of induction; Kuhn, Feyerabend, and radical philosophies of science; subsequent attempts to rebuild moderate empiricism and realism positions; a case study in the history of biology. GER:3a (DR:8)

5 units, Aut (Godfrey-Smith)

74Q. Stanford Introductory Seminar: Ethical Aspects of Risk—Preference to sophomores. GER:3a (DR:8)

3-5 units, Aut (Fellesdal)

77. The Ethics of Social Decisions: Racism, Poverty, and Environmental Justice—(Same as Ethics in Society 77.) The application of moral reasoning to a particular social or political issue.

4 units, Spr (Graum)

78. Medical Ethics—Introduction to moral reasoning and its application to problems in medicine: informed consent, confidentiality in the physician-patient relationship, reproductive technology and abortion, euthanasia and physician-assisted suicide, and the distribution of medical resources.

4 units, Aut (Jaworska)

80. Mind, Matter, and Meaning—Intensive survey of some central and perennial topics in philosophy: free will and determinism, the mind-body problem, and personal identity. Prerequisite: one course in philosophy other than logic. GER:3a (DR:8) (WIM)

5 units, Aut (Braman)

Spr (Taylor)

HISTORY OF PHILOSOPHY

100-103 are surveys of important figures and movements in Western philosophy. Other courses cover particular periods, movements, and figures in the history of Eastern and Western philosophy. Prospective philosophy majors should take as many as possible during the sophomore year.

100. Greek Philosophy—Greek philosophical thought, covering Socrates, Plato, Aristotle, and the Hellenistic schools (the Epicureans, the Stoics, and the Skeptics). Topics: the nature of the soul, virtue and happiness, knowledge, and reality. GER:3a (DR:8)

4 units, Win (Sedlucz)


4 units, Aut (Gellner)

102. Modern Philosophy, Descartes to Kant—Issues in the theoretical philosophies of Descartes, Locke, Leibniz, Hume, and Kant. Topics: questions of realism and idealism, the scope and limits of the human intellect, the idea of a "science of the mind," the status of metaphysical concepts like substance and cause, and the relation of philosophy to the "new science" that emerged in the 17th century. GER:3a (DR:8)

4 units, Win (Florka)

103. 19th-Century Philosophy—Introduction to the major thinkers and problems of European philosophy in the 19th century. Interpretation of works by Kant, Hegel, Marx, and Nietzsche, focusing on the philosophy of history, responses to Kantianism, the prospects for a scientific philosophy, the possibilities for and character of a philosophical system, and the value of particular historical and cultural formations (e.g., capitalism, economy, Christianity).

4 units (Anderson) not given 1999-2000

112/212. Socrates' Philosophy—(Graduate students register for 212) Socrates' main philosophical theses and his method of argument.

4 units, Win (Sedlucz)
115/215. Pre-Socratic Philosophy—(Graduate students register for 215.) The philosophies of Heraclitus and Democritus on the nature of rationality and rational explanation. Prerequisite: 100 or classics equivalent.
4 units (Moravcsik) not given 1999-2000

116/216. Plato's Philosophy—(Graduate students register for 216.) Plato's moral psychology.
4 units (Moravcsik) not given 1999-2000

117/217. Aristotle's Philosophy—(Graduate students register for 217.) Central doctrines in Aristotle's metaphysics.
4 units, Spr (Moravcsik)

118. Hellenistic Philosophy—The epistemology, metaphysics, and ethics of the main Hellenistic schools: the Epicureans, the Skeptics, and the Stoics.
4 units (Babonich) not given 1999-2000

121/221. Descartes—(Graduate students register for 221.) Descartes's philosophy is fundamental to modern Western thought. His views, focusing on mind-body dualism. Descartes's novel way of distinguishing between the corporeal and the incorporeal. Why he adopted his form of dualism and various problems for this view. Related questions about science, religion, and knowledge.
4 units, not given 1999-2000

122/222. Locke—(Graduate students register for 222.)
4 units, Spr (Florka)

125/225. Kant's Critique of Pure Reason—(Graduate students register for 225.) In-depth study of Kant's greatest work. Selections also from Kant's Prolegomena to Any Future Metaphysics that May be Able to Come Forwards as a Science, and secondary literature.
4-5 units, Win (Anderson)

128. Hobbes—Written during the English Civil War, Hobbes' Leviathan (1651) attempts to ground obligations of obedience to an absolute state by synthesizing views of science, morality, and religion. Focus is on interpreting and analyzing this work; close reading of Leviathan and present-day commentary.
4 units, not given 1999-2000

129/229. Pragmatism—(Graduate students register for 229.) Introduction to Pierce, James, Dewey, and some recent writers such as Rorty. Focus is on questions of truth, belief, knowledge, and the nature of philosophical inquiry.
4 units, Aut (Guttmann)

131/231. The Structure of Cognition: Introduction to Husserl's Phenomenology—(Graduate students register for 231.) Its background and basic concepts. Emphasis is on the concept of intentionality, and its role in Husserl's theory and in contemporary philosophical debates.
4 units, not given 1999-2000

132/232. Existentialism—(Graduate students register for 232.) Exploration of central existentialist questions (e.g., what constitutes authentic individuality? what is our relation to the divine? how can one live a meaningful life? what is the significance of death?) through the existentialist preoccupation with human freedom. A rethinking of the traditional problem of freedom and determinism in readings from Rousseau, Kierkegaard, and Nietzsche, and the extension of these ideas by Sartre, Beauvoir, and Camus, including their social and political consequences in light of 20th-century fascism and feminism.
4 units, Aut (Anderson)

133/233. Hermeneutics and Critical Theory—(Graduate students register for 233.) Introduction to two of the most important and influential schools in 20th-century German philosophy through the leading representatives of these schools: Heidegger, Gadamer, Horkheimer, and Habermas.
4 units, not given 1999-2000

134/234. Phenomenology and the Background of Contemporary Continental Philosophy—(Graduate students register for 234.) Presentation and critical discussion of Husserl's phenomenology as a key to understanding contemporary continental philosophy, notably Heidegger's and Sartre's existentialisms, Gadamer's hermeneutics, and recent trends in contemporary German and French philosophy. The role of intentionality in contemporary debates in cognitive science.
4 units (Follesdal) not given 1999-2000

LOGIC AND PHILOSOPHY OF SCIENCE

155. Concepts of Freedom—Historical and current concepts of freedom. The views of Hume, Kant, Mill, A. V. Dicey, and Hayek; recent works, including economic concepts of freedom.
4 units (Follesdal, Suppes) not given 1999-2000

157/257. Seeing Reason: An Interdisciplinary Approach—(Graduate students register for 257.) How can we combine diagrams and language in reasoning, and what are their internal mental forms? A satisfactory answer requires at least: a semantic analysis of diagrams and languages; an experimental analysis of student learning, based on the semantic theory; and an account of the different learning styles that lead to contrasting effects of presentations on different students. These ingredients yield a new theory of human reasoning focused on the creation and selection of representations.
3 units, Aut (Stenning)

156. Popper, Kuhn, and Lakatos—(Same as Education 214.) Popper, Kuhn, and Lakatos are 20th-century philosophers of science who have raised fundamental issues with the nature of scientific progress: the rationality of change of scientific belief: science vs. non-science, the role of induction in science, truth or verisimilitude as regulative ideals. Their impact in the social sciences and applied areas such as educational research.
3 units, Spr (Phillips)

159. Basic Concepts in Mathematical Logic—The concepts and techniques used in mathematical logic, primarily through the study of the language of first-order logic. Topics: formalization, proof, propositional logic, quantifiers, sets, mathematical induction, and enumerability.
GER.2c (DR.4)
4 units, Aut (Barker-Plummer)

160. First-Order Logic—The syntax and semantics of sentential and first-order logic. Introduction to the basic concepts of model theory. Gödel's Completeness Theorem and its consequences: the Löwenheim-Skolem Theorem and the Compactness Theorem. Prerequisite: 159 or consent of instructor.
4 units, Win (Mints)

160B. Computability and Logic—Different approaches to effective computation: recursive functions, register machines, and various programming styles. Proof of their equivalence, discussion of Church's Thesis. Development of some elementary recursion theory. These techniques are used to prove Gödel's Incompleteness Theorem for arithmetic, whose technical and philosophic repercussions are surveyed. Prerequisite: 160A.
4 units, Spr (Mints)

162/262. Philosophy of Mathematics—(Graduate students register for 262.) Introduction to 20th-century approaches to the foundations and philosophy of mathematics. Background in mathematics, set theory, and logic. The schools and programs of logicism, predicativism, platonism, formalism, and constructivism. Readings from leading thinkers. Prerequisites: 160A or consent of the instructor.
4 units (Feferman) not given 1999-2000
163. Philosophy of Statistics—Introduction to and definition of the concept of probability in a philosophically motivated fashion. Emphasis is on the use of probabilities for decision-making under uncertainty.

4 units (Guttmann) not given 1999-2000

164/264. Central Topics in the Philosophy of Science: Scientific Explanation—(Graduate students register for 264.) Empiricist, realist, and pragmatic accounts of scientific explanation, with emphasis on the connection between explanation and metaphysical questions about laws, causation, and chance. Topics: probabilistic explanation, functional explanation, explanation of one theory by another. Recommended: 60 or 80.

4 units, Win (Strevens)

165/265. Philosophy of Physics—(Graduate students register for 265.) The philosophy of quantum mechanics. What is a superposition? The measurement problem (Schrödinger’s cat, etc.). Modern approaches to the problem: the many worlds and many minds theories, the GRW theory, Bohm’s theory.

4 units, Spr (Guttmann)

167A/267A. Philosophy of Biology—(Graduate students register for 267A.) Questions about explanation and theory construction in evolutionary biology. Analysis of key concepts: adaptation, function, units of selection, species.

4 units, Win (Godfrey-Smith)

167B/267B. Philosophy, Biology and Behavior—(Graduate students register for 267B.) Continuation of 167A/267A. Further philosophical study of some key theoretical ideas in biology, focusing on problems involving explanation of behavior. Topics: altruism, group selection, genetic determinism. Prerequisite: 167A (students with some philosophy background and Biology or Human Biology core, or equivalent, admitted with consent of instructor).

4 units, Spr (Godfrey-Smith)

168/268. Theories of Truth—(Graduate students register for 268.) The correspondence, coherence, pragmatist, and deflationary theories of truth. Tarski’s semantic conception of truth. The problems posed by the Liar Paradox. Introduction to formal theories of truth proposed by philosophical logicians (e.g., Kripke, Gupta and Belnap, McGee, and Barwise and Etchemendy) in the last few decades. Prerequisite: 160A or equivalent.

4 units, Spr (Feferman)

169. Intensional Logic—Logical analysis of intensional notions like modality, time, conditionals, knowledge, action, starting from their philosophical background. Introduction to the modern notions and methods of modal logic, including a choice of recent applications to computer science, AI, linguistics, and mathematics.

4 units, Spr (van Benthem)

ETHICS, AESTHETICS, AND SOCIAL AND POLITICAL PHILOSOPHY

170. Kantian Ethical Theory—Detailed study of Kantian moral philosophy, based largely on readings from Grounding for the Metaphysics of Morals and from contemporary articles exploring various issues raised in the Grounding. Emphasis is on Kant’s various formulations of the moral law, Kantian theory of value, and the Kantian answer to the question “why should I be moral?”

4 units, Win (Jaworszka)

171. Political Philosophy—Liberalism and its critics. Individual and group rights. The ability of liberal political theory to respond to critics’ attacks on its methodological and psychological foundations and on its core values.

4 units, Spr (Satz)

172/272. Is Morality too Demanding—(Graduate students register for 272.) Exploration of one of the most damning criticisms of moral theories, that they demand too much. Critics have argued that prominent moral theories require moral agents to act in ways that are either impossible or, if possible, undesirable. Can these theories capture the value of acting with integrity? Do they require agents to act as saints? Do they alienate agents from their personal projects and relationships? Do they contain an overly strenuous commitment to impartiality?

4 units (Gruen) not given 1999-2000

173. Philosophy of Literature—The themes of friendship, loyalty, and overcoming resentment in four dramas spanning 2,400 years.

4 units (Moravcsik) not given 1999-2000

175. Feminist Practical Ethics—Over the last two decades, feminist philosophers and political theorists have been developing and refining a variety of feminist approaches to public policy issues. The controversies that have emerged between feminists over affirmative action, reproductive technologies, pornography and sex work, militarism, the environment, and other issues of contemporary social concern.

4 units (Guttmann) not given 1999-2000

176A. Justice and Public Service—(Same as Ethics in Society 76.) The meaning and justification of public service, and its relationship to political activism and to justice.

4 units (Satz) not given 1999-2000


4 units, Aut (Gruen)

177. Philosophical Issues Concerning Race and Racism—Concepts of race, race consciousness, and racism, and their connections. What is “race” and what is its role in racism? How should we view ethnic and racial identities if we wish to secure the conditions in which humanity can be viewed as a single moral community whose members have equal respect? What laws, values, and institutions best embody the balance between the competing goals of group loyalty, opposition to racism, and common humanity? Philosophical writings on freedom and equality, human rights, pluralism, and affirmative action. Historical accounts of group exclusion and various explanations.

4 units, Spr (Satz)

178. Ethics in Society Honors Seminar—(Same as Ethics in Society 190.) Interdisciplinary. Students present issues of public and personal morality; topics are chosen with the advice of the instructor. Student-prepared reading list is made available a week prior to the presentation.

3 units, Win (Reich)

179. Philosophy of Friendship—Examination of different conceptions of friendship in philosophy, literature, and across cultures.

4 units, Aut (Moravcsik)

EPistemology, Metaphysics, Philosophy of Mind, and Philosophy of Language

181. Philosophy of Language—Notions of meaning, reference, and language use; with relations to psycholinguistics and formal semantics. Prerequisites: 80 and some background in logic.

4 units, Win (Taylor)

183/283. Meaning and Experience—(Graduate students register for 283.) Interrelationships between meaning and experience, emphasizing how our judgments concerning meaning may be based on empirical
184. Theory of Knowledge—The major competing theories of epistemic justification (foundationalism, coherentism, and externalism) are evaluated against the background of two central problems in the theory of knowledge: radical skepticism and the infinite regress argument. Readings: Descartes, Alston, Chisholm, Bonjour, Goldman, Pollock, Plantinga. Prerequisite: 80 or consent of instructor.
4 units, Win (Lawlor)

183-285. Contextualism/Skepticism—Standard arguments for skepticism have proved compelling and hard to combat. Why do these arguments prove compelling while we consider them, but also prove to have no effect on our practice of attributing knowledge to ourselves and others? Contextualism seeks to exploit this curious fact in response to skepticism by claiming that how good a position one must be in to count as knowing varies with the context one is in. The skeptic changes the context, thereby briefly depriving one of one’s claim to know. Readings: Austin, Clarke, Cohen, DeRose, Dretske, Lewis, Unger.
4 units, Spr (Lawlor)

186. Philosophy of Mind—The mind-body problem, including behaviorism, functionalism, and other forms of materialism; intentionality and the nature of mental representation; the explanation of action in terms of the agent’s reasons. Prerequisite: 80 or consent of instructor.
4 units, Win (Crimmins)

157/287. Philosophy of Action—What is it to be an agent? Is there a philosophically defensible contrast between being an agent and being a locus of causal forces to which one is subject? What is it to act purposively? What is it to act intentionally? What is it to act for a reason? What is it to act autonomously? Readings: Davidson, Frankfurt, Korsgaard, Chisholm, Velleman, and others.
4 units, Win (Braman)

188. Personal Identity—People seem to remain the same despite the various changes they undergo during their lives. Why? The answer can profoundly influence one’s beliefs about whether people are essentially bodies or minds, and whether one’s own survival matters. Readings: John Locke, Thomas Reid, David Hume, Terence Penelhum, Bernard Williams, and Derek Parfit.
4 units, not given 1999-2000

189. Philosophical Applications of Cognitive Science—The relevance of recent discoveries about the mind to philosophical questions in metaphysics, epistemology and philosophy of science, and the rules. Is there a right way to “carve up” the world into kinds of things? Are the rules of logic objective or just a description of the way we happen to think? Is there such a thing as objective right and wrong? Prerequisite: one course in philosophy other than logic.
4 units, Aut (Strevens)

192G. Philosophical Art—(Same as Interdisciplinary Studies in Humanities 192G.)
5 units, Aut (Gutmann)

194. Undergraduate Seminars in Philosophy—Preference given to undergraduate majors. A series for advanced undergraduates. Enrollment limited to 14. For those in the Philosophy honors program, seminars serve as preparation for writing an honors thesis.

194C. Consciousness—Philosophical questions about the nature of consciousness, including how the conscious realm hooks up to the world of quarks and neurons. Some experimental; but mainly getting philosophically clear about conceptually difficult terrain.
4 units, Aut (Crimmins)

194E. Emotions and the Arts—The relationship between art and emotion, particularly the place of emotion in aesthetic experience. How is it possible to respond to artwork emotionally? What is the role of emotion in aesthetic response (is aesthetic response essentially emotional or is emotional response improper)? How do different art-forms (literature, dance, music, the visual arts) differ in their impact upon the emotions? What, if any, is the nature of our emotional response to fictional characters and to abstract and anti-subjective art?
4 units, Spr (Everett, Friend)

194M. Goodman and Wittgenstein: Rule-Following, Practices, and Community—What distinguishes lawlike statements from non-lawlike statements? How does our use of language in the past determine how we ought to use language in the future? Or does it? What is it to follow a rule? How does the community and its practices determine facts about what we mean by our language?
4 units, Win (Maguire)

194P. The Genetics of Human Identity—Stephen Anthony Mobley tried to convince the Supreme Court of Georgia that his disposition to violence was genetic in origin. The extent to which genes influence, and might be manipulated to control, aspects of human behavior and personality. The implications for notions of responsibility and the determination of individual identity.
4 units, Aut (Philpot)

194R. Topics in Moral Psychology—The sources of moral obligations, autonomy, practical identity, weakness of will. Historical readings by Plato, Aristotle, Kant, Hume; contemporary readings by Frankfurt, Watson, Korsgaard, Williams.
4 units, Win (Rosner)

194V. Latin American Philosophy—Some of the major thinkers and philosophical movements in Latin American thought, highlighting the role that specific intellectual programs have played in the history of Latin America. Topics: philosophical approaches to cultural identity and racial theory; the “culturalist” movement and the status of Latin American philosophy as a distinct intellectual project; liberation philosophy; recent Latin American analytic philosophy of culture and multiculturalism.
4 units, Spr (Vargas)

196. Tutorial: Senior Year
5 units, any quarter (Staff)

197. Individual Work for Undergraduates
any quarter (Staff)

198. The Dualist—Dedicated to the publication and promotion of The Dualist, a national journal of undergraduate work in philosophy. Requires neither papers nor presentations; students take the initiative in an informal atmosphere. May be taken one to three quarters. (AU)
1 unit, any quarter (Staff)

PRIMARILY FOR GRADUATE STUDENTS

Graduate students should also consult previous entries in the catalog for courses with graduate student numbers.

200. Symbolic Systems Seminar: Problems in Intelligence, Information, and Learning—(Same as Symbolic Systems 200.)
3 units, Win (Greeno, Wasow)

222. Genealogical Method and the Genetic Fallacy—Philosophers make appeals to the history of philosophy in support of philosophical arguments. Such appeals may be problematic, especially when they purport to address distinctively normative philosophical problems about knowledge, morality, etc. That a certain idea or practice has a particular historical origin seems irrelevant to the question of its justification. Do all “genealogical” claims in philosophy commit this genetic fallacy, and do historical claims have a standing within philosophy? Readings from continental and analytic philosophy.
3 units (Anderson) not given 1999-2000
226. Kant's System of Reason—The role of the faculty of reason in Kant’s theoretical philosophy. The limits Kant places on the use of this faculty, and the positive “regulative” use of the Ideas of Reason in philosophy and other sciences. Emphasis is on the ideal of systematicity in Kant’s thought. Readings from the Critique of Pure Reason, the Critique of Judgment, other works of Kant, and secondary literature.
3 units (Anderson) not given 1999-2000

235. James and Husserl—William James’s Principles of Psychology and Husserl’s main phenomenological works. Their bearing on recent psychological and philosophical studies of the mental.
3 units (Follesdal, Suppes) not given 1999-2000

237. Nietzsche—Nietzsche’s later works, questions of the structure of these books, and what that structure can teach us about what kind of philosopher Nietzsche was. Interpretation of the core doctrines of Nietzsche’s thought (perspectivism, the will to power, eternal recurrence) and Nietzsche’s vision of the good life for human beings. Some secondary literature.
3 units (Anderson) not given 1999-2000

239. Teaching Methods in Philosophy—For Ph.D. students in their second or third year who are teaching assistants for the department. Discussion of issues about the teaching of philosophy.
1-4 units, any quarter (Staff)

240. Individual Work for Graduates
any quarter (Staff)

242A. Philosophy of Science Seminar
3 units, Win (Guttmann, Suppes)

242B. Philosophy of Science Seminar: The Evolution of Complex Systems—A small change in one part of a complex system can have a big effect on the behavior of the system as a whole. If evolution works by “tinkering,” how can complex systems evolve, or at least, evolve in the time that they did? Recent attempts to understand the stability of complex systems under change. Emphasis is on understanding complex systems than on understanding evolution.
3 units, Win (Stevens)

250. Advanced Seminar in Philosophy of Education—(Same as Education 420B.)
1-3 units, Win (Phillips)

260. Core Seminar in Philosophy of Science—for first- and second-year students in the Philosophy Ph.D. program.
4 units (Godfrey-Smith, Strevens) not given 1999-2000

270. Core Seminar in Moral Philosophy—for first- and second-year students in the Philosophy Ph.D. program.
4 units, Win (Jaworska, Satz)

271. Graduate Seminar: Topics in Democratic Theory—Modern approaches to democratic theory including liberal, communitarian, republican, and participatory theories beginning with the works of Locke, Rousseau, and Mill. Writers: John Rawls, Ronald Dworkin, Jeremy Waldron, Joshua Cohen, Habermas, Petit, Iris Marion Young, Ian Shapiro, and Amy Gutman.
3-5 units (Ferejohn, Satz) not given 1999-2000

275. Marx and Weber—Marx and Weber aspired to grasp the fundamental political problems of the human predicament (unfreedom, inequality, oppression, and bureaucratization). Both developed theories to account for these problems and investigated the extent that such problems could be mitigated or resolved, and believed that social science could contribute to our understanding of the modern world, and to our efforts to change it. Their works are evaluated with regard to our own convictions about politics, human agency, social change, and the role of knowledge.
3 units (Satz) not given 1999-2000

279. Moral Psychology—Recent philosophical works on desire, intention, the motivation of action, valuing, and reasons for action. Readings: Williams, Korsgaard, Smith, Blackburn, Velleman, Stampe, Frankfurt, and others.
3 units, Spr (Bratman)

280. Core Seminar in Metaphysics and Epistemology—for first- and second-year students in the Philosophy Ph.D. program.
4 units, Aut (Godfrey-Smith, Lawlor)

281. Core Seminar in Philosophy of Language—for first- and second-year students in the Philosophy Ph.D. program.
4 units (Perry) not given 1999-2000

282. Mental Causation
3 units (Taylor) not given 1999-2000

284. Graduate Seminar in the Philosophy of Action—the central features of human agency, including our capacities for purposive agency, for reflective endorsement of our motivation, and for planning. Reading from Davidson, Frankfurt, Korsgaard, Velleman, etc.
3 units (Bratman) not given 1999-2000

286B. Graduate Seminar in Metaphysics—Examination of views on negation and predication (authors include Russell and Ramsey).
3 units, Spr (Moravcsik)

288. Graduate Seminar on Vagueness—theories about the nature and extent of vagueness in language and in the world, plus an attempt to push the boundaries. Recommended: some background in logic, philosophy of language, and metaphysics.
3 units, Aut (Crimmins)

289. Brain and Mind—Detailed comparison of current concepts in the philosophy of mind and in neuroscience, with emphasis on theories of brain computations and processing of language. Readings from current literature.
3 units, Aut (Follesdal, Suppes)

297. Phenomenology and Logic—Phenomenological views on logic, mathematics, and computation. Emphasis is on the contemporary relevance of these views. Selections from Husserl’s work on logic and mathematics and from the recent literature.
3 units, not given 1999-2000

298. Logical Dynamics—Logical analysis of information flow and cognitive action, using recent techniques from dynamic logic and other process theories, update semantics for natural language, and (powerful new development) interfaces with game theory.
3 units, Spr (van Benthem)

299. Topics in Philosophy of Logic—Foundational issues in logic; the question of what the subject matter and boundaries of logic are. The claim that second-order logic is not logic. What has led philosophers to such peculiar-sounding claims? Is the claim based, as the instructor has argued, on a faulty definition of logical consequence? Prerequisite: 160A, concurrent registration in 160A, or consent of the instructor.
3 units (Etchemendy) not given 1999-2000

322. Leibniz—Analysis of Leibniz’ philosophical system with an emphasis on his metaphysics.
3 units, not given 1999-2000

373. Mind, Action, and Rationality—Topic: the intersection of research in philosophy and the social sciences on basic issues about agency
and practical reason. Prerequisite: graduate standing or consent of instructors.

380. Graduate Seminar on Mind and Action: Animal Awareness—Recent psychological and philosophical literature on the question of animal thought, awareness, and intentionality.

3 units, not given 1999-2000

382. Concepts—Metaphysical questions about the nature of concepts and epistemological psychological questions about the acquisition of concepts. What in natural concepts are such that a mind may deploy them in thought. What makes a particular concept the concept that it is. The extent to which theories of concept acquisition must be informed by a correct account of the metaphysical nature of concepts. Readings from philosophy and some psychological literature.

3 units, not given 1999-2000

383. Epistemology—Examination and comparison of Hume and Goodman on induction, and Wittgenstein on following a rule.

3 units, not given 1999-2000

450. Thesis

any quarter (Staff)

AFFILIATED DEPARTMENT OFFERINGS

COMPARATIVE LITERATURE

80N. Stanford Introductory Seminar: The Science Wars—Does Physics get Closer to Reality than Poetry?

5 units, Win (Rorty)

172. From Religion through Philosophy to Literature

5 units, Win (Rorty)

240. Introduction to Philosophy of Education

4 units, Aut (Callan)

FRENCH AND ITALIAN

254E. Introduction to French Philosophy: From 1943 to the Present

3-5 units, Spr (Dupuy)

MATHEMATICS

161. Set Theory

not given 1999-2000

290A,B. Model Theory

3 units, Aut, Win (Mints)

291A,B. Recursion Theory

not given 1999-2000

292A,B. Set Theory

3 units, Win, Spr (Feferman)

293A,B. Proof Theory

not given 1999-2000

294. Topics in Logic

3 units, Spr (Mints)

POLITICAL SCIENCE

155S/255S. Seminar: Rousseau and his Times

5 units, Win (Okin)

157. Seminar: Morality and Law

5 units (Hardin) given 2000-01

251B. History of Political Thought II: The Origins of Modern Democracy

5 units, Win (Okin)

254H. Seminar: Hume and Montesquieu

5 units (Hardin) not given 1999-2000

267. Seminar: Gender, Development, and Women's Human Rights in International Perspective

5 units, Aut (Okin)

268. Seminar: Contemporary Theories of Justice

5 units (Okin) not given 1999-2000

RELIGIOUS STUDIES

42. Philosophy of Religion

4 units, Aut (Gelber)

55. Introduction to Chinese Religions

4 units, Win (Cedzich)

PHYSICS

Emeriti: (Professors) Stanley S. Hanna, William A. Little, Walter E. Meyerhof, David M. Ritson, J. Dirk Walecka, Mason R. Yeeian

Chair: Steve Chu

Associate Chair: Douglas D. Osheroff

Director of Graduate Study: Roger W. Romani

Director of Undergraduate Study: Charles M. Marcus


Associate Professors: Patricia Burchat, John Doyle, Giorgio Gratta, Shamit Kachni, Charles M. Marcus, Roger W. Romani, Zhi-Xun Shen

Assistant Professors: Sarah Church, Scott Thomas, Jeffrey Willick

Professors (Research): John A. Lipa, Phillip H. Scherrer, Todd I. Smith, John P. Turneaure

Courtesy Professors: Richard Taylor, Richard N. Zare

Lecturer: Richard L. Pam

Consulting Professor: Theodor Hansenh

Consulting Associate Professor: Peter Rowson

Consulting Assistant Professor: Hal Edwards

Visiting Professor: Matthias Neubert

The Russell H. Varian Laboratory of Physics, the nearby W. W. Han sen Experimental Physics Laboratory (HEPL) and the E. L. Ginzton Labor atory form a closely related complex which houses a range of physics activities from general courses through advanced research. At the Stanford Free Electron Laser Center, located in HEPL, tunable picosecond optical beams are available for materials and biomedical research at wavelengths that extend from the visible to the far infrared. Separate from this group is the Stanford Linear Accelerator Center (SLAC), a high energy physics lab which has as its principal tools a two-mile-long 50- GeV electron accelerator and a 6-GeV electron-positron storage ring. Also at SLAC are a 30 GeV electron-positron storage ring (PEP) and the Stanford Synchrotron Radiation Laboratory (SS-RL). A high-energy facility, the Stanford Linear Collider (SLC), provides electron-positron collisions at about 100 GeV in the center of mass.
Professor Byer is director of HEPL, and Professors Cabrera, Lipa, Michelson, Scherrer, Schwettman, Smith, and Tousey are members of the staff. The Gordon Laboratory, HEPL, SLAC, and SSRL are listed in the "Independent Research Laboratories, Centers, and Institutes" section of this bulletin.

Stanford is a member of the Hobby-Eberly Telescope Consortium. This 10.4 meter telescope has begun operation at McDonald Observatory in Texas. There are opportunities for graduate and undergraduate students doing research projects to use this telescope.

Stanford has also built (with CalTech) an underground laboratory for the study of neutrino oscillations near the Palo Verde Nuclear Generating Station, 50 miles west of Phoenix, Arizona. It is in operation and students are engaged in the construction and operation of the experiment.

The Physics Library, a center for the reading and study of physics and astronomy at all levels, includes current subscriptions and back sets of important journals together with textbooks, scholarly treatises in English, French, German, and Russian, and the collected works of the most eminent physicists.

Course work is designed to provide students with a sound foundation in both classical and modern physics. Students who wish to specialize in astronomy, astrophysics, or space science should consult the "Astronomy Course Program" section of this bulletin.

Three introductory series of courses include labs in which undergraduates carry out individual experiments. The Intermediate and Advanced Physics Laboratories offer facilities for increasingly complex individual work. Undergraduates are also encouraged to participate in research; most can do this through the honors program.

Graduate students find opportunities for research in the fields of astrophysics, atomic physics/laser science, coherent optical radiation, condensed matter physics, high energy physics, intermediate energy physics, low temperature physics, and theoretical physics. Opportunities for research are also available with the faculty at SLAC in the areas of theoretical and experimental particle physics and accelerator design, and with the faculty in Physics and Applied Physics in the areas of astrophysics, materials research, novel imaging technology, photon science, quantum electronics, and theoretical and experimental condensed matter physics.

The number of graduate students admitted to the Department of Physics is strictly limited. Students should complete application by January 1 for the following Autumn Quarter. Graduate students may normally enter the department only at the beginning of Autumn Quarter.

### UNDERGRADUATE PROGRAMS

The study of physics is undertaken by three principal classes of undergraduates: those including physics as part of a general education; those preparing for careers in professional fields that require a knowledge of physics, such as medicine or engineering; and those preparing for teaching or research careers in physics or related fields. Physics courses numbered below 200 are planned to serve all three of these groups. The courses numbered above 200 meet the needs mainly of the third group, but also of some students majoring in other branches of science and in engineering.

### BACHELOR OF SCIENCE

Requirements for the degree of Bachelor of Science in Physics are:

- Physics 61, 63, 64, 65, 66, 70, 105, 106, 107, 110, 111, 120, 121, 122, 130, 131, 132, 170, 171, 201; Mathematics 51, 52, 53, 131; any one additional mathematics course numbered 100 or higher; and one of the following advanced physics courses: 135, 160, 161, 172, 181, 203, 204 or 262. (The Physics 40 series can replace the 60 series requirements, and Mathematics 51H, 52H, and 53H may substitute for Mathematics 51, 52, and 53.)
- The department advises the study of some chemistry, for example, Chemistry 31 or 32, 33, and 35 and some computer science, for example, CS 106. Mathematics and physics courses taken to satisfy the department's major requirements cannot be taken on a credit/no credit basis. Prospective physics majors are also recommended to take Physics 59, Current Research Topics.

In an effort to increase the flexibility of the Physics major for students with strong interests in allied disciplines such as biology, chemistry, computer science, electrical engineering, or mathematics, selected courses from the Physics major (indicated by an * below) may be replaced with a concentration of correspondingly advanced courses in one of these other fields. In all cases, these modifications to the Physics major toward an interdisciplinary course of study should be worked out beforehand with the student's adviser and must be documented with the undergraduate program coordinator.

To decide which introductory sequence is appropriate, students contemplating majoring in physics are urged to consult with the instructor of Physics 61 or the undergraduate program coordinator at the earliest possible date to see which sequence is the most suitable. Students who begin taking an entry level physics course after their freshman year and wish to major in physics are generally advised to take the Physics 61, 63, 65 sequence, provided they have previously taken Mathematics 41.

Undergraduates are offered help with physics problems in the department tutoring center, the Reference Frame, which is staffed Monday through Thursday.

### REQUIRED COURSES FOR MAJORS

#### INTRODUCTORY SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tbody>
<tr>
<td>Physics 41. Mechanics</td>
<td>A</td>
</tr>
<tr>
<td>Physics 42. Electricity</td>
<td>W</td>
</tr>
<tr>
<td>Physics 45. Magnetism</td>
<td>S</td>
</tr>
<tr>
<td>Physics 46. Electricity and Magnetism Lab</td>
<td>W</td>
</tr>
<tr>
<td>Physics 47. Light and Heat</td>
<td>A</td>
</tr>
<tr>
<td>Physics 48. Light and Heat Lab</td>
<td>A</td>
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</table>

or

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 61. Mechanics</td>
<td>A</td>
</tr>
<tr>
<td>Physics 62. Electricity and Magnetism</td>
<td>W</td>
</tr>
<tr>
<td>Physics 64. Electricity and Magnetism Lab</td>
<td>W</td>
</tr>
<tr>
<td>Physics 65. Optics and Thermodynamics</td>
<td>S</td>
</tr>
<tr>
<td>Physics 66. Optics and Thermodynamics Lab</td>
<td>S</td>
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and

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 51, 52, 53. Multivariable Mathematics (or H series)</td>
<td>A,W,S 15</td>
</tr>
<tr>
<td>Physics 59. Current Research Topics (recommended)</td>
<td>W</td>
</tr>
</tbody>
</table>

#### INTERMEDIATE SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tbody>
<tr>
<td>Physics 70. Modern Physics</td>
<td>A</td>
</tr>
<tr>
<td>Physics 110, 111. Intermediate Mechanics</td>
<td>W,S</td>
</tr>
<tr>
<td>Physics 120, 121, 122*. Intermediate Electricity and Magnetism</td>
<td>A,W,S 12</td>
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and

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<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tr>
<td>Math. 131. Partial Differential Equations</td>
<td>W,S 3</td>
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#### ADVANCED SEQUENCE

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tbody>
<tr>
<td>Physics 130, 131, 132*. Quantum Mechanics</td>
<td>A,W,S 12</td>
</tr>
<tr>
<td>Physics 170, 171. Statistical Mechanics</td>
<td>A,W</td>
</tr>
<tr>
<td>Physics 201*. Advanced Physics Laboratory</td>
<td>A,S</td>
</tr>
<tr>
<td>one advanced Physics elective*</td>
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<tr>
<td>Physics 135. Computational Physics</td>
<td>A</td>
</tr>
<tr>
<td>Physics 160, 161. Astrophysics</td>
<td>A,S</td>
</tr>
<tr>
<td>Physics 172. Solid State Physics</td>
<td>S</td>
</tr>
<tr>
<td>Physics 181. Modern Optics</td>
<td>A</td>
</tr>
<tr>
<td>Physics 203. Advanced Physics Laboratory</td>
<td>A,S</td>
</tr>
<tr>
<td>Physics 204. Theoretical Physics</td>
<td>A</td>
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<tr>
<td>Physics 262. Gravitation and Astrophysics</td>
<td>S</td>
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and

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<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tr>
<td>one advanced Mathematics elective (100 level or higher)</td>
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* These courses may be replaced with a concentration of correspondingly advanced courses in another field as part of an interdisciplinary program. This must be discussed with the student's adviser and documented with the undergraduate program coordinator.

### CONCENTRATION IN ASTROPHYSICS

This area encompasses the study of the universe and its constituent planets, stars, and galaxies. The courses recommended for a concentration in astrophysics are four undergraduate courses; one laboratory course, 100; and three lecture courses: Electrical Engineering 106 (or also the Astronomy Program) on planetary exploration; Physics 160 on stars and galactic structure; and Physics 161 on galaxies and cosmology. More advanced students, and in particular, those undergraduates whose honors thesis topic is in this concentration area, are strongly urged...
MINOR IN ASTRONOMY

Modern astronomy deals with the origin and evolution of the dramatic range of objects observed in our Universe. The language of this study is physics. Those wishing to pursue advanced work in astronomy or related fields should major in physics with an astrophysics concentration. The minor programs below are designed primarily for those from other disciplines with a general interest in astronomy. In particular, the non-technical minor treats the subject in a more descriptive manner.

An undergraduate minor in Astronomy requires the following course work:

NON-TECHNICAL

For students whose majors do not require the Physics 40 or 60 series:

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Physics 70, 72</td>
<td>4</td>
</tr>
<tr>
<td>Physics 100, 107, 110, 111*, 120*, 121*, 130*, 131*, 160, 161, 170*, 171*</td>
<td>6-8</td>
</tr>
</tbody>
</table>

TECHNICAL

For students whose majors require Physics 40 or 60 series:

<table>
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<tr>
<th>Course No.</th>
<th>Units</th>
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</table>

NON-TECHNICAL

For students whose majors do not require the Physics 40 series:

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 21, 23, 25</td>
<td>9</td>
</tr>
<tr>
<td>Physics 100</td>
<td>4</td>
</tr>
<tr>
<td>Physics 160*, 161*, 162*</td>
<td>6-7</td>
</tr>
</tbody>
</table>

TECHNICAL

For students whose majors require Physics 40 series:

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 27*</td>
<td>3</td>
</tr>
<tr>
<td>Physics 70</td>
<td>3</td>
</tr>
<tr>
<td>Physics 100</td>
<td>4</td>
</tr>
<tr>
<td>Physics 160*, 161*, 162*</td>
<td>9</td>
</tr>
</tbody>
</table>

HONORS PROGRAM

The department offers a program leading to the degree of Bachelor of Science in Physics with Honors as follows:

1. Students must submit an Honors Program Proposal to the Undergraduate Program Coordinator once they find a physics project, either theoretical or experimental, in consultation with individual faculty members. Proposal forms are available from the Physics Undergraduate Center and must be submitted by November 1 of the year in which the students' degree will be conferred.

2. Credit for the project is assigned by the adviser within the framework of Physics 205 or Astronomy 169. The work done in the honors programs may not be used as a substitute for regularly required courses.

3. Both a written report and a presentation of the work at its completion is required for honors. By mid-May, each honors candidate is required to present his or her project at the department's Honors Presentations. (This event is publicized and is open to the general public. The expectation is that the student's adviser and second reader, along with all other honors candidates, will attend.)

4. The decision as to whether a given independent study project does or does not merit award of honors is made jointly by the student's honors adviser and the second reader for the written thesis. This decision is based on the quality of both the honors work and the other work in physics.

GRADUATE PROGRAMS

MASTER OF SCIENCE

The department does not offer a coterminal degree program, nor a separate program for the M.S. degree, but this degree may be awarded for a portion of the Ph.D. degree work.

University requirements for the master's degree, discussed in the “Graduate Degrees” section of this bulletin, include registration for at least three quarters at full tuition as a graduate student and completion of 36 units of course work after the bachelor's degree. Among the department requirements are a grade point average (GPA) of at least 'B' in courses 201, 203, 210, 211, 212, 220, 221, 230, 231, 232, or their equivalents. Up to 6 of these required units may be waived on petition if the equivalent is submitted.

DOCTOR OF PHILOSOPHY

The University's basic requirements for the Ph.D. are discussed in the “Graduate Degrees” section of this bulletin. The minimum department requirements for the Ph.D. degree in Physics consist of completing all courses listed below, and at least one quarter from each of two subject areas (among condensed matter, quantum optics and atomic physics, astrophysics and gravitation, and nuclear and particle physics) chosen from courses with numbers above 232, except 290 and 294. The requirements in this list may be fulfilled by passing the course at Stanford or passing an equivalent course elsewhere: 201, 203, 210, 211, 212, 220, 221, 230, 231, 232, 290, 294. A GPA of at least 'B' is required in all the courses taken toward the degree.

All Ph.D. candidates must have math proficiency equivalent to the following courses: 106, 113, 114, 130, 131, 132.

Prior to making an application for candidacy, each student is required to pass a comprehensive qualifying examination on undergraduate physics. This exam is given annually at the beginning of Winter Quarter. Graduate physics is tested by the exams in the first-year courses (210-232). A thesis proposal must be submitted during the third year. In order to assess the direction and progress toward a thesis, an oral report and evaluation is required during the fourth year. After completion of the dissertation, each student must take the University oral examination (defense of dissertation). The Physics faculty also believes that a scientist should have facility with a foreign language for cultural reasons as well as to establish better contact at meetings in foreign countries.

Three quarters of teaching (including a demonstrated ability to teach) are a requirement for obtaining the Ph.D. in Physics.

Students interested in applied physics and biophysics research should also take note of the Ph.D. grant independently by the Department of Physics.
Applied Physics and by the Biophysics Program administered through the Department of Chemistry. Students interested in astronomy, astrophysics, or space science should also consult the "Astronomy Course Program" section of this bulletin.

Ph.D. MINOR

Minors in Physics must take at least six courses numbered 210 to 232 among the 20 required units. All prospective minors must obtain approval of their physics course program from the Physics Graduate Study Committee at least one year before award of the Ph.D.

FELLOWSHIPS AND ASSISTANTSHIPS

The Department of Physics makes an effort to support all its graduate students through fellowships, teaching assistantships, research assistantships, or a combination of sources. Information on application procedures is mailed with the admission information.

TEACHING CREDENTIALS

For information on teaching credentials, consult the "School of Education" section of this bulletin or address an inquiry to the Credential Administrator, School of Education.

The degree of Master of Arts in Teaching is offered jointly by this department and the School of Education. The degree is intended for those who have a teaching credential and wish to strengthen their academic background. Both the Twenty and Forty Series consist of demonstration lectures on the fundamental principles of physics, problem work on application of these principles to actual cases, and lab experiments closely correlated with the lectures. Their objectives are not only to give information on particular subjects, but also to provide training in the use of the scientific method. The primary difference between the two series of courses is that topics are discussed more thoroughly and treated with greater mathematical rigor in the Forty Series.

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There are four series of beginning courses. The Ten Series (11, 15, 16, 19, 27) is recommended for the humanities or social science student who wishes to become familiar with the methodology and content of modern physics. The Twenty Series (21, 22, 23, 24, 25, 26) is recommended for general students and for students preparing for medicine or biology. The Forty Series (41, 43, 45, 46, 47, 48) is for students of engineering, chemistry, geology, mathematics, and some physics majors. The Advanced Freshman Series (61, 63, 64, 65, 66) is for the well-prepared student and is the preferred introductory series for those physics majors who have the appropriate background.

COURSES

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Courses beyond 99 are numbered in accordance with a three-digit code. The first digit indicates the approximate level of the course: undergraduate courses (1); first-year graduate courses (2); more advanced courses (3); research, special, or current topics (4). The second digit indicates the general subject matter: laboratory (0); general courses (1), (2), (3); nuclear physics (4); elementary particle physics (5); astrophysics, cosmology, gravitation (6); condensed matter physics (7); optics and atomic physics (8); miscellaneous courses (9).

UNDERGRADUATE

(WIM) indicates that the course meets the Writing in the Major requirements.

ASTRONOMY

For further information on astronomy and astrophysics courses, consult the Astronomy Course Program.

15, 16. Topics in Modern Astronomy—15 and 16 are for students not majoring in the physical sciences and are taught in different quarters by different instructors. They are related in topic but emphasize different aspects of modern astronomy and cosmology. Students may take 15, 16 individually or in sequence.

15. The Nature of the Universe—Introduction to the structure, origin, and evolution of the major components of the Universe: planets, stars, and galaxies. Emphasis is on the formation of the Sun and planets, the evolution of stars, and the structure and content of our galaxy. Topics: cosmic enigmas (dark matter, black holes, pulsars, X-ray sources). Star birth and star death. The origins of and search for life in our solar system and beyond. GER:2a (DR:5)

3 units. Aut (Wagoner)

16. Cosmic Horizons—Introduction to the origin and evolution of our universe and its contents: stars, galaxies, quasars, etc. The overall structure of the cosmos and the physical laws that govern matter, space, and time. Topics: the evolution of the cosmos from its primeval fireball, the origin of the elements and the formation of stars and galaxies, exotic astronomical objects (black holes, quasars, supernovae, and gamma ray bursts), dark matter, and the fate of the cosmos. GER:2a (DR:5)

3 units. Spr (Romani)

18N. Stanford Introductory Seminar: Revolutions in Concepts of the Cosmos—Preference to freshmen. Faculty led dialogue. Introduction to four revolutionary changes in humanity's concept of the cosmos (explored at the Stanford Observatory): Copernicus' heliocentric model of the solar system, Herschel's concept of the galaxy as a collection of stars, Shapley's model of the Milky Way galaxy, and Hubble's discovery that the universe is expanding. Enrollment limited to 20 in one section. GER:2a (DR:5)

3 units. Win (Wagoner)

27. Evolution of the Cosmos—Similar to 15 or 16 but at a somewhat more quantitative level. The origin and evolution of astronomical objects: planets, stars, black holes, galaxies, and the universe at large, emphasizing modern developments in astronomy and physics relevant to the subject matter. The development of life in the universe. (Algebra is used.) Offered occasionally. Recommended: high school physics and calculus. GER:2a (DR:5)

3 units. Win (Wagoner)

50. Astronomy Laboratory and Observational Astronomy—The theory and use of the optical telescope and the interpretation of basic observational data of planets, stars, and galactic systems. Individual observations with a 24-inch Cassegrain telescope are supplemented by lectures/discussion of basic observational techniques, astronomical catalogs and coordinate systems, and the relation of observations to astrophysical models. Limited enrollment. Lab. GER:2a (DR:5)

3-4 units. Aut, Sum (Walker)

59N. Stanford Introductory Seminar: 21st-Century Physics—Current Topics of Research—Preference to freshmen. Supplements 59 Discussion, reading, and writing on areas of physics research currently active: neutrinos, Bose-Einstein condensates, high temperature superconductors, the fate of the universe.

1 unit. Win (Marcus)

81Q. Stanford Introductory Dialogue: Lookback Time in Cosmology—Preference to sophomores. The use of telescopes as "time machines" to see the history of the universe. Summary of the big bang, galaxies and quasars at high redshift. How old is the universe? When did the first objects form? When were the elements created? What is the cosmic dark matter? Can we predict the future evolution of the cosmos? Discussion is at a semi-quantitative level: basic physics concepts used without calculus. Directed reading, sample exercises, and (weather permitting) a term project observing distant galaxies and quasars at the Stanford teaching observatory. Prerequisites: elementary physics (21-22 or equivalent).

1 unit. Win (Romani)

3 units, Aut (Petrosian)

162. Planetary Exploration—(Enroll in Electrical Engineering 106.)

3 units, Spr (Fraser-Smith)

169A,B,C. Independent Study in Astrophysics and Honors Thesis—Detailed study of a selected problem in astrophysics with one or more faculty members. While not all projects require three quarters, the sequence below suggests the format most projects are expected to follow. Projects may commerce in any quarter.

169A. Selection of the Problem—Selection of the problem to be studied and development of the theoretical apparatus or initial interpretation of the selected problem. Preparation of a detailed description of the problem and its background and a comprehensive discussion of the work planned in the subsequent two quarters.

1-9 units, Aut (Staff)

169B. Continuation of Project—Substantial completion of the required computations or data analysis for the research project selected.

1-9 units, Win (Staff)

169C. Completion of Project—Completion of research and writing of a detailed paper presenting methods used and results.

1-9 units, Spr (Staff)

PHYSICS

11N. Stanford Introductory Seminar: Symmetries of Nature—From Inner Space to Outer Space—Preference to freshmen. Physicists use symmetry principles to discover the laws of nature on a subatomic scale and how these symmetries determine the behavior of matter on microscopic scales of atoms, nuclei, and elementary particles. In parallel with our understanding of Nature on subatomic scales (Inner Space), our understanding of the structure and development of the universe (Outer Space) has undergone radical revisions. Observations of the motions of galaxies, plus the assumption that we have a typical view of the universe, have led to the conclusion that the universe began with an instantaneous, enormous explosion, about 12 billion years ago. The status of the quest to unify the fundamental interactions (electromagnetic, weak, strong, and gravitational interactions) observed in Nature into a unified Theory of Everything. The impact of this quest to understand Inner Space on understanding the origin and evolution of the universe. Discussions semi-quantitative. Term project paper. Prerequisite: high school physics or equivalent.

1 unit, Aut (Michelson)

120Q. Stanford Introductory Dialogue: Expanding Cosmic Horizons—Preference to sophomores. The history and structure of our cosmic environment. How recent advances in observations at various wavelengths are expanding the horizons of our knowledge. Possible topics: What are the properties of black holes? What is the nature, amount, and distribution of the "dark matter" which appears to dominate the universe? What is the geometry and fate of the universe? Prerequisite: freshman physics or equivalent. 1 unit, Aut (Wagoner)
29. Electricity and Magnetism II, Optics, Modern Physics—Magnetism, induced currents; wave motion, optics; relativity, quantum mechanics, atomic theory, radioactivity, nuclear structure and reactions, elementary particles, astrophysics, and cosmology. Prerequisite: 28. GER:2a (DR:5)
6 units, Sum (Staff)

41. Mechanics—Vectors, particle kinematics and dynamics, work, energy, momentum, angular momentum; conservation laws; rigid bodies. Discussions based on use of calculus. Corequisite: Mathematics 19 or 41, or consent of instructor. GER:2a (DR:5)
3 units, Aut (Cabrera)

41N. Stanford Introductory Seminar: Mechanics—Insights, Applications, and Advances—Preference to freshmen. Faculty led and associated with 41, with student participation. Possible topics: tidal forces, gyroscopic effects, fractional dimensions, and introduction to chaos. Enrollment limited to 20 in one section. Corequisite: 41 or advanced placement.
1 unit, Aut (Romani)

43. Electricity—Mechanical waves. Electrostatics including fields, potentials, capacitors, and dielectrics. Steady state currents, and circuits with batteries and resistors. RC circuits. Prerequisites: 41, and Mathematics 19 or 41. Corequisite: Mathematics 20 or 42, or consent of instructor. GER:2a (DR:5)
3 units, Win (Schwettman)

43N. Stanford Introductory Seminar: Electricity—Understanding Electrical Phenomena—Preference to freshmen. Expands on the material presented in 43, discussing a variety of phenomena associated with electricity and magnetism, and allowing students to connect the material in 43 with the world in which they live. Corequisite: 43 or advanced placement.
1 unit

45. Magnetism—Time varying currents and fields, inductance, Maxwell's equations, electromagnetic oscillations and waves. Special relativity. Prerequisite: 43. GER:2a (DR:5)
3 units, Spr (Michelson)

45N. Stanford Introductory Seminar: Special Topics in Electromagnetism—Preference to freshmen. Expands on the material presented in 45, discussing a variety of phenomena associated with electricity and magnetism, and allowing students to connect the material in 45 with the world in which they live. Special topics related to recent developments in experimental and theoretical physics. Corequisite: 45 or advanced placement.
1 unit, Spr (Thomas)

46. Electricity and Magnetism Laboratory—Pre- or corequisite: 45. 1 unit, Spr (Michelson)

47. Light and Heat—Reflection and refraction of light, lens systems; light and electromagnetic waves; temperature, properties of matter, introduction to kinetic theory of matter. Prerequisites: 45 and Mathematics 51, or consent of instructor. GER:2a (DR:5)
4 units, Aut (Osheroff)
Sum (Staff)

48. Light and Heat Laboratory—Pre- or corequisite: 47. 1 unit, Aut (Osheroff)
Sum (Staff)

50. Advanced Physics—Recommended for all prospective physics majors. Major areas of current research. Topics: fundamental particles, solid state physics, low temperature physics, biophysics, and astrophysics. Lectures by faculty and physicists with research interests in these fields.
1 unit, Win (Marcus)

61, 63, 65. Advanced Freshman Physics—Recommended for students contemplating a major in Physics and other students interested in a more rigorous treatment of physics. The fundamental structure of classical physics including Newtonian mechanics, special relativity, and electricity and magnetism; selected topics in heat and light in Spring Quarter. Lectures and small discussion sections. Prerequisites: high school physics and familiarity with calculus (differentiation and integration in one variable); prior or concurrent registration in Mathematics 42. Physics 61, 63, and 65 are all GER:2a (DR:5)
61. 4 units, Aut (Moler)
63. 4 units, Win (Dimopoulos)
65. 4 units, Spr (Dimopoulos)

1 unit, Aut (Romani)

63N. Stanford Introductory Seminar: Applications of Electromagnetism—Preference to freshmen. Faculty led and associated with 63, including material related to the 63, but at a slightly more advanced level. Student participation is encouraged in the selection of topics. Enrollment limited to 20 in one section. Corequisite: 63.
1 unit, Win (Fetter)

64, 66. Advanced Freshman Physics Laboratories—Experimental work in mechanics, electricity and magnetism, and optics. Prerequisite: 61.
64. 1 unit, Win (Dimopoulos)
66. 1 unit, Spr (Dimopoulos)

65N. Stanford Introductory Seminar: Statistical Mechanics—Principles and Applications—Preference to freshmen. Faculty led and associated with 65, including material related to 65, but at a slightly more advanced level. Concepts about thermal and statistical physics are discussed with examples and applications. Enrollment limited to 20 in one section. Corequisite: 65.
1 unit, Spr (Zhang)

70. Modern Physics—Relativity, the experimental basis of quantum theory, Schrödinger equation, atomic structure, nuclear structure, high energy physics, elementary particles. Prerequisite: 45. Recommended: prior or concurrent registration in Mathematics 53 or 130. GER:2a (DR:5)
3 units, Aut (Marcus)

72. Modern Physics Laboratory—Preference or corequisite: 25 or 70. 1 unit, Aut (Marcus)

80N. Stanford Introductory Seminar: The Technical Aspects of Photography—Preference to freshmen. For those with some background in photography. How cameras record photographic images of film and electronically. The technical photographic processes which the photographer must understand in order to use cameras effectively. Camera types and their advantages, how lenses work and their limitations, camera shutters, light meters and the proper exposure of film, file types, depth of focus, control of the focal plane, and special strategies for macro and night photography. View cameras and range finders. Basic exposure calculations. Students exploit the flexibility of these formats to take photographs around campus. Prerequisite: knowledge of elementary physics.
3 units, Spr (Osheroff)
30. **Stanford Introductory Seminar: The Physics of Terrorist Bomb Detection**—Preference to sophomores. The bombing of Pan Am 103 over Lockerbie, Scotland in December 1988 has pushed efforts to develop a suitable bomb detector to protect airplanes, buildings, tunnels, and other terrorist targets. The limitations imposed on a successful detection system, and the physics principles already tried or under development. Site visits are made to industrial laboratories engaged in making bomb detectors. Prerequisite: high school background in physics. 3 units

34. **Stanford Introductory Dialogue: On Growth and Form**—Preference to sophomores. Introduces important concepts in physics by analyzing the shapes of objects and growth mechanisms from a statistical mechanics point of view. Concepts such as self-similarity, fractals, and random processes describe the objects. Simple computer simulations study and visualize objects. Demonstrations by instructor and the students. 1 unit

105, 106, 107. **Intermediate Physics Laboratory Seminars**—Sequence in experimental techniques required of all Physics majors. Topics: electronics, detectors and radioactive sources, optics and lasers, statistics and data handling. Lectures/labs. 106 consists of independent experiments. Prerequisites: 46 or 64 and 66; prior or concurrent registration in 48 and the 120 series.

105. **Laboratory Seminar I: Electronics** 3 units, Aut (Pam)

106. **Laboratory Seminar II: Particle Physics Experimental Techniques** 3 units, Win (Grazia)

107. **Laboratory Seminar III: Optics**—(WIM) 3 units, Spr (Chu)

110, 111. **Intermediate Mechanics**—The mechanics of systems of particles and rigid bodies. Coordinate transformation and vectors; Newtonian mechanics; linear and nonlinear oscillations; Hamilton’s principle, Lagrangian and Hamiltonian dynamics; central forces, planetary motion; collisions; non-inertial reference systems; rigid body dynamics; coupled oscillations; and introductory fluid mechanics. Prerequisites: 41 or 61, and Mathematics 53 or 130.

110. 4 units, Win (Shen)

111. 4 units, Spr (Kono)

120, 121, 122. **Intermediate Electricity and Magnetism**—Vector analysis, electrostatic fields, including multipole expansion; dielectrics. Special relativity and transformation between electric and magnetic fields. Maxwell’s equations. Static magnetic fields, magnetic materials. Electromagnetic radiation, plane wave problems (free space, conductors and dielectric materials, boundaries). Dipole and quadrupole radiation. Wave guides and cavities. Prerequisites: 45 or 63; concurrent or prior registration in Mathematics 53, 130 or 131; with Physics 120 and 121, respectively. Recommended: concurrent or prior registration in Mathematics 103.

120. 4 units, Aut (Thomas, Dimopoulos)

121. 4 units, Win (Thomas)

122. 4 units, Spr (Thomas)

130, 131, 132. **Quantum Mechanics**—The origins of quantum mechanics, wave mechanics, and the Schrödinger equation. Heisenberg’s matrix formulation of quantum mechanics, solutions to one-dimensional systems, separation of variables and the solution to three-dimensional systems, the central field problem and angular momentum eigen-states, spin and the coupling of angular momentum, Fermi and Bose statistics, perturbation theory and other approximation techniques. Scattering theory: partial wave expansion, Born approximation, Green’s functions. Reference to problems in atomic and nuclear physics explaining the basic phenomenology of these disciplines. Invariance principles and conservation laws in the context of quantum theory. Prerequisites: 70 or equivalent and 110, 111; concurrent or prior registration in 120, 121, 122, and Mathematics 53 or 130, 131.

130. 4 units, Aut (Laughlin)

131. 4 units, Win (Laughlin)

132. 4 units, Spr (Laughlin)

135. **Computational Physics**—Development of computational methods with application to problems in classical, electro-, quantum, and statistical mechanics. Numerical integration; solution of ordinary differential equations including the Runge-Kutta method; solutions of the heat equation and Poisson’s equation with relaxation methods, etc.; Monte Carlo methods; matrix methods and eigenvalue problems. Short introduction to Basic programming; class projects may be programmed in Basic, Fortran Pascal, or C. Offered occasionally. Prerequisites: 110, 111, 121; Mathematics 53 or 130.

3 units
201, 203. Advanced Physics Laboratory—Experiments in atomic, nuclear, solid state, and low-temperature physics; optics; and particle physics. 201 has individually prepared lab experiments. 203 consists of continued experiments at the advanced physics lab level or preparation of a new experiment. Prerequisites: 105, 107. Recommended: prior or concurrent registration in 171.

201. 3 units, Spr (Marcus)
203. 3 units, Spr (Marcus)

204. Senior Seminar in Theoretical Physics—Topics of recent interest in theoretical physics: Bose-Einstein condensation of atoms, high Tc superconductivity of cuprates, quantized Hall effect, quantum chaos, superfluidity of H_2. Work in the seminar may provide a basis for an honors project in theoretical physics. Prerequisite: 132 or consent of instructor.

3 units, Aut (Doniach)

205. Honors Undergraduate Research—Experimental or theoretical project and thesis in physics under supervision of a faculty member. Planning of the thesis project should begin no later than middle of the junior year. Successful completion of an honors thesis leads to graduation "with departmental honors." Prerequisites: superior work in physics as an undergraduate major and approval of the honors committee.

1-8 units, any quarter (Staff)

GRADUATE

207, 208. Laboratory Electronics—(Enroll in Applied Physics 207, 208.)

207. 3 units, Win (Fox)
208. 3 units, alternate years, given 2000-2001

210. Advanced Particle Mechanics—The Lagrangian and Hamiltonian dynamics of particles (a review), small oscillations, and rigid body motion. Transition to continuum mechanics. Prerequisites: 111, 122.

3 units, Aut (Fetter)

211. Continuum Mechanics—Elasticity, fluids, turbulence, waves, gas dynamics, shocks, and MHD plasmas. Examples from everyday phenomena, geophysics, and astrophysics. Prerequisite: 111.

3 units, Win (Romani)


3 units, Spr (Willick)


3 units, Win (Doniach) alternate years, not given 2000-01

216. Back of the Envelope Physics—Survey of topics intended to develop the ability to do simple, physically based calculations with undergraduate physics. Goal: sharpen ones physical intuition and promote a synthesis of physics at the undergraduate level through the examination of problems normally not usually included in undergraduate physics. Topics: practice in making order of magnitude estimates, applications of statistical mechanics, astrophysics and cosmology, biological physics, scaling concepts in physics, quantum interference and quantum measurement, geophysics, etc. Prerequisites: mechanics, statistical mechanics, electricity and magnetism, and quantum mechanics at the undergraduate level.

3 units, Aut (Chu)

220, 221. Classical Electrodynamics—Electrostatics and magnetostatics: conductors and dielectrics, magnetic media, electric and magnetic forces and energy. Maxwell's equations; electromagnetic waves, Poising's theorem, electromagnetic properties of matter, dispersion relations, wave guides and cavities, magnetohydrodynamics. Special relativity: Lorentz transformations, covariant, equations of electrodynamics and mechanics, Lagrangian formulation, Noether's theorem and conservation laws. Radiation: dipole and quadrupole radiation, electromagnetic scattering and diffraction, the optical theorem, Liénard-Wiechert potentials, relativistic Larmor's formula, frequency and angular distribution of radiation, synchrotron radiation. Energy losses in matter; Bohr's formula, Cherenkov radiation, bremsstrahlung and screening effects, transition radiation. Prerequisites: 122 or equivalent; Mathematics 106 and 132, or concurrent registration in Physics 210 and 211.

220. 3 units, Win (Whittum)
221. 3 units, Spr (Whittum)

230, 231, 232. Quantum Mechanics—Prerequisites: 132 and a strong course on differential equations.


3 units, Aut (Shenker)


3 units, Win (Shenker)


3 units, Spr (Shenker)

240. Asymptotics Methods in Physics Problems—Use of the notion of asymptotics in physics. Algebraic equations, branching (eigenfrequencies of small oscillations). Asymptotic estimates of integrals (short and long time behavior, near and far field, group velocity and energy transport by waves); uniform asymptotics. Asymptotic methods for ODEs: coordinate and parameter asymptotics, regular and singular perturbations; WKB method (quasiclassic approximation, one-dimensional wave propagation); Poincare method, "fast" and "slow" variables (perturbation of periodic orbits, weak dissipation, adiabatic invariants); matched asymptotic expansions—boundary layers (problems of electrodynamics, heat conductivity, elasticity, etc.). Asymptotic methods for PDEs: ray method for multi-dimensional linear wave propagation (rays, wavefronts, least-time path principle, caustics for waves of different physical origin); matched asymptotic expansions—boundary layers and "thin" bodies (applications to electrostatics, hydrodynamics and MHD, linear elasticity, etc.); multi-scale expansions: homogenization, effective parameters for composite bodies. Examples from various branches of physics (astrophysics and general relativity).

3 units

252. Introduction to High Energy Physics—Graduate section; see 152
3 units, alternate years, given 2000-01


3 units
262. Introduction to Gravitation—Tensor analysis: special relativity, energy-momentum tensor, and curvature. Einstein’s equations: weak fields, tests, spherically-symmetric solutions, gravitational waves. Cosmology, black holes, stellar structure, and other topics in astrophysics, as time permits. Prerequisites: 111, 122.

3 units, Spr (Wagoner)

271. Introduction to Solid State Physics—Reviews key discoveries in condensed matter physics in the past 15 years, with emphasis on experiment. Topics: sliding charge density waves in layered compounds, the first pressure-induced Mott transition, the first organic superconductor, the discovery of superfluid 3He, quasicrystals, the Sharvin effect, the quantum hall effect, and re-entrant superconductivity. Journal club format, with presentations by students on assigned topics. Offered occasionally.

3 units


3 units (Staff) alternate years, given 2000-01

290. Research Activities at Stanford—Required of all first-year physics graduate students and strongly suggested for junior physics majors for 1 unit; no registration needed for graduate students. Review of research activities in the department and elsewhere at Stanford at a level suitable for entering graduate students.

1-3 units, Aut (Chu)

291. Practical Training—Opportunity for practical training in industrial labs. Arranged by student with the research adviser’s approval. A brief summary of activities is required, approved by the research adviser.

3 units, Sum (Staff)

293. Literature of Physics—Intensive study of literature of any special topic. Preparation, presentation of reports. If taken under the supervision of a faculty member outside the department, approval of the Physics chair required. Prerequisites: 25 units of college physics, consent of instructor.

1-15 units, any quarter (Staff)

294. Teaching of Physics Seminar—Required of all teaching assistants in Physics prior to or concurrent with the first quarter of a teaching appointment; registration not required. Techniques of teaching physics by means of weekly seminars/discussions, simulated teaching situations, and evaluation of in-class teaching performance.

1 unit, Aut (Pam)

301. Astrophysics Laboratory—Combined seminar/lab investigating the fundamental observational basis of physical models of astronomical objects. Observational component uses the 24-inch telescope at the Stanford Observatory and ancillary photometric and spectroscopic instrumentation. Emphasis is on spectroscopic and photometric observation of main sequence, post-main sequence, and variable stars. Limited enrollment. Offered occasionally. Prerequisite: consent of instructor.

3 units, Sum (Walker)

320. Quantum Optics and Selected Topics in Atomic Physics—Quantization of the electromagnetic field, photon states, and vacuum fluctuations and atomic transitions of real atoms. Two-level atoms, the Optical Bloch Equations, dressed states, coherent transients, resonance fluorescence, laser cooling and trapping of atoms and ions, tests of quantum mechanics and Bell’s Theorem, photon statistics, coherence, antibunching, squeezed states, and parity non-conservation and time-reversal invariance tests in atomic physics. Offered occasionally.

3 units


3 units

323. Laser Cooling and Trapping—The fundamental principles of laser cooling and atom trapping. The general treatment of optical forces on atoms, the various forms of laser cooling, atom optics and atom interferometry, ultra-cold collisions, and Bose condensation of dilute gases. Emphasis is on the development of the general formalisms currently used to treat these topics. Applications of the cooling and trapping techniques: atomic clocks, internal sensors, measurements that address high-energy physics questions, studies of many-body effects, polymer science, and biology. Prerequisite: 231 or equivalent.

3 units

324. Introduction to Accelerator Physics—(Enroll in Applied Physics 324.)

3 units, Aut (Siemann) alternate years, not given 2000-01

330,331,332. Quantum Field Theory—Introduction to the concepts and methods of quantum field theory. Prerequisites: 210, 221, 232.


3 units, Aut (Susskind)

331.—Loop diagrams, electron (g-2), renormalization, Ward Identities, the renormalization group, perturbation theory anomalies.

3 units, Win (Brodsky)


3 units


3 units

351.—Introduction to the Standard Model—Features of high-energy interactions of hadrons; deeply inelastic lepton-hadron scattering; structure functions; the parton model; QCD, gluons, and scaling violations; jets and quark fragmentation in rr(LC) and e+e- annihilation to hadrons; radiative corrections in QED and QCD; running coupling constants; experimental measurements of the strong coupling; Monte Carlo techniques.

3 units

352.—Hadron spectroscopy in the static quark model; properties of heavy quarks and quarkonium systems. Weak interactions: muon, pion, and beta decay; weak mixing angles; the K-L system on CP violation; charged and neutral current neutrino scattering; the standard model of electroweak interactions; determinations of sin^2(θ_W); properties of W and Z bosons; gauge symmetries and the Higgs mechanism; properties of Higgs particles. Introduction to topics beyond the standard model: grand unification, proton decay, super-symmetry.

3 units

360. Physics of Astrophysics—Theoretical concepts and tools for modern astrophysics. Radiation transfer equations, and scattering and absorption processes: Compton, synchrotron photoionization, lines, and Bremsstrahlung. Equations of state of ideal, interacting, and degenerate gasses. Particle kinetic equations (Boltzmann, Fokker-Planck) and mechanisms for particle acceleration and transport. Application to ionization and dust scattering in HII regions and high-energy astrophysics.
sources such as accretion disks, x-ray and radio sources. Prerequisites: 122, 171.

3 units

361. Stellar and Galactic Astrophysics—Basic astronomical data on stars, star clusters, interstellar medium, and the Milky Way galaxy. Basic theory of stellar structure; hydrostatic equilibrium, radiation balance, and energy production. Stellar formation, Jean’s mass and protostars. Evolution of stars to the main sequence and beyond to red giants, white dwarfs, neutron stars, and black holes. Structure of the Milky Way; the disk and spiral arms, central bulge or bar, black hole, the halo and mass of the galaxy. Prerequisites: 221, and 260 or 360.

3 units

362. Extragalactic Astrophysics and Cosmology—Basic observational data on galaxies and their activities, cosmic microwave background radiation, gravitational lensing and dark matter in the universe. Models of the origin, structure, and evolution of the universe based on the theory of general relativity. Test of the models. Physics of the early universe, inflation, Baryosynthesis, nucleosynthesis, and galaxy formation. Prerequisites: 210, 211, 260 or 360, 262.

3 units, Spr (Petrosian)

363. Solar and Solar-Terrestrial Physics—Structure, mechanisms, and properties of the sun’s interior and atmosphere; solar wind and its variability; solar activity; coronal mass ejections; UV, x-ray, and high-energy particle emission. Earth’s magnetosphere. Interaction of the solar wind with the earth’s magnetosphere and its terrestrial effects. Sun’s electromagnetic radiation effect on the terrestrial environment. Prerequisite: Physics 221 or equivalent.

3 units, Win (Kosovichev) alternate years, not given 2000-01


3 units


3 units

372. Condensed Matter Theory I—(Enroll in Applied Physics 372.)

3 units, Aut (Harris) alternate years, not given 2000-01

373. Condensed Matter Theory II—(Enroll in Applied Physics 373.)

3 units, Win (Zhang) alternate years, not given 2000-01


3 units (Staff) alternate years, given 2000-01


3 units

377. Literature of Condensed Matter Physics—Review of key discoveries in condensed matter physics in the past 15 years, with emphasis on experiment. Topics: sliding charge density waves in layer compounds, the first pressure-induced Mott transition and organic superconductor, the discovery of superfluid 3He, quasicrystals, the Sharvin effect, the Quantum Hall effect, and reentrant superconductivity. Journal club format with presentations by students on assigned topics. Offered occasionally.

3 units

383. Introduction to Atomic Processes—(Enroll in Applied Physics 383.)

3 units, Aut (Harris) alternate years, not given 2000-01

387. Quantum Optics and Measurements—(Enroll in Applied Physics 387.)

3 units, Win (Yamamoto) alternate years, not given 2000-01

388. Mesoscopic Physics and Nanostructures—(Enroll in Applied Physics 388.)

3 units (Yamamoto) given 2000-01

392. Topics in Molecular Biophysics—(Enroll in Applied Physics 392.)

3 units (Doniach) alternate years, given 2000-01

450,451,452. Theoretical Physics of Particles and Fields—Advanced topics in theoretical high-energy physics. Topics change by quarter and year to provide a background in all areas of current theoretical research. Prerequisite: 332.

450. M-theory Compactifications and Duality

3 units, Aut

451. Elements of String Theory

3 units, Win

452. Strings, Branes, and Duality

3 units, Spr

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future direction. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

463. Special Topics in Astrophysics—Research-level discussions of current topics in astrophysics. Content varies each quarter and year, depending on the interests of staff and students. Topics to be announced. Offered occasionally.

3 units

473A. Condensed Matter Physics—(Enroll in Applied Physics 473A)

2 units, Aut (Kapitulnik)

473C. Electronic Structure—(Enroll in Applied Physics 473C)

3 units, Spr (Harrison)

490. Research Orientation—Familiarizes students with the activities of one or more research groups, within the department or outside. Registration limited to one quarter per research group with overall limitation of two quarters. Prerequisite: consent of student’s adviser.

1-15 units, any quarter (Staff)
491. Research—Open only to graduate physics major students, with consent of instructor. Work is in experimental or theoretical problems in research, as distinguished from independent study of a non-research character in 190 and 293. If taken under the supervision of a faculty member outside the department, Physics Graduate Study Committee approval required.
1-15 units, any quarter (Staff)

**POLITICAL SCIENCE**


Chair: Barry R. Weingast


Associate Professors: James D. Fearon, Luis R. Fraga, Jane C. Oi, Scott D. Sagan

Assistant Professors: Claudine Gay (on leave 1999-2000), Simon Jackman, Beatriz Magaloni, Isabela Mares, Michael A. McFaul (on leave Winter, Spring), Rob Reich, Carolyn Wong

Professor (Research): Norman Nie

Courteous Professors: David P. Baron, Jonathan B. Bendor, Bruce Bueno de Mesquita, Gerhard Casper, Steven H. Chafee, Larry Diamond, Gerald Dorfman, Jean-Pierre Dupuy, Lawrence Friedman, Keith Krehbiel, Gail Lapidus, James Morrow, Roger Noll, Michael Okzen

Courteous Associate Professors: Coit Blacker, Timothy J. Groseclose, Debra M. Satz

Senior Lecturer: Elisabeth Hansot

Lecturers: Alison Alter, Jeremy Buchman, Adrienne Jamieson


Visiting Associate Professors: David Epstein, Stephen Stedman

Visiting Assistant Professor: Alberto Diaz-Cayeros

Affiliated Professors: Michael W. Kirs, Michael M. May

**UNDERGRADUATE PROGRAMS**

**BACHELOR OF ARTS**

To receive an A.B. in Political Science, a student must:

1. Begin by submitting an application for the Political Science major to the undergraduate administrator. Forms are available in Building 160, room 161H. For additional information, drop by or phone (650) 723-1608.

2. Complete 60 units, at least 50 of them in Political Science courses. Up to 10 units may be from courses outside the department that are related to the student’s interests in Political Science and are not entry-level courses in other disciplines (such as Economics 1 or Psychology 1). All courses counted for the degree must be taken for a letter grade.

3. Satisfy a depth requirement. Each major should declare a primary concentration in one subfield and take at least 20 units in this concentration, including the introductory course for that subfield. Subfields include:

   - Public Administration and Public Policy (100-109, 206-209)
   - Comparative Politics (110-129, 210-229)
   - International Relations (130-149, 230-249)
   - Political Theory (150-169, 250-269)

American Politics (170-198, 270-298)

A student may propose an individual primary concentration in a special subfield, for example, politics in advanced industrial democracies, political organizations, public policy, the politics of development, or formal models in political science. This concentration proposal is subject to the approval of the Director of Undergraduate Studies.

4. Satisfy a breadth requirement. Each major should declare a secondary concentration in another subfield, with at least 10 units in that concentration.

Each major should take at least 5 units in a third subfield.

A secondary concentration may be designed by the student and is subject to the approval of the Director of Undergraduate Studies.

5. Demonstrate the capacity for sustained research and writing in the discipline. This requirement is satisfied by taking a Political Science course which has been designated a Writing in the Major (WIM) course.

6. Take at least one 5-unit seminar in Political Science.

7. A maximum of 20 units of transfer work may be given Political Science credit toward the major.

8. Directed reading units may not be used to fulfill a distribution requirement, and no more than 10 units of directed reading may be Counted toward the 50 Political Science units.

9. All courses counting toward the 60-unit requirement must be taken for a letter grade, although units in excess of the required 60 may be taken on a credit/no credit basis.

**MINORS**

Students must complete their declaration of the minor no later than the last day of the quarter two quarters before degree conferment. For example, a student graduating in June (Spring Quarter) must declare the minor no later than the last day of Autumn Quarter of the senior year.

To receive a minor in Political Science, a student must complete a minimum of 30 units in two subfields. All units must be in courses listed or cross-listed in the Department of Political Science. A maximum of 5 units of Directed Reading may count if supervised by a member of the department.

All units are for a letter grade.

**Concentration**—The student selects a subfield in which three courses are taken. Ordinarily one of these courses is at the introductory level (numbered under 100), the other two at the advanced level (numbered above 100). Where a linked set of advanced courses is offered (as with the Political Theory 151A,B,C series), an introductory course need not be taken.

Ordinarily the concentration corresponds to one of the subfields the department already has in place, namely, American politics, comparative politics, international relations, political organizations, and political theory. An alternative way of defining a subfield is acceptable, however, if a sufficient number of courses is offered and if the student’s proposal is accepted by the department.

**Distribution**—Three courses must be in the area of concentration, as specified above, for 15 units. An additional 10 units of advanced courses (100 level or above) must be in two additional subfields.

**Transfer Work**—A maximum of 10 units of transfer work may be given Political Science credit toward the major, upon approval.

**PRIZES**

There are four annual prizes for undergraduate students: the Edwin A. Cottrell Memorial Prize for the best student in Political Science 1, the Arnaud B. Leavelle Memorial Prize for the best paper in the History of Political Thought sequence (Political Science 151A,B,C), a cash prize for the best thesis written in political theory, and the Lindsay Peters, Jr., Memorial Prize for the outstanding student each year in Political Science 10.

**HONORS PROGRAM**

This program offers qualified students an opportunity to conduct independent research and to write a thesis of superior quality summariz-
ing the results of their research. It provides for close contact between students and their advisers, so that students can receive intensive guidance and assistance throughout their research and writing. The aim is to help students through the process of research, analysis, drafting, rethinking, and redrafting essential to excellence in writing.

The basic requirement for admission to the program is that students secure the agreement of a regular faculty member to be their thesis adviser. No faculty member can effectively supervise more than a few honors theses each year. Application to the program should therefore be made as early as possible, preferably by Spring Quarter of the junior year. Application forms can be obtained from the department office, should be countersigned by both the student and his or her thesis adviser, and then approved by the Director of the Honors Program. Normally, the thesis adviser is a faculty member with whom the student has already worked. To be eligible for the program, students must have at least a 3.5 grade point average (GPA) in Political Science courses when they apply. They should enroll in the program at the start of the Autumn Quarter of the senior year and take Political Science 199R, a 2-unit Autumn Quarter seminar focusing on research and writing skills. If a student is not on campus during that quarter, an equivalent to 199R should be taken.

The program is based on the assumption that good writing takes time. Students are, therefore, strongly discouraged from attempting to complete an honors thesis in less than three quarters. While details are worked out on an individual basis between students and thesis advisers, the following patterns are typical: (1) If a student already has substantial background on the thesis topic, the honors thesis program can be completed in two or three quarters (for a total of 10-15 units); (2) if a student has done little or no previous work on the topic, then the program should be spread over three quarters (for a maximum of 15 units).

Successful completion of honors in Political Science requires (1) completion of all requirements for the major, (2) enrollment in Political Science 199R, and (3) successful completion of a thesis of honors quality ("B+" or better). Honors work done for credit (Political Science 199) may not be counted toward the required 50 units in Political Science but may be counted as all or part of the additional 10 units which relate to the student's interest in political science.

**GRADUATE PROGRAMS**

**Admission**—Prospective graduate students should write to Graduate Admissions, the Registrar's Office for application materials. All applicants are required to submit a sample of their writing and to take the General Test of the Graduate Record Examination. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE). The TOEFL and TSE requirements are waived for applicants who have recently completed two or more years of study in an English-speaking country. For details concerning these tests, see the Guide to Graduate Admission. The application deadline is January 1. Admission is offered for the Autumn Quarter only. The department expects all students to pursue a full-time program except for time devoted to teaching or research assistantships.

**MASTER OF ARTS IN TEACHING**

The University's basic requirements for admission to the Ph.D. program are discussed in the "Graduate Degrees" section of this bulletin. The degree is intended for candidates who have a teaching credential or relevant teaching experience and wish to further strengthen their academic preparation. The program consists of a minimum of 25 units in Political Science courses and 12 units in the School of Education. A student's plan must be approved by the Director of Graduate Studies before the courses are taken. Detailed program requirements are outlined in the "School of Education" section of this bulletin.

**DOCTOR OF PHILOSOPHY**

The University's basic requirements for the Ph.D. degree are discussed in the "Graduate Degrees" section of this bulletin. Programs of study leading to the Ph.D. degree are designed by the student, in consultation with advisers and the Director of Graduate Studies, to serve his or her particular interests as well as to achieve the general department requirements. A student is recommended to the University Committee on Graduate Studies to receive the Ph.D. degree in Political Science when the following program of study has been completed:

1. The candidate for the Ph.D. degree must offer three of the following concentrations in political science: American politics, comparative politics, international relations, political theory, and public organizations. Upon petition, a special field (for example, methodology, public law, or urban politics) may be offered as a third concentration. Students concentrate on two of these areas by fulfilling, depending on the concentration, combinations of the following: written qualifying examinations, research papers, research design, or course work. The requirement for the third concentration may be satisfied by taking either a written examination in that area or by offering a minimum of 10 units with a grade point average (GPA) of 'B' or better in the third concentration from among the formal graduate-level courses in the Ph.D. degree program. The third concentration cannot be satisfied by courses taken as a requirement for a first or second concentration. A third concentration in theory requires two courses in addition to the 5 units necessary to fulfill the program requirement. Completion of special concentrations may require more than 10 units of course work.

2. The Ph.D. candidate is required to demonstrate competence in a language and/or skill that is likely to be relevant to the dissertation research. The level of competence needed for successful completion of the research is determined by the student's adviser. All candidates must complete 5 units of statistical methods or its equivalent. Students who are in the concentration of international relations, American politics, or public organizations are required to take an additional 5 units of methods. Previous instruction can be counted towards this requirement only if approved by the Director of Graduate Studies.

3. If the candidate has not completed at least one year of previous undergraduate instruction in political science, or at least 5 quarter units of graduate political theory, he or she must take 5 quarter units of graduate instruction in political theory.
4. By the start of the fourth quarter in residence, each first-year graduate student submits to the student's adviser a statement of purpose. This statement indicates the student's proposed major concentrations of study, the courses taken and those planned to be taken to cover those fields, the student's plan for meeting language and/or skill requirements, plans for scheduling of comprehensive examinations and/or research papers, and, where possible, dissertation ideas or plans. This statement is reviewed with, and must be approved by, the student's adviser. In the Autumn Quarter following completion of their first year, students are reviewed at a regular meeting of the department faculty. The main purposes of this procedure are, in order of importance: to advise and assist the student to realize his or her educational goals; to provide an incentive for clarifying goals and for identifying ways to achieve them; and to facilitate assessment of progress toward the degree.

5. When both the student and adviser feel that the student is ready, he or she takes comprehensive examinations in two concentrations and completes one research paper. Comprehensive examinations are offered at the discretion of the faculty. If scheduled, they are given in the third week of Autumn and Winter Quarters, and in the seventh week of Spring Quarter. Students should normally expect to complete these examinations and the research paper by the end of their second year.

6. Upon completion of one research paper and two comprehensive exams in his or her two major concentrations, the student files an Application for Admission to Candidacy for the Ph.D. which details program plans and records. This document, along with a student's examination performance, is reviewed by the faculty at a regular meeting. If it is approved, the student is advanced to candidacy. Students must be approved to candidacy by the completion of their sixth quarter as a full-time student.

7. During the third year, a formal dissertation proposal is submitted by the student to a thesis committee of three faculty members, including the principal adviser.

8. A candidate for the Ph.D. in Political Science is required to serve as a teaching assistant (TA) in the department for a minimum of two quarters.

9. Doctoral candidates who apply for the A.M. degree are awarded that degree on completion of the requirements outlined in the description of the A.M. program.

10. The candidate must pass the University oral examination on the area of the dissertation, at a time, after the passing of the written comprehensive examinations, suggested by the candidate's dissertation committee.

11. The candidate must complete a dissertation satisfactory to the Dissertation Reading Committee and the University Committee on Graduate Studies.

**Ph.D. MINOR**

Candidates in other departments offering a minor in Political Science select two concentrations in political science in consultation with the Director of Graduate Studies and submit to her or him a program of study for approval. Written approval for the program must be obtained from the Director of Graduate Studies before application for doctoral candidacy. Students are required to complete at least 20 units in Political Science courses. Two of these courses, in separate concentrations of political science, must be 200 level and above. All grades must be a GPA of 'B' or better. Candidates may be examined in their concentrations in the general oral examination by a member of the Department of Political Science, chosen in consultation with the Director of Graduate Studies.

**WEST REFERENCE ROOM**

The department maintains, for its faculty, guests, graduate students, and advanced undergraduates, a small reference room that holds political science journals, handbooks, books useful in preparing for Ph.D. examinations, and other materials. Access to West Reference Room is restricted to eligible key holders.

**COURSES**

(WM) indicates that the course meets the Writing in the Major requirement.

**Summer Quarter**—During Summer Quarter, the Department of Political Science offers a variety of courses and seminars. The specific offerings depend on the faculty available during the Summer Quarter.

The department uses the following course numbering system:

1-99 Introductory Courses
100-199 Advanced Courses and Undergraduate Seminars (at the instructor's discretion, graduate students may enroll and be given graduate credit when additional work is assigned and the appropriate department Graduate Credit Authorization form is completed)
200-299 Graduate-Undergraduate Seminars (principally for graduate students; at the instructor's discretion, undergraduates may be admitted)
300-400 Graduate Seminars

Course information is accurate when the Stanford Bulletin goes to press; however, students should be aware that there may be changes and should check the quarterly Time Schedule for up-to-date information.

**INTRODUCTORY**

1. **Introduction to Political Science**—Alternative public policies in selected areas, including control of monopoly, poverty, and foreign policy. The political process: the influence of cultural, economic, and political factors and the location of political power in determination of public policy. GER:3b (DR:9)
   5 units, Win (Perejohn, Fiorina)

10. **American National Government and Politics**—The role and importance of the ideal of democracy in the evolution of the American political system. American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) are examined against the backdrop of American culture and political history. The major areas of public policy in the current practice of the ideal of democracy. GER:3b (DR:9)
    5 units, Win (Perejohn, Fiorina)

20. **Comparing Political Systems: Power, Policy, and Industrial Development**—How is industrialization affected by a country's political life and by policies of its central government? How in turn does industrialization affect a country's politics and governmental policies? The answers are found by comparing countries that differ in the timing, extent, and character of industrial development. Cases include Britain, Germany, Japan, the Soviet Union, Korea, and India.). GER:3b (DR:9)
    5 units, Aut (Abernethy)

21N. **Stanford Introductory Seminar: The Politics of Labor in Advanced Industrial Democracies**—Preference to freshmen. The emergence of compromise between labor and capital in post-war Europe and its impact on economic performance. What political factors contributed to the successful institutionalization of a cross-class compromise in post-war Western Europe? What was the role of labor in the development of solidaristic wage policies and the expansion of a redistributive welfare state? What are the obstacles faced by social-democratic governments in their pursuit of full-employment policies during the last two decades? How do the new constraints posed by increased economic globalization and the creation of a common market affect the political sustainability of this cross-class compromise? GER:3b (DR:9)
    3 units, Aut (Mares)

25. **Colonialism and Nationalism in the Third World**—Comparative historical analysis of European exploration, conquest, and colonial rule in Latin America, the Caribbean, Africa, and Asia. Factors affecting the timing, character, and effectiveness of nationalist movements in the Third World. The impact of colonialism on postcolonial political and economic systems. GER:3b (DR:9)
    5 units (Abernethy) given 2000-01
28. East Asia in the Age of Imperialism—Designed for freshman and sophomores. Interdisciplinary introduction to E. Asian political, social, cultural, and economic evolution 1840 to 1945. The various responses in China, Japan, and Korea to Western penetration of the region. GER:3b (DR:9)
   5 units, Win (Oksenberg, Duus)

29. Contemporary East Asia—Designed for freshmen and sophomores, introducing E. Asian history and cultures from the end of WW II to the present. Focus is on long-standing interactions among Japan, Korea, China, and the peripheries of Central, S.E., and S. Asia. Issues: politics, economic development, and common challenges for the region as whole. GER:3b (DR:9) (WIM)
   5 units, Spr (Oksenberg)

35. International Politics—(Same as 135.) Approaches to the study of world politics including realism, liberalism, and decision-making theories. WW I, the nuclear weapons debate, and contemporary and economic problems. The normative and policy implications of different theories. GER:3b (DR:9)
   5 units, Aut (Okin)

51D. Introduction to Political Philosophy/Theory—(Same as Philosophy 30, Public Policy 103A.) Critical introduction to issues of state authority, justice, liberty, and equality. The issues are approached through major works in political philosophy. Topics: human nature and citizenship, the obligation to obey the law, democracy and economic inequality, equality of opportunity and affirmative action, religion and politics. Readings: Aristotle, Locke, Rousseau, Mill, Marx, Rawls, the U.S. Constitution, some Supreme Court cases. GER:3a (DR:8)
   5 units, Aut (Okin)

53N. Stanford Introductory Seminar: Plato and Aristotle on Justice—Preference to freshmen. What does it mean for humans to be just? What constitutes a just society? What is the relationship between just political arrangements and just human behavior? Focus is on Plato’s Republic and Aristotle's Politics, two texts in political philosophy that continue to provide insight into these questions. Discussion-based and requires close reading of the primary texts. GER:3a (DR:8)
   3 units, Aut (Reich)

60. The American Dream—Critical analysis of America's dominant ideology, the American Dream, as experienced by women, minorities, labor, Indians, and immigrants. GER:3b,4b (DR:3 or 9)
   5 units, Win (Manley)

90N. Stanford Introductory Seminar: The Evolution of Voting Rights in the U.S.—Preference to freshmen. The evolution of voting rights in the U.S. from the enactment of the Constitution of 1787 to the present. Emphasis is on identifying conditions under which expansion was possible as a result of the removal of barriers (property ownership, racial and ethnic discrimination, gender bias, and language facility). Current issues in the interpretation and implementation of the provisions of the Voting Rights Act. Implications of the evolution of voting rights in the U.S. for understanding democratic theory and American political development. GER:3b (DR:9)
   3 units, Spr (Fraga)

   5 units, Win, Spr (Moe)

95A. Introduction to Political Data Analysis I—Introduction to applied data analysis techniques commonly employed by political scientists and policy analysts. Emphasis is on application and hands-on experience with political data, rather than mathematical derivations and statistical theory. Computer applications that support data analysis in the social sciences. The basic elements of research design and causal analysis using survey data on the American electorate and data on other substantive problems. GER:2c (DR:4)
   3 units, Aut (Stone)

95B. Introduction to Political Data Analysis II—Introduction to applied regression analysis using a variety of substantive examples and data from political science and policy analysis. The logic of hypothesis testing and control in post-hoc designs commonly used by political scientists and policy analysts. Topics: the graphical presentation of data, bivariate and multivariate regression analysis, inference, and assumptions. Emphasis is on the application of the techniques to data analysis and research problems. Prerequisite: 195A or consent of instructor. GER:2c (DR:4)
   5 units, Win (Stone)

95C. Introduction to Political Data Analysis III—Review of data sources in political science and related fields, including archived data, data sources on the Web, and documentary sources. Emphasis is on developing each student's independent experience with research, applying appropriate principles of research design, data management, data analysis, and on the presentation and evaluation of results. Prerequisite: 195B or consent of instructor. GER:2c (DR:4)
   5 units, Spr (Stone)

ADVANCED UNDERGRADUATE

Advanced undergraduate courses are open to undergraduates who have the necessary prerequisites, and to graduates where advisable. Undergraduate seminars have limited enrollments and admission generally requires consent of instructor. They are intended for juniors and seniors, but may admit graduate students. Sign-up sheets for undergraduate seminars are posted in the department office at class list sign-up time. Undergraduates should also consider the graduate-undergraduate seminars, numbered 200-299, in the next general section.

GENERAL

100A. Statistical Methods I—(Same as 200A.) Introduction to probability and statistical inference, with applications to political science and public policy. Prerequisite: elementary calculus.
   5 units, Aut (Stone)

100B. Statistical Methods II—(Same as 200B.) Understanding and using the linear regression model in a social-science context: properties of the least squares estimator; inference and hypothesis testing; assessing model fit; presenting results for publication; consequences and diagnosis of departures from model assumptions; outliers and influential observations; graphical techniques for model fitting and model checking; interactions among explanatory variables; pooling data; extensions for binary responses.
   5 units, Win (Jackman)

100C. Statistical Methods III—(Same as 200C.) Models for discrete outcomes, time series, measurement error, and simultaneity. Introduction to nonlinear estimation, large sample theory.
   5 units, Spr (Jackman)

POLITICAL ORGANIZATIONS

The courses and seminars listed below are open to all undergraduates in the University regardless of major. There are no prerequisites. There are no formal course sequences in public administration.

101P. Politics and Public Policy—(Same as Public Policy 101.) The domestic policy-making process, emphasizing how elected officials, bureaucrats, and interest groups shape government policies in various areas including tax, environmental, and social-welfare policy, give their goals and available tactics. How public policies are formulated as
109. Directed Reading/Research in Political Organizations—Advanced individual study in public administration.

any quarter (Staff)

COMPARATIVE POLITICS

Undergraduate courses and seminars in comparative politics generally fall into two groups: those dealing with a particular country or region, and those dealing with major political problems or processes. Students concentrating in comparative politics are encouraged to take courses from both groups, and are also urged to do course work in more than one country or region.

110D. British Politics—Britain has experienced a remarkable change in its politics the last two decades. After a prolonged period of political and economic instability, Prime Minister Thatcher and her Conservative Party established in 1979 a one-party dominance that persisted until 1997. Changes in British policy, and the revival of political competition in the years ahead. GER:3b (DR:9)

5 units, Win (Dorfman)

112M. Parties and Elections in Latin America—The last two decades have witnessed a wave of democratization and a fundamental shift in economic policy in virtually all Latin American countries. Competitive elections established themselves as a means to elect governments precisely at a time when runaway inflation, balance-of-payment crises, and other symptoms of macroeconomic instability led governments to embrace so-called "neoliberal" economic policies and market reforms. The determinants of individual voting behavior in such "transitional" contexts, how institutions and electoral rules shape emerging party systems, the dynamics of electoral competition, and the effects of partisan governments and regular elections on public policies and political-economic outcomes.

5 units, Win (Magaloni)

113A. Politics and Development in Latin America—Survey of political, economic, and social development in selected Latin American countries (normally Brazil, Mexico, Argentina, and Cuba) and analysis of policy and theoretical issues such as ideologies of development, democracy and its alternatives, constraints on national autonomy, and civil-military, state-society, and state-market relations. Student papers on any country in the region.

5 units (Packenham) not given 1999-2000

114K. Political Economy of Development—Introduction to the major theories of political development, emphasizing the interplay between political economic processes, and national and international factors from Latin America, Africa, and Asia. Cases: S. Africa, Chile, Brazil, Mexico, Taiwan, China, India, and the oil-exporting countries.

5 units (Karl) not given 1999-2000

115. Chinese Politics—(Same as 215.) The politics of the People's Republic of China. The origins of the Communist Revolution, the institutionalization and consequences of communist rule and attempts to reform the system since 1978.

5 units (Oi) not given 1999-2000

115A. Chinese Politics: The Revolution and the Mao Years—(Same as 215A.) The rise of the Chinese Communist Party (1921-49) and the era of Mao Zedong's rule (1949-76). The political institutions, policy process, and major domestic policies of the Mao years and their consequences. GER:4a (DR:2)

5 units (Oi) not given 1999-2000

115B. Chinese Politics: The Transformation and the Era of Reform—(Same as 215B.) The content, process, and consequences of reform in China from 1976 to the present. Changes in property rights, markets, credit, and the role of the state in economic development.

GER:3b,4a (DR:2 or 9) (WIM)

5 units, Spr (Oi)

115C. Seminar: Topics in Chinese Politics—Political Change in China—Content varies each year. The forms of political participation and transitional communist systems, with a focus on China. Why and when certain forms are used and why new forms emerge. Topics: covert pursuit of interests, overt protests, and competitive elections.

5 units (Oi) not given 1999-2000

116L. Comparative Democratic Development—(Same as 216L) The social, cultural, political, economic, and international factors favorable to the development and consolidation of democracy, in historical and comparative perspective. Worldwide development and the reemergence of democracy in the past decade. Case studies of individual country experiences with democracy.

5 units, Spr (Diamond)

117K. The Global Politics of Human Rights—The global development of human rights and the rise of an international human rights movement. The changing nature of rights and various dilemmas, e.g., conflicts between national sovereignty and rights, conflicts between various types of rights, etc., through specific case studies, including genocide in Rwanda, holding torturers accountable in Chile and El Salvador, factory workers vs. Nike, and the rights of women in South Africa.

GER:3b (DR:9) (WIM)

5 units, Win (Karl)

118A. Political Change in Tropical Africa—The colonial situation, growth of nationalism, achievement of political independence, ethnic patterns in new states, civilian and military leadership, role of party and bureaucracy, movements for electoral democracy, succession struggles and civil war, problems in stimulating economic development, and efforts at regional integration.

GER:3b,4a (DR:2 or 9)

5 units, Win (Abermethy)

118B. The Politics of Race and Class in Southern Africa—The political history of the region's 10 countries, emphasizing relations among racial and ethnic groups. Diplomatic, economic, and military interactions among these states. The impact of movements, corporations, and international organizations based outside the region. Domestic politics in South Africa, emphasizing struggles over the character of post-apartheid society.

GER:3b (DR:9)

5 units (Abermethy) given 2000-01

119M. Seminar: Revolutions—While "revolutions" mark important turning points in the modern world, the causes and consequences of revolutions are poorly understood. Given the limited number of cases, theorizing about revolutions is underdeveloped, underspecified, and outdated. Seeks a study of revolutions as a legitimate focus for theoretical inquiry by reviewing structural, institutional, cultural, and rational choice approaches. Case studies focus on testing and applying recent theories of political change to classic revolutionary cases.

5 units (McFaul) not given 1999-2000

120A. Comparative West European Institutions—(Same as Public Policy 160, International Relations 160.) How institutions shape politics and policies in Western Europe. Electoral laws, parliamentary systems, and government institutions at the national level influence the quality and nature of representation, political competition, and policy outcomes. Institutional developments at the subnational level and within the Euro-
pean Union challenge the domestic politics and policies of the European nation states.

5 units, Win (Alter)

121A. Comparative Political Economy of Post-Socialist Transitions—(Same as Public Policy 161, International Relations 161.) The post-Socialist economic and political transitions ongoing in Eastern Europe and the former Soviet Union, investigating attempts to build market economies and democratic governments. The politics of constitutional choice and variation in reform strategies and outcomes across the cases. Prerequisites: Economics 1, Political Science 1 or 10.

5 units (Abernethy) given 2000-01

122. Seminar: Decolonization in Asia and Africa, 1940-80—Comparison of the dynamics of decolonization and “new state” formation. Factors affecting the timing, speed, nature, and extent of violence in the decolonization process, and the character of the regime ruling the new state. Case studies: India/Pakistan, Indonesia, Indochina, Ghana, Ivory Coast, Algeria, and Zimbabwe.

5 units (Abernethy) given 2000-01

125. The Rise of Industrial Asia—(Same as 225.) The political, economic, social, and cultural aspects of industrial development and change in Asia as a region. Prerequisite: consent of instructors. GER.3b (DR:9)

5 units, Win (Oi, Oksenberg, Rohlen, Rowen, Staff)

127. Political Economy of Western Europe—Analytical and historical introduction to the political economy of Western Europe. Fundamental differences in economic performance are explained by examining the relative importance of structural institutional variables and of the strategic choices of key political actors. Topics: macroeconomic policy, wage determination and income inequality, welfare state expansion and reorientation, European integration. Readings focus on Britain, France, Germany, and Sweden.

5 units, Win (Mares)

128. Seminar Fiscal Politics—The causes and consequences of taxation, expenditure, and fiscal structures in the political system. Starting from the framework provided by the “new institutionalism” and the contributions to economic history by Douglass North and others, the recent political economy literature on economic growth, distribution, taxation, and expenditure. The historical conformation of tax authority and a comparative assessment of fiscal structures around the world. The geographic distribution of public expenditure (pork barrel politics and federalism).

5 units, Spr (Diaz-Cayeros)

129. Directed Reading/Research in Comparative Politics—Advanced individual study in comparative politics.

any quarter (Staff)

INTERNATIONAL RELATIONS

Students interested in international relations are encouraged to take Political Science 35, International Politics. While not a formal prerequisite for many of the courses listed below, 35 provides a desirable background for more advanced work.

The courses in international relations offered by the Department of Political Science can be divided into two groups: those dealing with global political, military, and economic problems; and those dealing with the foreign relations of specific nations or geographic regions. Students concentrating in international relations are encouraged to select their courses from both groups.

Students interested in a major in international relations are encouraged to refer to the “International Relations” section of this bulletin, which lists international relations courses in other departments.

132D. Seminar: Controversies over Foreign Aid—Debates over official development assistance: the ethical basis for aid; the effectiveness, efficiency, and distributional impact of aid, trade, and private investment: economic conditions attached to structural adjustment loans; human rights and democratization conditions attached to aid programs; humanitarian relief efforts in times of natural disaster, civil war, and anarchy.

5 units (Abernethy) given 2000-01

133. Peace Studies—(Same as Psychology 165.) Interdisciplinary, dealing with the challenges of pursuing peace in a world where the sources of conflict are many, and regional, ethnic, and religious antagonisms are rising. The art of creating and maintaining peace is analyzed from historical, social, psychological, and moral perspectives. Goals: to illustrate the current and potential contributions of various academic disciplines and critical analyses to the study of peace; and to prepare students to think critically and to act responsibly and effectively on behalf of peace. Eight sections: challenges, enemies, theoretical understandings, justice, security, non-violence, public peace processes, and peace and you. Seminar format once a week. Limited enrollment. GER.3b (DR:9)

5 units, Spr (Bland, Holloway, Ross)

134A. Strategy, War, and Politics—Traditional and modern theories on the causes of war and sources of peace. Contrasting explanations for the origins of WW I and II; alternative theories of deterrence in the nuclear age; the causes of war in the Persian Gulf, ethnic conflicts and terrorism in the post-Cold War era. GER.3b (DR:9)

5 units, Spr (Sagan)

134B. America and the World Economy—Developmental approach analyzes American foreign economic policy, centering on a historical analysis of the basic issues involved in the formation of American foreign policy. Issues: the evolution of American tariff and trade policy, the development of mechanisms for international monetary management, and American foreign investment policy reflected in the changing political goals pursued by American central decision-makers. Prerequisite: 35 or equivalent. GER.3b (DR:9) (WIM)

5 units, Win (Goldstein)

134P. The Role of Technology in National Security—(Enroll in Engineering Economic Systems and Operations Research 193; same as 234P.)

3 units, Aut (Perry)

135. International Politics—See 35. Limited to students with graduate standing.

5 units, Aut (Krasner)

137F. Nationalism and International Conflict—Nationalism is a leading candidate as the most important source of conflict between and within states after the Cold War. How the scholarly literatures of nationalism and war might be integrated and used to shed light on post-Cold War international politics. Theories and evidence on war and the international system, largely from Europe since 1648. Theories and evidence on the nature and origins of nationalism. Arguments about how nationalism causes (and is caused by) international conflict. The application of these ideas in several regions.

5 units (Fearon) not given 1999-2000

138. International Security in a Changing World—(Same as Engineering-Economic Systems and Operations Research 195.) Surveys the major international and regional security problems in the modern world. Interdisciplinary faculty lecture on the political and technical issues involved in arms control, the military legacy of the Cold War, regional security conflicts, proliferation of advanced weapons capabilities, ethnic conflicts, and peacekeeping efforts. GER.3b (DR:9)

5 units, Win (Blacker, Perry, May, Sagan)

138A. Seminar: Advanced Study in International Security—Provides undergraduates an opportunity to conduct advanced research
international security. Themes: whether prominent theories in security studies that were developed during the Cold War are appropriate today; whether metaphors and models from other disciplinary traditions (psychology, sociology, and organization theory) might be useful for the explanation of international political outcomes. Contemporary security issues (Democracies do not fight each other. Is that claim accurate? Did deterrence theory in the developing world “work” during the Cold War and are smaller powers (Iraq and N. Korea) deterrable?). The international relations theory failed to account for the possibility of the end of the Cold War. (How can we explain and address this?) Great power responses to the spread of nuclear weapons (Is nuclear proliferation dangerous, and if so, what should be done?).

5 units (Staff) not given 1999-2000

138B. International Negotiation—Almost every major international event or continuing institution has been shaped by a negotiation. A negotiator can balance the push for a favorable outcome against the risk of a disagreement. Topics: agency in negotiation, coalitions, threats and promises, the agenda, symbolic moves, single- vs. multi-issue negotiations, the relevance of information about the other party, bargaining chips, mediation, bargaining in good faith, and honesty. Experiential learning, where students take on assigned roles in negotiation, then analyze and discuss their strategies and experiences. (WIM)

5 units, Spr (O’Neill)

139B. Seminar: Foreign Policy Decision-Making—Foreign policy events are unusually well documented: sometimes transcripts of leaders’ deliberations are available, making these cases uniquely valuable ways to explore theories of real decision-making. Cognitive psychology, organizational behavior, and decision analysis are joined with history and international relations. Topics: belief systems and operational codes; symbolic, analogical, and metaphorical thinking; counterfactual reasoning; motivated misperception, hindsight, probability biases and other heuristics; utility theory, and its alternatives, including prospect theory and other approaches; decision making under the pressure of a crisis; and organizational influences on decisions.

5 units, Aut (O’Neill)

140B. Chinese Foreign Policy—(Same as 240M.) Introductory. The origins of Chinese foreign policy. China’s intentions, capabilities, and strategies in world affairs since 1949, Chinese crisis behavior, and national security institutions and processes.

5 units (Oksenberg) not given 1999-2000

142S. Seminar: Advanced Study in the United Nations and the Wars of the 1990s—The UN has in recent years played a lead role in conflict management. Topics: peacekeeping, the implementation of peace agreements in civil wars, humanitarian intervention, mediation, preventative diplomacy, UN reform, and relations between the U.S. and the UN. Case studies evaluate the UN’s performance in preventing, managing, and resolving various wars in the 1990s including Cambodia, El Salvador, Mozambique, Rwanda, and the former Yugoslavia.

5 units (Stedman) not given 1999-2000

143S. Major Issues in International Conflict Management—Surveys contemporary issues of international conflict management: conflict prevention, mediation and implementation of peace agreements, peacekeeping, peacebuilding, and humanitarian intervention. Topics: ethical dilemmas of conflict management, evaluation of international, regional, and non-governmental organizations in conflict management, the future of the UN, and the use of economic sanctions.

5 units, Spr (Stedman)

149. Directed Reading/Research in International Relations—Advanced individual study in international relations.

any quarter (Staff)
159R. Issues in Public Service—Preference to freshmen and sophomores who will/are participating in service activities through the Haas Center or enrolling in courses with service learning components. What does it mean to “do” public service? Why should or should not citizens do volunteer work? Is public service by definition a good thing? The historical context of public service work in the U.S., introducing the range of ethical concerns involved with service. Provides the basis for a more intimate connection between the undergraduates’ service activities and his or her academic experiences at Stanford.

5 units, Win (Reich)

161S. Seminar: Democratic Theory—The major questions in modern democratic theory, including obedience to authority, alienation, participatory democracy, and political tolerance.

5 units, Aut (Sniderman)

162. Seminar: Capitalism and Democracy—Attacks on and defense of the workings of the American political economy, emphasizing competing theories of democracy.

5 units, Win (Manley)

165S. Graduate Seminar: Topics in Democratic Theory—(Same as Philosophy 271.)

3-5 units (Ferejohn, Satz) not given 1999-2000

167. Seminar: Gender, Development, and Women’s Human Rights in International Perspective—(Same as 267.) The intersections of gender and development theory and practice. The evolution of development theory from modernization to neoliberal, and the parallel growth of feminist critiques. The effects of specific economic, social, educational, and environmental development policies on women, and women’s activism around these policies at the national and international levels. Examples from the developing regions: Asia, Africa, Latin America, and the Middle East. GER:4c (DR:t)

5 units, Aut (Okin)

169. Directed Reading/Research in Political Theory—Advanced individual study in political theory.

any quarter (Staff)

AMERICAN POLITICS

170. Judicial Politics and Constitutional Law: The Federal System—The interaction of law and politics, and the role of the U.S. Supreme Court in constitutional interpretation and the political system generally. Focus is on major court cases dealing with separation of powers and federalism. Prerequisites: 10 or equivalent, and sophomore standing.

5 units, Win (Barker)

171. Judicial Politics and Constitutional Law: Civil Liberties—The role and participation of courts, primarily the U.S. Supreme Court, in public policy making and the political system. Judicial activity in civil liberty areas (religious liberty, free expression, race and sex discrimination, political participation, and rights of persons accused of crime). Prerequisites: 10 or equivalent, and sophomore standing.

5 units, Spr (Buchman)

172R. Undergraduate Colloquium: Constitutional Interpretation in History and Theory—(Enroll in History 250B.)

5 units (Rakove) not given 1999-2000

172J. Undergraduate Colloquium: Thomas Jefferson and his World—(Enroll in History 250C.)

5 units, Spr (Rakove)

173M. Critical Overview of American Political History—Critics and defenders of American “democratic capitalism,” from colonial times to present. Prerequisite: 10 or consent of instructor.

5 units, Spr (Manley)

174M. Seminar: The American Dream—Open to juniors and seniors. The American dream in American history. Weekly meetings discuss readings and individual research projects. Prerequisite: 60, or consent of instructor.

5 units, Spr (Manley)

175R. Seminar: Judicial Biography in the Study of Law and Courts—The Life and Times of Justice Thurgood Marshall—Overview of the use of judicial biography in understanding the nature and functions of courts and law in American politics and society, with an intensive study of the life and times of Justice Thurgood Marshall. Prerequisite: advanced undergraduate or graduate standing with two or three courses in law, or law related courses, and/or consent of instructor.

5 units, Win (Barker)

176. Seminar: The Supreme Court—Intensive study of the U.S. Supreme Court and its role in the governing system. Topics: the court as a political-legal institution, judicial recruitment and selection, the nature and dynamics of judicial decision-making in individual and collegial contexts, and the differential role and responsiveness of the court as compared to other governing institutions. Prerequisites: 170 or 171 and junior standing, or consent of instructor.

5 units, Win (Barker)

177. Seminar: Courts, Politics, and Public Policy—The role and interaction of courts with other political institutions and interests in the formulation and implementation of public policy. Prerequisites: 170 or 171 and junior standing, or consent of instructor.

5 units, Spr (Buchman)

178. Environmental Policy and Law—(Enroll in Human Biology 125)

5 units, Spr (Rosencranz)

178R. Natural Resources Policy—(Enroll in Human Biology 131)

5 units, Win (Rosencranz)

180. Courts, Color, and the Constitution—A political-legal analysis of the role of the judiciary, especially the U.S. Supreme Court, in dealing with matters relating to race. Focus is on the development and application of jurisprudential doctrines in historical and contemporary perspective; and how legal concepts have influenced public policy and public discourse on race. Prerequisites: 10 or consent of instructor, sophomore standing and some relevant background social science course.

5 units (Barker) not given 1999-2000

180R. Global Environment Policy and Law—(Enroll in International Relations 135)

5 units, Aut (Rosencranz)

181. African Americans and the Political System—African Americans as political actors and the development and use of political resources as the means to achieve policy objectives. Emphasis is on the role and differential responsiveness of governing institutions to the concerns of African Americans. Prerequisite: 10 or consent of instructor.

5 units (Staff) not given 1999-2000

182F. Introduction to American Law—(Same as American Studies 179, Law 106.) American law for undergraduates. The structure of the American legal system, including the courts; American legal culture; the legal profession and its social role, the scope and reach of the legal system, the background and impact of legal regulation, the relationship between the American legal system and American society in general. Prerequisite: 10 or consent of instructor. GER:3b (DR:9)

5 units, Aut (Friedman)

184W. Issues of Representation in American Politics—How the mass citizenry and organized interests are represented in American politics and the policy making process. Focus is on problems of representation in controversies over social and economic policies that evolve economic
and ethnic cleavages in society. Problems of minority representation, including a comparison of the issues confronting Asian American, Chicano/a, Native American, and African American groups. Prerequisite: 10 or consent of instructor. GER:3b (DR:9)
5 units, Win (Wong)

5 units, Spr (Wong)

186. Urban Politics—Introduces the major actors, institutions, processes, and policies of sub-state government in the U.S., focusing primarily on city general-purpose governments through a comparative examination of historical and contemporary politics. Issues are related to federalism, representation, voting, race, poverty, housing, and finances. Prerequisite: 10 or consent of instructor. GER:3b (DR:9)
5 units, Win (Fraga)

187. Introduction to the Politics of Educational Analysis—(Enroll in Education 220B.)
4 units, Spr (Kirst)

191J. Seminar: The Politics of the American Macro-Economy—(Same as 291J.) Survey of the relationship between the American macro-economy, public opinion, elections, and policy outcomes. Examples include the links between the state of the American macro-economy and election outcomes, the existence of a political business cycle, and the origins and consequences of public opinion on economic matters. How people learn about the macro-economy, the role of the media in shaping public opinion about the economy, and the implications for representation and policy-making. 5 units (Jackman) not given 1999-2000

192F. Seminar: Politics of Race and Ethnicity in the United States—Examines the historical and contemporary politics of selected communities of color to comprehensively understand American political development and the important issues in current American politics. The issues common to communities of color (educational opportunity, vote dilution, and immigration). Participation in a class debate on affirmative action. 5 units (Fraga) given 2000-01

193. Politics by the Numbers—Analysis of the uses of statistics in political argument and in political science. Elementary statistical concepts (e.g., research design, sampling, correlation, inference, and threats to validity). The "political" uses of statistics in settings such as polling data in political campaigns, and in evaluating public policy (e.g., education, welfare, the environment). Research and analysis paper. Prerequisite: 10 or consent of instructor. 5 units, Spr (Jackman)

194C. The Press and the Political Process—(Enroll in Communication 260.)
5 units, Spr (Iyengar)

196. Issues of Race in American Politics—Surveys the forms that racism takes in contemporary American political thinking, emphasizing the connections, if any, between central values in the American political tradition, e.g., self-reliance and individualism, attitudes toward Blacks, and ideas about racial policies. Recent, large-scale surveys of the opinions and attitudes of Americans. Prerequisite: 10 or consent of instructor. GER:3b (DR:9)
5 units, Aut (Sniderman)

197P. Seminar: Political Beliefs and Values of Black Americans—An examination, based on original analysis and research, of the view of African Americans on current issues and controversies.
5 units, Win (Sniderman)

197S. Seminar: Prejudice and Group Conflict—An opportunity to engage in original data analysis on problems of significant social and political interest. Focus is on the analysis of prejudice, e.g., the views of white Americans toward Black Americans and Black toward white Americans.
5 units (Sniderman) not given 1999-2000

198. Directed Reading/Research in American Politics—Advanced individual study in politics. Prerequisite: 10 or equivalent. any quarter (Staff)

199A,B,C. Senior Project—Students conduct independent research work towards a senior honors thesis. See "Honors Program" above. any quarter (Staff)

199R. Seminar: Senior Research Project—Required for students writing honors theses. Focuses on acquisition of research skills and development of an appropriate research design. (WIM)
3 units, Aut (Abernethy)

GRADUATE-UNDERGRADUATE SEMINARS
Conducted as seminars or colloquia, and open to advanced undergraduates and graduates. Non-majors and majors are usually welcome, but enrollments are limited. Sign-up sheets for these courses are posted in the department office on class list sign-up days. Sheets should be checked for specific enrollment information.

GENERAL

200. Strategy in Politics—Introduction to formal theories of rational choice in political science. Basic utility, game, and social choice theory is explained and applied to topics in American, comparative, and international politics. Objectives: lay out the logical basis of rational choice methods at an accessible level, and demonstrate the application of these methods.
5 units, Aut (Morrow)

200A. Statistical Methods I—For graduate students; see 100A.
5 units, Aut (Stone)

200B. Statistical Methods II—For graduate students; see 100B.
5 units, Win (Jackman)

200C. Statistical Methods III—For graduate students; see 100C.
5 units, Spr (Jackman)

201A. Seminar: Foundations of Political Economy—(Same as Business 680.) First in a three-part sequence and a prerequisite for the remaining courses. Political economy is the study of collective decision-making and the institutions used to make and implement those decisions. The central issues and techniques in the political economy, laying a foundation for original research using methods of positive political science. Topics: social choice, majority rule, strategic behavior, agendas, norms, institutions, interest groups, and lobbying. Material is somewhat technical but accessible to most graduate students in political science, economics, and business.
5 units, Aut (Groseclose)

201B. Seminar: Economic Analysis of Political Institutions—(Same as Business P681.) Continuation of 201A, applying the techniques of microeconomic analysis and game theory to the study of political behavior and institutions, including information economics, games of incomplete information, sequential bargaining theory, repeated games, and rational expectations. Applications include agenda formation in legislatures, the implications of legislative structure, government form-
The institutional constraints in which parties operate and how electoral behavior of parties, and the way they shape the operation of government in different national and subnational settings, e.g., parliamentary and presidential systems. The institutional constraints in which parties operate and how electoral rules and social cleavages shape party systems. Why people vote, whether voters choose parties rationally to reflect their points of views, and in which way government performance shapes voting choices. Why politicians seek to further their goals and ambitions through the party, the strategies they follow to mobilize electoral support, and in what way partisan government shapes economic performance and peoples' welfare. Research and models are developed from advanced industrial democracies to understand party politics in new democracies.

212M. Seminar: Comparative Political Institutions—Overview of the range of existing political institutions and their impact on political economies. The roles of political institutions and what determines their stability, how they are chosen, and which processes enable their transformation over time. The main variances in institutional settings, emphasizing the menu of democratic institutions, e.g., parliamentary, semi-presidential and presidential systems; electoral rules; bicameralism; federalism; and legislative-executive relations. The effects of political institutions on economic growth and political stability.

213P. Seminar: Economic Reform and Development in Latin America—For graduate students and advanced undergraduates. Theoretical and policy approaches to Latin American development in recent decades, with an emphasis on issues raised, and positive and normative theories in use since the economic crises of the 1980s. Prerequisite: consent of instructor.

214M. Seminar: Chinese Communist Revolution—(Enroll in Sociology 217B.)

215. Chinese Politics—(Same as 115.)

215A. Chinese Politics: The Revolution and the Mao Years—(Same as 115A.)

215B. Chinese Politics: The Transformation and the Era of Reform—(Same as 115B.)

215D. Graduate Seminar: Approaches to Chinese Politics—Provide bibliographic control of the major secondary literature on Chinese politics, organized around theoretical concepts and issues found in studies of the Chinese political system. Prerequisite: basic knowledge of the government and politics of post-1949 China.

215E. Graduate Seminar: Political Economy of Reform in China—The content, process, and problems of China's post-Mao reform. Changes in property rights, markets, credit, and the role of the state in economic development. Comparative insights about reform in the Chinese communist system that distinguishes it from the experience of democracies to understand party politics in new democracies.

216L. Comparative Democratic Development—For graduate students; see 116L.

216M. Seminar: Environmental Politics in the Asia/Pacific Region—Focus is on the evolving ecology of Asia/Pacific from 1400 to the present (topography, climate, flora and fauna, and human populations); traditional patterns of managing and perceiving environmental issues; recent environmental consequences of industrialization and modern agriculture (trends in water, air, and soil quality; land use; and coastal
water quality); contemporary policies of Asian countries concerning their environmental problems (improved water management and effluent discharge standards, soil conservation, auto emission controls, national energy policies, transportation policies, and policies on population growth and migration); and bureaucracies, interest groups, transitional actors, and the environmental politics of Asian/Pacific countries. Emphasis is on Japan, China, Indonesia, Thailand, India, and the small Pacific island nations. Policy making and implementation processes in the environmental area: the structures and institutions established in recent years; their efficacy; and the political, economic, and cultural obstacles and inducements to implementing environmental policies. Prerequisite: consent of instructor.  
5 units (Okansen) not given 1999-2000

217M. Seminar: Evolution of the Chinese State  
5 units Win (Okansen, Miller)

218L. Seminar: Ethnicity and Nationalism in Soviet and Post-Soviet Politics—The major theoretical approaches to the study of ethnicity and nationalism in the Soviet system and how they attempt to explain the strategies and institutions utilized by the Soviet state to manage its "nationality problem;" the impact of Gorbachev's reforms in precipitating national movements which contributed to the dissolution of the Soviet system; and the role of ethnicity and nationalism in the new states of the region.  
5 units, Win (Lapidus)

219A. European Integration—(Same as Public Policy 205, International Policy Studies 205.) Seminar on the political and economic factors shaping European integration from its conception to the present day. The evolution of the European Union and its governing institutions through the lens of several policy areas. Agricultural, regional, monetary, regulatory, and foreign policy. The debates about democratic accountability, the future of the European Union, and the interplay between EU institutions and the domestic political arenas of member states. Prerequisites: Economics 1, Political Science 1 or 10.  
5 units, Aut (Aller)

220C. Seminar: The Political Economy of Development—Latin America and other Regions—The process of economic development from a political perspective, focusing on Latin American development, with implications of the theoretical material to other regions in the developing world. Overview of theoretical classics (e.g., modernization and dependency theory); current theories of development (e.g., endogenous growth theory and the effects of inequality on growth). Recent academic contributions to questions of structural adjustment, the size of government, fiscal deficits, poverty alleviation, and budgetary politics.  
5 units, Win (Diaz-Cayeros)

221K. Seminar: Comparative Democratization—Latin America and other Regions—Critical issues of democracy, its definition, problems of transition and consolidation, and comparison. The relationship between democracy and the military, the economy, and the interstate system.  
5 units, Aut (Karl)

222D. Seminar: Non-Governmental Organizations and Development in Poor Countries—How might non-governmental organizations affect economic growth, equity, political stability, and prospects for democracy in poor countries? Do NGOs actually contribute to these goals? What is reasonable and appropriate to expect from the NGO sector? Interactions among NGOs with wealthy countries; NGOs based in poor countries, governments, international financial institutions, and multi-national corporations.  
5 units (Abernethy) given 2000-01

223. Seminar: Japanese Politics—The primary institutions in Japanese politics (the bureaucracy, legislature, political parties, and interest groups) through the lens of the major theories that have been used to explain their structure and behavior (statism, pluralism, elitism, and network theory).  
5 units, Win (Staff)

223M. Seminar: Political Economy of Post-Communism—The sources of the collapse of the communist states in Eastern Europe and the former Soviet Union. Issues facing the formation and consolidation of post-communist states and societies, including democratization, privatization, nationalism, and foreign relations between newly independent states. Models and historical analogues for analyzing the emergence of post-communist polities. Prerequisite: 121M.  
5 units (McFaul) not given 1999-2000

224. Seminar: States and Markets in Development—For graduate students and advanced undergraduates. Research-oriented; focus is recent trends in most of the world toward market-oriented policies and models of national development: what has happened, why, what it means and how to evaluate it. Prerequisite: consent of the instructor.  
5 units (Packenham) not given 1999-2000

225. The Rise of Industrial Asia—See 125. Limited to graduate students.  
5 units, Win (Oi, Okansen, Rohlen, Rowen, Staff)

5 units, Aut (Mares)

227D. Seminar: Consolidating Democracy—Problems and processes in consolidating new or recently restored democracies. Examples and illustrations from Europe, Asia, Africa, and Latin America, with emphasis on the new democracies of the post-1974 "third wave" period. The nature of consolidation and its relationship to legitimation; legacies of authoritarian rule and the transition; design of political institutions; (re)building political parties; crafting agendas and constructing coalitions; problems of democratic governance (delivering accountability, a rule of law, electoral integrity); the relationship between consolidation and structural economic reform, managing ethnic and regional conflict; establishing civilian control over the military; developing a democratic civil society and political culture; and the role of international actors. Students write a major research paper on an individual country.  
5 unit (Diamond) given 2000-01

228D. Seminar: Non-Governmental Organizations and Development in Poor Countries—How might non-governmental organizations affect economic growth, equity, political stability, and prospects for democracy in poor countries? Do NGOs actually contribute to these goals? What is reasonable and appropriate to expect from the NGO sector? Interactions among NGOs with wealthy countries; NGOs based in poor countries, governments, international financial institutions, and multi-national corporations.  
5 units (Abernethy) given 2000-01

229. Directed Reading in Comparative Politics  
any quarter (Staff)

INTERNATIONAL RELATIONS

234P. The Role of Technology in National Security—(Enroll in Engineering-Economic Systems and Operations Research 193; same as 134P.)  
3 units, Aut (Perry)

237S. Seminar: War in the 20th Century—The causes, character, and consequences of war in the 20th century provides a survey of trends in warfare. The processes of the totalization of war: interstate and civil
239. Game Theory Applications in Political Science—Game theory applications in international relations, legislative decision-making, the development of institutions and other areas. The philosophy and the mechanics of game models. Goal: the ability to read critically articles using the approach, and to promote student skill in formulating such models themselves. Recommended: prior course in game theory.
   5 units, Win (O’Neill)

240M. Chinese Foreign Policy—For graduate students only; see 140M.
   5 units (Oksenberg) not given 1999-2000

241. Seminar: Issues in International Political Economy—Open to master’s students and to advanced undergraduates. Critical examination of the major theories which shed light on contemporary issues of global economic relations.
   5 units, Win (Goldstein)

241B. Seminar: Decision Making in U.S. Foreign Policy—(Same as International Policy Studies 208.) Priority given to students in International Policy Studies. The formal and informal processes involved in U.S. foreign policy decision-making. The formation, conduct, and implementation of policy, emphasizing the role of the President and Executive Branch agencies. Theoretical and analytical perspectives are supplemented by case studies. Preparation of policy memorandum and substantial research paper or take-home final.
   5 units, Spr (Blacker)

242F. Graduate Seminar: The Politics of Ethnicity—Why do political coalitions form along ethnic lines in some places and at some times but not others? Why do conflictual but peaceful interethnic relations become violent at some times and in some places but not others?
   5 units (Fearon) not given 1999-2000

243A. Graduate Seminar: International Relations Theory—Introduction to contemporary theories of international politics. Micro and macro approaches to the study of conflict and cooperation in world politics, including the work of Carr, Waltz, Gilpin, Keohane, and Bueno de Mesquita. Format emphasizes student oral and written presentations of assigned readings.
   5 units, Spring (Hansot)

243B. Seminar: Theoretical Issues in International Security—Critical examination of the major theories concerned with international security. The theories are reviewed at a variety of levels of analysis (systemic, domestic politics, organizational, and psychological). Short research design papers and a longer literature review essay.
   5 units, Spr (Krasner)

243C. Seminar: Theoretical Issues in International Political Economy—For Ph.D. students only. Major contemporary theories affecting global economic relations and related national policies.
   5 units, Spr (Goldstein)

   5 units (Rice) not given 1999-2000

249. Directed Reading in International Relations
   any quarter (Staff)

POLITICAL THEORY

Graduate students in Political Theory should also see courses numbered 150-169.
course in political theory. GER:4c (DR:†)
5 units (Okin) not given 1999-2000

267. Seminar: Gender, Development, and Women's Human Rights in International Perspective—(Same as 167.)
5 units, Aut (Okin)

268. Seminar: Contemporary Theories of Justice—Social and political justice. Facilitates understanding of the major contemporary debates in political theory. The major recent works that develop the principles of justice, and the political arrangements that best satisfy their requirements.
5 units (Okin) not given 1999-2000

269. Directed Reading in Political Theory
any quarter (Staff)

AMERICAN POLITICS

272R. Graduate Colloquium: Creating the American Republic—
(Enroll in History 372.)
4-5 units, Win (Rakove)

291F. Seminar: Urban Politics and Policy—Graduate and undergraduate. The major theoretical approaches used in the analysis of urban politics and policy. Assesses the fundamental conclusions about American politics reached by urban scholars as to how subsequent interpretations continue to set the context for scholarly debate and an understanding about American political development generally.
5 units, Spr (Fraga)

291J. Seminar: The Politics of the American Macro-Economy—
(Same as 191J.)
5 units (Jackman) not given 1999-2000

292A. Graduate Seminar: Approaches to the Study of American Politics—Theories of American politics, focusing on Congress, the presidency, the bureaucracy, and the courts.
5 units, Aut (Fiorina)

292B. Graduate Seminar: Topics in American Political Behavior—
For graduate students with some background in American politics embarking on their own research. Current research in American politics, emphasizing political behavior and public opinion. Possible topics: uncertainty and ambivalence in political attitudes, heterogeneity in public opinion, the structure of American political ideology, political leaning, the media as a determinant of public opinion, and links between public opinion and public policy.
5 units, Win (Jackman, Snideman)

292C. Graduate Seminar: American Political Institutions—Students undertake supervised research in American politics and political behavior, producing a research proposal, and conducting research leading to the completion of a significant scholarly paper. Corequisites: 292A,B.
5 units, Spr (Ferejohn, Moe)

292D. Research and Writing—Students undertake supervised research in American politics and behavior, leading to the completion of a significant scholarly paper. Prerequisites: 292A,B,C.
5 units, Aut (Iyengar, Wong)

293. Graduate Seminar: Models of Political Choice—Recent research on political reasoning in mass publics. The nature of ideology, the role of political values, the framing of political issues, informational constraints, and alternative conceptions of the process of political choice.
5 units (Snideman) not given 1999-2000

294. The Press and the Political Process—(Enroll in Communication 260.)
4 units, Win (Iyengar)

294C. Graduate Seminar: Politics of Social Policy and Race—The politics of social policy-making in the U.S. Topics: partisan conflict over social policy; the role of budgeting in the making of welfare policy, interest group influence and the nature of public opinion. Focus is on the relationship between the politics of race and welfare policy. Social policy issues include welfare policy, health care, affirmative action, and language policy.
5 units, Spr (Wong)

296. Seminar: Racial and Ethnic Politics in the U.S.—Focus is on the evolution of racial and ethnic politics in the U.S., examining the political development of the American polity generally. Goal: the construction of a comprehensive theory of American political development which can incorporate race and ethnicity.
5 units (Wong) given 2000-01

297. Graduate Seminar: The Political Economy of Immigration—
The theoretical and empirical literature on migration politics and the economic causes and effects of migration. The political economy of American immigration in comparative perspective. The immigration dilemmas of governments in Western Europe, Asia, and Australia.
5 units (Wong) given 2000-01

298. Directed Reading in American Politics
any quarter (Staff)

GRADUATE SEMINARS

Seminars numbered 300 and above are limited to graduate students. Instructors should be consulted before enrolling.

300. Thesis
any quarter (Staff)

311. Graduate Seminar: Major Theories in Comparative Politics—
Required for all Political Science Ph.D. students with comparative politics as a first or second concentration; others by consent of instructor. Major theoretical approaches in comparative politics including modernization, institutionalist, Marxist, rational choice, cultural, and new institutionalist theories; also theories about major regime types (democracy, authoritarianism, totalitarianism) and transitions between them. Enrollment limited to 14.
5 units, Aut (Packenham)

312. Seminar: Comparative Political Analysis—For Political Science Ph.D. candidates. Required of all students with comparative politics as a first or second concentration. Qualified Ph.D. candidates in other departments and A.M. candidates in Political Science may be admitted with consent of the instructors. Enrollment limited.
5 units, Win (Abernethy)

313H. Graduate Seminar: Historical Approaches to Social Science—(Enroll in History 482.)
4-5 units, Spr (Haber)

314K. Seminar: Political Economy of Development—The major development theories in the area of comparative politics, emphasizing the interplay between global and domestic factors, and economics and politics in the developing world.
5 units (Karl) not given 1999-2000

315F. Graduate Seminar: Topics in Chinese Politics—In depth examination of selected topics in Chinese politics. Content varies each year.
5 units, Spr (Oi)

340. Seminar: New Approaches to International Security—Live televised seminar between Stanford and the universities of Minnesota and Wisconsin. Innovative interdisciplinary approaches to security from the political science, sociology, anthropology, history, and engineering perspectives. Issues relating to war, nationalism, ethnic conflict, conflict
resolution, democratization, and sustainable development. Approaches and issues are related to changing understandings of international security and conflicting disciplinary assumptions and methodologies.

5 units, Aut (Eden)

343A, B, C. Research Seminar: International Security and Social Science—Advanced graduate students, faculty, and visitors present current research on contemporary problems in international security.

1 unit, Aut, Win, Spr (Eden, Sagan)

380A, B, C. Workshop on Political Economy

5 units, Aut, Win, Spr (Ferejohn, Weingast)

401. Seminar: Graduate Orientation—Open to first-year graduate students in Political Science.

1 unit, Aut (Staff)

402A, B, C. Seminar: Graduate Speaker Series—Open to graduate students in Political Science.

1 unit, Aut, Win, Spr (Goldstein)

OVERSEAS STUDIES

Courses approved for the Political Science major and taught overseas can be found in the "Overseas Studies" section of this bulletin, or in the Overseas Studies office, 126 Sweet Hall.

MORRISON INSTITUTE FOR POPULATION AND RESOURCE STUDIES

Faculty: (Director) Marcus W. Feldman (Biological Sciences); Carl Djerassi (Chemistry), William Durham (Anthropological Sciences), Paul R. Ehrlich (Biological Sciences), Lawrence H. Goulder (Economics, Institute for International Studies), Mary Lake Polan (Gynecology and Obstetrics), Shripad Tuljapurkar (Consulting Professor)

Although Stanford University does not have a formal degree program in population studies, it does have scholars of international reputation in such specialties as demographic history, demographic methods, economic demography, epidemiology, population biology, population genetics, and the sociology and anthropology of populations.

The Morrison Institute for Population and Resource Studies is an interdisciplinary group serving three major functions: (1) encouraging graduate work in population studies through fellowship grants and supervision, (2) instituting courses and seminars in population studies, and (3) bringing visiting faculty to Stanford to strengthen existing course offerings. The institute also organizes an interdisciplinary Colloquium on Population Studies to introduce upper-division undergraduates and graduate students to a variety of issues in population-related specialties.

For the convenience of interested students, offerings of population and resource studies at Stanford are listed below.

COURSES

ANTHROPOLOGICAL SCIENCES

22N. Stanford Introductory Seminar: Genes, Peoples, and Diversity

3 units (Mountain) not given 1999-2000

105. Race, Gender, and Biology

5 units (Durham) not given 1999-2000

123. Environmental Issues in the Americas

5 units (Staff) not given 1999-2000

150. Population and Society

5 units (Wolf) not given 1999-2000

151. Demography in Anthropology

5 units (Staff) not given 1999-2000

153. The Population Question: From Malthus to Rio

3-5 units (Durham) not given 1999-2000

154. The Limits to Growth

3-5 units (Staff) not given 1999-2000

160. Development and Environment

5 units (Staff) not given 1999-2000

161. Conservation and Development Issues in the Amazon

5 units (Durham) not given 1999-2000

162. Indigenous Peoples and Environmental Problems

3-5 units (Durham, Charnley) not given 1999-2000

163. Community-Based Conservation

5 units (Charnley) not given 1999-2000

164. Ecological Anthropology—(Same as Human Biology 134.)

5 units, Spr (Durham, Charnley)

165. Human Ecology of the Amazon

5 units, Win (Lu)

166. Indigenous Forest Management

5 units (Irvine) not given 1999-2000

167/267. Social Policy for Sustainable Resource Use

5 units, Win (Irvine)

168. Ecology and Equity

5 units, Win (Guha)

170/270. Medical Anthropology

5 units, Aut (Barnett)

181. Genes and Culture through Time and Space

5 units (Mountain) not given 1999-2000

204. Culture and Politics in South Asia

5 units, Win (Guha)

251. Anthropological Solutions to Environmental Problems

5 units (Staff) not given 1999-2000

252. Political Ecology

5 units (Durham) not given 1999-2000

266. Human Evolutionary Ecology

5 units, Spr (Lu)

BIOLOGICAL SCIENCES

13N. Stanford Introductory Seminar: Environmental Problems and Solutions

3 units, Spr (Ehrlich)

15N. Stanford Introductory Seminar: Environmental Literacy

3 units, Win (Schneider) alternate years, not given 2000-01

16N. Stanford Introductory Seminar: Island Ecology

3 units, Win (Vitousek)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units, Term(s)</th>
<th>Instructor(s)</th>
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<tr>
<td>17N</td>
<td>Stanford Introductory Seminar: Assessment of Chronic, Low-Level Environmental Risks</td>
<td>3, Aut (Kennedy)</td>
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<td>22Q</td>
<td>Stanford Introductory Seminar: Infection and Immunity</td>
<td>3, Spr (Jones)</td>
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<tr>
<td>51</td>
<td>Evolution, Genetics, and Ecology</td>
<td>5, Aut (Watt, Simon, Gordon, Vitousek)</td>
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<tr>
<td>117</td>
<td>Biology and Global Change—(Same as Earth Systems 111.)</td>
<td>3, Win (Matson, Vitousek, Mooney)</td>
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<tr>
<td>125</td>
<td>Ecosystems of California</td>
<td>3-4 units (Mooney)</td>
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<tr>
<td>138</td>
<td>Ecology and Evolution of Plants</td>
<td>3-5 units, Spr (Ackerly) alternate years, not given 2000-01</td>
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<tr>
<td>140</td>
<td>Population Biology of Butterflies</td>
<td>2-5 units (Ehrlich) alternate years, given 2000-01</td>
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<tr>
<td>142/242</td>
<td>Principles of Ecology—(Same as Geophysics 142.)</td>
<td>4, Aut (Roughgarden)</td>
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<tr>
<td>146</td>
<td>Colloquium on Population Studies</td>
<td>1, Win (Feldman)</td>
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<tr>
<td>175H</td>
<td>Problems in Marine Biology</td>
<td>12 units, Spr (Gilly, Levine, Somero, Epel, Thompson, Watanabe)</td>
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<tr>
<td>194/294</td>
<td>Seminar in Environmental Policy Research</td>
<td>3 units (Ehrlich) alternate years, not given 2000-01</td>
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<tr>
<td>216</td>
<td>Ecosystem Ecology and Global Biogeochemistry</td>
<td>3 units (Vitousek) alternate years, given 2000-01</td>
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<tr>
<td>217</td>
<td>Climate Theory, Modeling, Applications, and Implications—(Same as Civil and Environmental Engineering 263S.)</td>
<td>3, Win (Schneider) alternate years, not given 2000-01</td>
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<tr>
<td>383</td>
<td>Seminar in Population Genetics</td>
<td>1-3 units, Aut, Win, Spr (Feldman)</td>
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<tr>
<td>384</td>
<td>Seminar in Theoretical Ecology—(Same as Geophysics 385Y.)</td>
<td>1-3 units, Spr (Roughgarden)</td>
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<tr>
<td>61Q</td>
<td>Stanford Introductory Dialogue: Big Dams, City Hall, and the Sierra Club</td>
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<td>64</td>
<td>Air Pollution: From Urban Smog to Global Change</td>
<td>3, Spr (Jacobson)</td>
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<tr>
<td>265</td>
<td>Sustainable Water Resources Development</td>
<td>3, Win (Ortolano)</td>
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<td>266</td>
<td>Environmental Policy Design and Implementation</td>
<td>4, Spr (Ortolano)</td>
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<tr>
<td>86</td>
<td>Environmental Politics and Development</td>
<td>5 units (Gupta) not given 1999-2000</td>
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<td>113A,B,C</td>
<td>Ethics of Development in a Global Environment (EDGE)—(Same as Engineering 297A,B,C.)</td>
<td>1-4 units, Aut, Win, Spr (Lastignan, Gupta)</td>
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<td>Anthropology of Medicine: Illness, Suffering, and Health Policy</td>
<td>5 units, Spr (Kohrman)</td>
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<td>169/269</td>
<td>The Scientific, Economic, and Political Issues of Radioactive Waste</td>
<td>2 units, Spr (McWilliams)</td>
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<tr>
<td>170/270</td>
<td>Multidisciplinary Perspectives on Environmental Justice</td>
<td>2-3 units (Thompson) not given 1999-2000</td>
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<tr>
<td>118</td>
<td>The Economics of Development</td>
<td>5 units, Spr (Chun)</td>
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<tr>
<td>126</td>
<td>Comparative Economic Institutions: The Economics of Transition</td>
<td>5 units, not given 1999-2000</td>
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<tr>
<td>155</td>
<td>Environmental Economics and Policy—(Same as Earth Systems 112.)</td>
<td>5 units, Win (Staff)</td>
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<tr>
<td>214</td>
<td>Microeconomic Issues in Economic Development</td>
<td>5 units, Spr (A. Krueger, Rosenzweig)</td>
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<tr>
<td>243</td>
<td>Economics of the Environment</td>
<td>5 units, not given 1999-2000</td>
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<td>103/203</td>
<td>The World Food Economy—(Same as Economics 106.)</td>
<td>5 units, Win (Falcon, Naylor)</td>
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<td>119/219</td>
<td>Development and Population Interactions in the Third World</td>
<td>5 units, Win (Yotopoulos)</td>
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<td>446</td>
<td>Transportation, Energy, and Environment Research Roundtable (TEERR)</td>
<td>1 unit, Aut, Win, Spr (Sweeney)</td>
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<tr>
<td>105</td>
<td>Economics of Natural Resources</td>
<td>4 units, Win (Sweeney)</td>
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<tr>
<td>249</td>
<td>Growth and Development</td>
<td>3 units, Sum (de La Grandville)</td>
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<tr>
<td>446</td>
<td>Transportation, Energy, and Environment Research Roundtable (TEERR)</td>
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<td>44N</td>
<td>Stanford Introductory Seminar: Emerging Issues in Global Environmental Change</td>
<td>3 units, Spr (Matson) alternate years, not given 2000-01</td>
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<td>45N</td>
<td>Stanford Introductory Seminar: Detecting Changes in Climate and the Environment</td>
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<td>131</td>
<td>Environmental Earth Sciences II</td>
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<tr>
<td>160</td>
<td>Introduction to Statistical Methods for Earth and Environmental Sciences</td>
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<td>170</td>
<td>Environmental Geochemistry</td>
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<td>223</td>
<td>Seminar in Environmental Problem Solving</td>
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<td>HUMAN BIOLOGY</td>
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<td>Human Diversity: A Linguistic Perspective</td>
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<td>119</td>
<td>Conservation Biology</td>
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<td>125</td>
<td>Environmental Policy and Law</td>
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<td>131</td>
<td>Natural Resources Policy</td>
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<td>Global Environmental Policy and Law</td>
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<td>137</td>
<td>The Role of Population in Developing Countries</td>
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<td>138</td>
<td>Theories in Demography</td>
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<tr>
<td>141</td>
<td>Race, Poverty, and the Environment</td>
<td>5</td>
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<tr>
<td>147</td>
<td>The Road to Buenos Aires: Controlling Climate Change in the 21st Century</td>
<td>3</td>
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<td>148</td>
<td>Environmental Policy</td>
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<td>150</td>
<td>Gender-Specific Perspectives on Birth Control</td>
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<td>152</td>
<td>Environmental Policies and Institutions in Developing Countries</td>
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<td>167</td>
<td>International Health</td>
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<td>181</td>
<td>Evolutionary Anthropology</td>
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<tr>
<td>182</td>
<td>Urban Environmental Policy—(Same as Urban Studies 182.)</td>
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<td>207</td>
<td>Methods of International Policy Analysis</td>
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<td>International Environmental and Resource Economics</td>
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<td>129</td>
<td>International Health Policy: Comparative National Health-Care Systems</td>
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<td>South Asia: Environment, Development, and Security</td>
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<td>LATIN AMERICAN STUDIES</td>
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<td>87Q</td>
<td>Stanford Introductory Seminar: Urbanization, Poverty, and Children in Latin America</td>
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<td>195</td>
<td>Perspectives on Sustainable Development in Latin America</td>
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<td>OVERSEAS STUDIES</td>
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<td>122P</td>
<td>Environmental Policy in Europe</td>
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<td>MOSCOW</td>
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<td>21</td>
<td>Ethnic Moscow</td>
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<td>SANTIAGO</td>
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<td>106H</td>
<td>Man-Environment Interactions: Case Studies from Central Chile</td>
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<td>162X</td>
<td>Core Seminar: Ecology-Policy Studies</td>
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<td>PHILOSOPHY</td>
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<td>77</td>
<td>The Ethics of Social Decisions: Racism, Poverty, and Environmental Justice</td>
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<td>POLITICAL SCIENCE</td>
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<td>216M</td>
<td>Seminar: Environmental Politics in the Asia/Pacific Region</td>
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<td>297</td>
<td>Graduate Seminar: The Political Economy of Immigration</td>
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<td>SCIENCE, MATHEMATICS, AND ENGINEERING</td>
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<td>1A,B,C</td>
<td>Earth Resources and the Sustainability of Life</td>
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<td>SCIENCE, TECHNOLOGY, AND SOCIETY</td>
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<tr>
<td>114Q</td>
<td>Stanford Introductory Seminar: Urbanization, Poverty, and Children in Latin America</td>
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<td>279</td>
<td>Technology, Policy, and Management in Newly Industrializing Countries</td>
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<td>SOCIOLOGY</td>
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<td>134</td>
<td>Education and the Status of Women: Comparative Perspective—(Same as Education 197.)</td>
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<td>217</td>
<td>China's Social Transformation</td>
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</table>
The courses and research opportunities in the Department of Psychology introduce students to the vast corpus of data on, and explanations of, human nature and human behavior. Through the study of, for example, abnormal behavior, aging, decision-making, emotion, group behavior, infancy, language, learning and memory, personality, social perception, and visual perception, students are introduced to the properties of sensory, cognitive, and affective systems, and of their interrelationships; to the reciprocal effects of one person on another; and to the effects on behavior of the physical, social, and cultural environment. The research programs of the faculty and students focus on the study of basic psychological mechanisms and, where appropriate, on relating basic research to the analyses and solutions of important societal problems.

The department, housed in Jordan Hall, maintains shop facilities and many computer-equipped laboratories. Bing Nursery School, located on campus at 850 Escondido Road, provides a laboratory for child observation, training in nursery school teaching, and research. It was constructed with funding from the National Science Foundation and a special grant from Mrs. Anna Bing Arnold and Dr. Peter Bing.

The department provides (1) courses designed for the general student, (2) a major program leading to the degree of Bachelor of Arts, including options for honors and a specialization in one of four content area tracks, (3) a minor program, (4) a coterminal master’s degree program leading to the degree of Master of Arts, and (5) programs of graduate study and research leading to the degree of Doctor of Philosophy. Applications are not accepted for the master’s degree except as noted below.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

Major Requirements—As of Autumn Quarter 1996-97, all students declaring in Psychology must complete a minimum of 55 units of course work in psychology. All courses taken to satisfy the 55-unit requirement must be taken for a grade of ‘C’ or better (including the grades of S and CR). All majors complete Psychology 1, Introduction to Psychology, and one course in statistics, which may be selected from Psychology 10 or 101. Beyond these two required courses, students must complete at least five of the following nine core courses:

- 20. Introduction to Brain and Behavior
- 30. Introduction to Perception
- 40. Introduction to Cognitive Psychology
- 50. Introduction to Human Neuropsychology
- 60. Introduction to Developmental Psychology
- 70. Introduction to Social Psychology
- 80. Introduction to Personality Psychology
- 90. Introduction to Abnormal Psychology
- 153. Introduction to Clinical Psychology

Students must take one writing intensive course (designated WIM) in psychology, and should check the Stanford Bulletin yearly as these courses may change.

Students enrolled in the senior Honors program may take up to 15 units in independent study and practica, including Psychology 197 and 198. Other students may count up to 10 units of independent study and practica through Psychology 194 and 195, which are graded on a mandatory satisfactory/no credit basis. The department strongly recommends that all majors take at least one seminar.

Lifestyle courses (formerly Psychology 190, 193, and 196), and Psychology 199 do not count toward the Psychology major.

Transfer students must take at least 28 units of course work in the department in order to receive the department’s recommendation for graduation. Such students may receive transfer units for courses completed in psychology at any accredited university or college provided that the courses were taught by a regular faculty member and were approved by the Transfer Credit Office. All students must satisfy the five-core course requirement through courses completed at Stanford.

Beyond the Minimal Requirement—Many students want a “stronger” program than the minimal requirements listed above. This may be achieved in any or all of these ways:

1. Within the general major, the student may take advanced undergraduate or graduate courses. The student may also take advantage of widespread opportunities for directed research, working closely with individual faculty and graduate students.
2. The student may apply to the senior honors program, described below.
3. The student may elect to pursue one of four specialization tracks:
   - Health and Development
   - Neurosciences
   - Mind, Culture, and Society
   - Cognitive Sciences

The training obtained from the pursuit of any of these options is valuable not only for students considering graduate work in psychology, but also for those thinking of professional careers outside of psychology.

Note—Students who declared the psychology major before Autumn Quarter 1996-97 have the option of completing their major requirements as described in the Stanford Bulletin 1995-96.

MINORS

Declarations—Students who wish to declare a minor field of concentration in Psychology must do so no later than the deadline for their applications to graduate.

Requirements—Completion of a minimum of seven courses in psychology is required for the minor. Beyond Psychology 1 and 10, the minor must include three of nine core courses (20, 30, 40, 50, 60, 70, 80, 90, and 153) and at least two other courses within the department. All courses to be counted toward the minor must be passed with a grade of ‘C’ or better. Lifestyle courses (formerly Psychology 190, 193, and 196) and Psychology 199 do not count toward the Psychology minor.

SPECIALIZATION TRACKS

Students in the major program, including those in the honors program, may elect to specialize in one of four tracks, namely, Health and Development; Neurosciences; Mind, Culture and Society; and Cognitive Sciences. Students must meet the general requirements for the major (Psychology 1, 10 or 101, and the five core courses) plus the requirements designated for the specialization track. Typically the courses required for the track include one or two required courses and four to six recommended courses in psychology, along with three to four courses in related disciplines. (Psychology courses completed for the track would count toward satisfying the major requirements stated above.) In the ideal case, the student who specializes would acquire an understanding of a range of

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psychological processes, as well as an appreciation of the significance of these processes in the chosen area of application. In this way, specialization could facilitate the student’s preparation for a professional career in, for example, medicine, business, or counseling, or for graduate work in psychology and a more academic career. Information about the required and recommended courses for each track is available from the Undergraduate Coordinator in Building 420, room 214. After declaring a major, a student who wants to specialize should discuss the chosen track with the Undergraduate Coordinator or his/her assigned adviser.

For information concerning the coterminal bachelor’s and master’s degree program, see below.

HONORS PROGRAM

The senior honors program is designed for exceptionally able students who wish to pursue a year of intensive supervised independent research. Admission to the program is made at the end of the student’s junior year on the basis of (1) excellent academic performance, (2) previous research experience, and (3) recommendations by faculty and/or graduate students. An information meeting about the program is held in Winter Quarter.

Students interested in the program should involve themselves in research as early as possible and acquire a broad general background in a chosen area. The program is particularly appropriate for students planning to go to graduate school in psychology and in other social sciences, as well as computer science, business, law, and medicine.

Funds for research are available in the form of Firestone Grants (applied for early in Spring Quarter of the junior year) and Small Grants (applied for early in Autumn Quarter of the senior year). Information is available at the Undergraduate Research Opportunities office in Sweet Hall.

During Autumn Quarter of the senior year, students participate in a weekly seminar concerned with general methods and issues in psychological research. At the same time, they plan for research under the supervision of an appropriate faculty member, and proposals are presented orally at the seminar for discussion. A written copy of the proposal is turned in at the end of Autumn Quarter. During Winter and Spring Quarters, students are primarily involved in completing research and writing the honors thesis. Students present completed projects at a convention at the end of Spring Quarter, attended by other students, faculty, and graduate students.

GRADUATE PROGRAMS

There are no specific course requirements for admission to the doctoral program. However, an applicant should have research experience as an undergraduate, as well as the equivalent of an undergraduate major in psychology. The major focus of the doctoral program is on research training, and admission is highly selective.

Applicants for admission must submit their scores on the Graduate Record Examination (both general and psychology subject tests) as part of the application. This examination may be taken at most universities and colleges.

MASTER OF ARTS

University requirements for the master’s degree are described in the “Graduate Degrees” section of this bulletin.

The Department of Psychology normally offers an A.M. degree only to students concurrently enrolled in its Ph.D. program or students concurrently pursuing coterminal A.B. and A.M. degrees. All applicants must satisfy University residency requirements for the degree and are responsible for consulting with their primary departments or the Financial Aid Office about the effects of the proposed program on their current funding.

Stanford undergraduate students who would like advanced training in psychology may apply for a coterminal A.M. degree in psychology. To do so, students should consult with the student services officer in the department. Along with a coterminal program application, applicants must submit (1) a statement of purpose, (2) a program plan specifying the courses in which they intend to enroll to fulfill degree requirements, (3) at least two letters of recommendation from Stanford faculty members familiar with their academic work, (4) a current Stanford undergraduate transcript, and (5) a written agreement by a member of the psychology faculty to serve as the student’s adviser. This program is limited in size and admissions are selective. Students should apply to this program between their eighth and eleventh quarters of undergraduate study. The department’s deadline for the submission of an application to the coterminal program is March 20.

In exceptional cases, students concurrently enrolled in another doctoral or professional program at Stanford may also apply for the A.M. degree. Such applicants should also consult with the department’s student services officer, and need to submit (1) a written agreement by a member of the Psychology faculty to serve as the student’s adviser, (2) a statement of purpose, (3) a program plan specifying the courses in which they intend to enroll to fulfill degree requirements, (4) at least two letters of recommendation from Stanford faculty members familiar with their academic work, (5) complete undergraduate transcript(s), (6) a current Stanford transcript, and (7) GRE (or professional school test) scores.

Students must complete at least 36 units of psychology courses for the degree. (For coterminal degree students, course work for the master’s degree may not duplicate courses taken for the undergraduate degree.) Of these 36 units, at least 18 must be in psychology courses numbered 200 or above. Units from Psychology 275 (Graduate Research) may be counted toward these 18 units; service as a teaching assistant for Psychology 1 or 60, through registration in 257 or 281 (Practicum in Teaching), may be counted for up to 3 of these 18 units. Two of the graduate courses must be selected from the courses listed as “core course” requirements for the Ph.D. in psychology. In addition, at least one statistics course beyond the introductory level is required. The course must be approved by the student’s adviser. All courses to be counted toward the master’s degree must be passed with a grade of “B” or better (unless the course is offered only on a satisfactory/no credit basis). Demonstration of competence in the design and execution of psychological research is also required for receipt of the master’s degree. Normally, this demonstration entails completion of a master’s thesis. However, evidence of other research experience, notably the completion of a senior honors thesis, may be substituted for a formal master’s thesis upon approval of the department’s Committee on Graduate Studies. Students enrolled in the coterminal program must meet the University’s residency requirement of 15 full tuition quarters or three tuition quarters beyond the quarter in which 180 units were completed.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

In addition to fulfilling the residence requirement for the degree, the following requirements are stipulated.

First-Year Course Requirements—During the first year of graduate study, the student must take 207 (Proseminar for First-Year Graduate Students), at least one approved graduate statistics course, and at least two core courses from the list below.

201. Personality
202. Neuroscience
205. Foundations of Cognition
211. Developmental Psychology
212. Social Psychology or 215. Mind, Culture, and Society
213. Personality

The student is expected to spend at least half of the time in research from the beginning of the first year of graduate study to the completion of the Ph.D., normally taking no more than 9 units of course work each quarter. At the end of the first year of graduate study, the student must file with the department a written report of the first-year research activities.

Second-Year Course Requirements—During the second year of graduate study (or as additional courses during the first year), the student must complete the core courses listed above and take a second approved graduate course in statistics.
Third-Year Major Area Paper—During the first week of Autumn Quarter of the fourth year, the student turns in a Conceptual Analysis of the Dissertation Area (CADA). This paper provides a general framework for the research topic of the dissertation, addresses the central issues within the specialty area, and reviews the pertinent literature. Typically, the analysis has the kind of scope found in the opening chapters of the more traditional dissertations, but the exact format and scope of the paper is a joint decision made by student and adviser.

At the same time, the student selects two faculty members to read the paper and give feedback and commentary on it. These should be two faculty members most likely to serve on the later oral committee of the dissertation. A portion of the paper, revised as appropriate, can then become the first section of the actual dissertation proposal.

If the student should radically change the area of the dissertation research after CADA has been written, the formal CADA procedure does not need to be repeated for the second dissertation topic. The student is still expected to be knowledgeable about the literature and problems of any research topics being pursued for the dissertation.

Minor Requirements—The candidate must complete either a University minor satisfactory to the minor department, or elect to have the minor waived by selecting 12 approved units outside the department. A student designing a program of 12 units outside the Department of Psychology is expected to do so in consultation with the adviser.

Dissertation Reading Committee—The candidate must select a dissertation reading committee satisfactory to the department. The minimum membership of this committee must be (1) the principal dissertation adviser, (2) a second member from within the department, and (3) a third member chosen from Psychology or another department.

Orals—The candidate must pass the University oral examination, which is based on the dissertation proposal, not on the defense of the dissertation itself. The reason for this policy is to permit the oral to serve the function of guiding and improving the proposed research. This function can best be served if the oral is scheduled early in the year in which the dissertation research is conducted. It is therefore expected that the oral will be taken by the end of the Autumn Quarter of the fourth year.

Dissertation Requirements—The candidate must complete a dissertation satisfactory to the dissertation reading committee.

Ph.D. candidacy expires five years after admission to candidacy by the University Committee on Graduate Studies. Reapplication requires department reexamination.

STUDENT EVALUATIONS

First-Year Evaluation—It is the department’s policy to evaluate the progress of each graduate student at the end of the first year of graduate study. As part of the procedure, each student is required to file with the department a report of the first-year research activities.

Students should discuss this report and the evaluation procedures with their adviser as early as possible in their first year. The report is due on June 1. If the student fulfills the academic promise displayed upon entrance, he or she is invited to continue to the doctorate.

The first-year evaluation is primarily based on three factors:
1. Quality of research carried out in the first year
2. Performance in courses (especially required courses)
3. Recommendations of the adviser (including a commitment on the part of that adviser to continue in that role)

Second-Year Evaluation—A similar evaluation is conducted at the end of the second year of graduate training involving the same criteria as the first year; however, the student is not required to submit a paper. Students who do not make satisfactory progress during the second year may be dropped from the program.

THE DOCTORAL TRAINING PROGRAM

As indicated by the requirements described above, a student may concentrate in any one of several areas within psychology. Regardless of area, however, the training program places emphasis on the development of research competence, and students are encouraged to develop those skills and attitudes that are appropriate to a career of continuing research productivity.

Two kinds of experience are necessary for this purpose. One is the learning of substantial amounts of technical information. A number of courses and seminars are provided to assist in this learning, and a student is expected to work out a program, with his or her adviser, that attains such knowledge in the most stimulating and economical fashion.

A second aspect of training is one that cannot be gained from the courses or seminars. This is firsthand knowledge of, and practical experience with, the methods of psychological investigation and study. These methods do not exist in the abstract; they are ways of behaving with the people or animals who are being studied. They are skills and require guided practice for their perfection. Students are provided with whatever opportunities they need to reach those levels of competence representative of doctoral standing. Continuing research programs, sponsored by members of the faculty, offer direct opportunities for experience in fields represented by the faculty’s many research interests.

Each student achieves competence in unique ways and at different rates. Each student and adviser share in planning a program leading to the objectives discussed. The student is expected to spend half of his or her time on research and normally takes no more than 9 units of course work per quarter.

FELLOWSHIPS, SCHOLARSHIPS, AND ASSISTANTSHIPS

Research and teaching assistantships, United States Public Health Service traineeships, and some University fellowships are available. The type of support offered may vary from year to year. The department depends on the fact that a number of its students receive outside awards. Qualified applicants are asked to take initiative in applying for predoc toral fellowships from the National Science Foundation, the Danforth Foundation, Ford Foundation, and the United States Public Health Service, among others. Applications may be made by college seniors planning to work for a higher degree. Students should apply early in Autumn Quarter of the senior year. For information concerning application forms and procedures, consult representatives from the financial awards office of your home institution.

TEACHING REQUIREMENT

The department views experience in supervised teaching as an integral part of its graduate program. Regardless of the source of financial support, all students serve as teaching assistants for four Psychology courses during their graduate study. Of the four courses, one of them should be Psychology 1, General Psychology, and another be Psychology 10, Statistical Methods. Students are discouraged from participating in teaching the first year of graduate study. Students typically progress from closely supervised teaching to more independent work. They usually begin by teaching sections of General Psychology and Statistics and then progress to more advanced courses in their area of specialization. They may offer a supervised, but essentially independent, seminar during their final year of graduate study.

Ph.D. MINOR

Candidates for the Ph.D. degree in other departments may elect a minor in psychology. To obtain a minor, the student must complete 20 units of course work at the graduate level in the Department of Psychology, excluding Psychology 275 (graduate-level research). Cross-listed graduate courses can be used to satisfy this requirement. All courses counted toward the Ph.D. minor must be passed with a grade of 'B-' or better (unless the course is offered only on a satisfactory/no credit basis).

COGNITIVE SCIENCE PROGRAM

Psychology is participating, along with the departments of Computer Science, Linguistics, Philosophy, and the School of Education, in an interdisciplinary program of cognitive science. The program is intended to provide students with an interdisciplinary education as well as a deeper concentration in psychology. Doctoral students in psychology are eligible to participate in the Cognitive Science program. Students who complete the requirements receive a special designation in cognitive
science along with the Ph.D. in Psychology. To receive this field designation, students must complete 30 units of approved courses, 18 of which must be taken in two disciplines outside of psychology.

**PSYCHOLOGY COLLOQUIUM**

The Psychology Colloquium meets on most Wednesday afternoons at 3:45. Speakers from Stanford and other institutions present topics of current interest. Graduate students are expected to attend.

**COURSES**

(WIM) indicates that the course meets the Writing in the Major requirements.

**SUMMER SESSION**

The courses announced for the Summer Session are those regularly scheduled in the department curriculum. Additional courses may be announced in the Stanford University bulletin *Summer Session 2000*, issued annually in January.

**STANFORD INTRODUCTORY SEMINARS**

3N. Stanford Introductory Seminar: Culture and Mind—Preference to freshmen. Explore the ideas that cultures and mind make each other up, including the role of culture in cognition, emotion, and motivation.

4N. Stanford Introductory Seminar: Affect and Cognition—Preference to freshmen. The psychological processes of emotions as they influence behavior, emphasizing the relation of emotions to other psychological concepts, such as cognition and motivation. Conscious and nonconscious emotional influences. Three units for paper and final exam; two units for final exam only.


6N. Stanford Introductory Seminar: Remembering and Misremembering—Preference to freshmen. Discussion of experiments and cases of errors, biases, distortions, and omissions in memory, and understanding them in light of a theory of memory.

8N. Stanford Introductory Seminar: Evaluating Popular Media Accounts of Social Science Findings—Preference to freshmen. Introduction to the concepts and concerns of social psychology through pop media and user-friendly “trade books,” e.g., Frank Sulloway’s *Born to Rebel*, which deals with the impact of birth order and Dick Nisbett’s *Culture of Honor*, which deals with the reasons for high homicide rates in the American south. Critical considerations of articles, books, and documentary film are intended for lay people that deal with findings relevant to social psychology and related fields. Documentary films and magazine articles deal with the impact of parents on delinquency and achievement, and with various social problems and policy issues, e.g., affirmative action and crime. Limited enrollment.

9N. Stanford Introductory Seminar: The Social Psychology of Race, Gender, and Culture—Preference to freshmen. Focus is on the role that one’s social context (one’s position in society and social identity) plays in shaping the psychology of the individual and the collective psychology of society more generally.

10N. Stanford Introductory Seminar: Collective Violence—Preference to freshmen. By some estimates, 100 million civilians were victims of organized violence during this century alone. The significant psychological factors underlying massacres and other forms of collective violence, focusing on the perpetrators and on the victims. The literature authored by psychologists, historians, journalists, sociologists, political scientists. Limited enrollment.

12Q. Stanford Introductory Dialogue: Emotion—Preference to sophomores. The fundamental questions about emotions: What is emotion? Why do we have emotions? Can we change our emotions? How do different people’s emotions differ? Can emotions make us sick? Focus is on experimentally tractable questions, and empirical research findings relevant to these questions, emphasizing critical thinking and writing skills. Limited enrollment.

14Q. Stanford Introductory Dialogue: Psychological Studies of the Life Course—Preference to sophomores. How psychologists have conceived of the life course of an individual from birth to death, exploring two or three classical life course studies, including Lewis Terman’s study of the gifted.


20Q. Stanford Introductory Seminar: Oldies but Goodies in Pop Self-Help Psychology—Preference to sophomores. Review of popular self-help books, e.g., *You Just Don’t Understand* and *Emotional Intelligence*; their claims, and how to relate the themes to those in contemporary psychological research.

**OPEN TO ALL STUDENTS**

Additional courses not listed here are frequently offered by selected postdoctoral or terminal Ph.D. personnel in the areas of their special research. These are listed in the quarterly *Time Schedule*; the course descriptions are circulated in advance.

1. Introduction to Psychology—The scientific study of behavior, focusing on psychological research and theory. Topics: the biological bases of behavior, sensation and perception, emotion, learning, memory, cognition, child development, psychopathology, and social psychology. (Sections optional) GER:3b (DR:9)

3 units, Win (Gabrieli)

Win (Zimbardo)
Spr (Gross)

3. Practicum in Effective Teaching Methods and Style—Enrollment limited to advanced undergraduates serving as teaching assistants in Psychology 1. Discussions on teaching methods and style, selected readings on teaching effectiveness, student presentations to class sections, preparation of exams, and grading essays and term papers.

2 units. Win (Zimbardo)

10. Introduction to Statistical Methods—(Same as Statistics 60.) Emphasis is on techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. GER:2c (DR:4)

5 units, Win (Walther)
Spr (Thomas)

20. Introduction to Brain and Behavior—How the brain regulates behavior and in turn is influenced by behavioral interactions. Behavior is described in physiological terms, organized with respect to evolution-
ary principles. Topics: neurons, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states and the biology of learning, memory, and psychopathology. Recommended: 1. GER:2a (DR:5)
3 units, Aut (R. Fernald)

30. Introduction to Perception—Perceptual psychology and sensory neuroscience, emphasizing vision and hearing. Topics: anatomy and physiology of the eye and ear, anatomy and physiology of the visual and auditory areas of the brain, pitch and loudness perception, speech perception, color vision, depth perception, visual motion perception, etc. Recommended: 1. GER:3b (DR:9)
3 units, Spr (Heeger)

40. Introduction to Cognitive Psychology—Survey and analysis of major topics in cognitive psychology, including perception, memory, problem solving, and reasoning. Emphasis is on contemporary research and theory. Recommended: 1 and 10. GER:3b (DR:9)
4 units, Win (Spier)

4 units, Win (Gabrieli)

60. Introduction to Developmental Psychology—Psychological development from birth to adulthood, emphasizing infancy and the early and middle childhood years. The nature of change during childhood and theories of development. Recommended: 1. GER:3b (DR:9) (WIM)
3 units, Aut (Flavell)

60A. Introduction to Developmental Psychology Section—Guided observation of children age 2-6 at Bing Nursery School. Corequisite: 60.
2 units, Aut (Hartman)

70. Introduction to Social Psychology—Surveys, theory, and empirical research on social psychological topics: attitudes and persuasion, identity, person perception, compliance, obedience, aggression, altruism, group dynamics, interpersonal relationships, prejudice, stereotyping, roles, norms, attribution, and social judgment. Two lectures plus section each week. Original research proposal. Recommended: 1. (WIM)
4 units, Spr (Eberhardt)

80. Introduction to Personality Psychology—Provides a broad, balanced introduction to the study of personality. Key concepts and research methods, major theoretical approaches, and related empirical findings including psychodynamic, trait, biological, humanistic, behavioral, social-learning, and cognitive perspectives. Recommended: 1.
3 units, Spr (Gollub)

90. Introduction to Abnormal Psychology—The nature, origin, and treatment of a variety of psychological disturbances, examined from psychodynamic, behavioral, cognitive, and biomedical perspectives. Historical and current controversies in the field. Recommended: 1. GER:3b (DR:9)
3 units, Spr (Butler)

101. Introduction to Statistical Methods (Postcalculus) for Social Scientists—(Enroll in Economics 80, Statistics 190.)
3-5 units, Aut (Johnstone)
Win (Amemiya)
Spr (Liu)
Sum (Staff)

102. Statistical Methods for Behavioral and Social Sciences—See 252.

103. Statistical Theory, Models, and Methodology—See 253.

110. Research Methods and Experimental Design—Experimental research methods and principles in psychology. Structured research exercises and the design of an individual research project. Prerequisite: consent of instructor.
5 units (M. Lepper) not given 1999-2000

112. Research Methods in Cognitive Psychology—Focus is on conceptual and methodological issues that arise in research in the areas of cognitive science and cognitive neuroscience. Training in the logic and techniques of research provides students with the skills necessary for research in cognitive science. Students conduct several experiments, analyze their data, and interpret the results.
5 units, Aut (Spier)

120. Cellular Neuroscience: Cell Signaling and Behavior—Survey of neural interactions underlying behavior. Prerequisites: 1 or equivalent, and elementary biology.
4 units, Aut (Wine)

121. Ion Transport and Intracellular Messengers—(Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Lab demonstrations and brief hands-on introduction to some techniques (e.g., patch clamping). Recommended: 120 or introductory course in biology or human biology.
3 units, Spr (Wine)

122. Human Behavioral Biology—(Enroll in Biological Sciences 150.)
6 units, Spr (Sapolsky) alternate years, not given 2000-01

123. Graduate Seminar in Cognitive Neuroscience—See 222. Prerequisite: consent of instructor.
1-3 units, Aut, Win, Spr (Gabrieli)

124. Seminar on Psychophysiology—See 236. Prerequisite: consent of instructor.
4 units (Gross) not given 1999-2000

126. Sleep and Dreams—(Enroll in Human Biology 11.)
3 units, Win (Dement)

131. Language and Thought—The psychology of language, including production and understanding in utterances; from speech sounds to speaker's meaning; children's acquisition of the first language; and the psychological basis for language systems. Language functions in natural contexts and their relation to the processes by which language is produced, understood, and acquired. Prerequisite: 1 or Linguistics 1. (WIM) GER:3b (DR:9)
4 units, Aut (Clark)

132. Language Processing—Influential theories, computational models, major issues, and research in psycholinguistics. Emphasis is on sentence- and word-level processes in human language comprehension and production. Prerequisite: 40.
4 units, Spr (Griffin)

133. The Psychology of Trauma—Seminar analyzes the impact of emotional trauma on cognitive, emotional, and social functioning throughout life. Cross-disciplinary, including literatures from social, clinical, cognitive, and developmental psychology; and neuroscience and psychiatry. Students lead and participate in weekly discussions. Paper.
3 units, Win (Bower, Sivers)

529
134. Seminar on Language and Deception—Deceptive, exploitative, and other noncooperative uses of language. How is language used to deceive or exploit? Where are these techniques practiced and why? What are the personal, ethical, and social consequences of these practices? Prerequisite: 131, Linguistics 1, or Philosophy 181.
3 units, Win (H. Clark)

3 units, Win (Greeno, Wasow)

136. Cognition and Aging—(Graduate students register for 225.) Survey of research examining the influence of aging on cognition. Topics: influence of aging on attention, language, memory, and the cognitive effects of age-related neurological disorders such as Alzheimer’s and Parkinson’s disease. Prerequisite: 40.
3 units, Spr (Spierer)

141. Cognitive Development—Topics and issues on cognitive development, developmental changes in memory, conceptual organization, logical reasoning, and communication skills. Prerequisite: 1. GER:3b (DR:9)
3 units, Aut (O’Donnell, Henderlong)

142. Social Development—Socialization and the development of social behaviors. Review of research concerning conscience and conduct, altruism and aggression, cooperation and competition, achievement motivation, and self-control.
3 units (M. Lepper) not given 1999-2000

144. Conceptual Organization and Development—See 242. Prerequisite: 141 or consent of instructor.
1-3 units (Markman) not given 1999-2000

145. Seminar on Infant Development—For students interested in research skills. Focus is on conceptual and methodological issues related to research on early development; training in experimental design, lab, and observational procedures; and the collection, analysis, and interpretation of data. Limited enrollment.
1-3 units, Aut, Win, Spr (A. Fernald)

146. Observation of Children—Seminar on learning about children through guided observations at Bing Nursery School, Psychology’s lab for research and training in child development. Physical, emotional, social, cognitive, and language development. Recommended: 60.
3-5 units, Win, Spr (Hartman)

147. Development in Early Childhood—Supervised experience with young children at Bing Nursery School. Three units require four hours per week in Bing classrooms throughout the quarter; 4 units require seven hours per week; 5 units require 10.5 hours per week. Weekly seminar on developmental issues in the teaching-learning environment at Bing School. Prerequisite: 60 or 146, or consent of instructor.
3-5 units, Aut, Win, Spr (J. Lepper)

152. Social Conflict: Models and Methods of Mediation—Conceptual models of social conflict and approaches to resolving them through mediation. Examples from a spectrum of conflict settings ranging from minor disputes between individuals to intragroup and intergroup tensions. Existing theories and empirical research. Students generate examples from the Stanford community, and role play methods of mediation in resolving social conflict.
3 units, Spr (Daheer, Martinez)

153. Introduction to Clinical Psychology—Survey and analysis of topics in clinical psychology: the history of clinical psychology, models and assessment of personality, behavior, cognition, psychopathology, and approaches to the treatment of abnormal behavior. Emphasis is on current theory, research, and issues in clinical psychology and on the role of clinical psychology in contemporary society. Recommended: 1.
3 units, Win (Gottlieb)

154. Selected Topics in Affective Disorders—See 234. 3 units, Spr (Gottlieb)

155. Research Seminar on Stereotyping and Prejudice—Students participate in on-going laboratory research on stereotyping and prejudice. Emphasis is on theoretical and methodological issues; research design; data collection and analysis. Two-quarter practicum. Prerequisites: 1, 70, research experience, and consent of instructor.
3-4 units, Aut, Win, Spr (Eberhardt)

156. Applications of Social Psychology—(Graduate students register for 271.) The application of social psychological theory and research to a variety of issues and problems: evaluating the impact of social interventions, strategies, and shortcomings in personal and social decision making; the effects of mass media and other sources of social persuasion; problems of conflict resolution and negotiation; applications of social psychology in legal, medical, educational, and business settings. Prerequisites: 1 and 10, or consent of instructor.
4 units, Aut (Ross)

157. Theoretical Approaches in Social Psychology—(Graduate students register for 279.) The field of social psychology, organized by the theories and systems that tie together wide-ranging findings and phenomena. Possible topics: how attitudes, beliefs, and self-concepts originate in our actions; the importance of construal and cognition in social-psychological phenomena; and the relationships between thought and emotion, and health. Emphasis is on developing a systematic understanding of the field of social psychology.
3 units (Stein) not given 1999-2000

158. Emotions: History, Theories, and Research—See 259. Prerequisite: consent of instructor.
3 units, Aut (Zajonc) alternate years, not given 2000-01

159. Psychological Perspectives on the Self—(Graduate students register for 223.) The evolution of scientific conceptions of the self, developmental approaches; motivational and cognitive self processes; applications of self and self-regulation theory to depression, gender roles, and achievement outcomes. Modernist and postmodernist conceptions of the self, and the importance of cultural influence. Changes in the nature and phenomenological experience of the self as a function of historical periods. Prerequisites: 1, 10, 70.
3 units (Stein) not given 1999-2000

160. Culture and Self—See 226. Prerequisites: 1, 10, 70.
3 units, Win (Markus) alternate years, not given 2000-01

161. Cultural Psychology—The cultural sources of diversity in thinking, emotion, motivation, self, personality, morality, development, and psychopathology. Prerequisite: 1 or equivalent. GER:4a (DR:2)
5 units (Markus) not given 1999-2000

162. Psychology of Gender—Research and theory on the socialization and psychological development of women and men. The biological, cultural, and social factors that influence gendered behavior. GER:4e (DR:4)
4 units (Carstensen) not given 1999-2000

163. The Interpersonal Basis of Abnormal Behavior—The role of interpersonal problems and processes in producing different forms of psychopathology, from neurotic reactions to schizophrenia. Combine clinical (case study) approach with conventional empirical approaches to clarify the origin, nature, and treatment of emotional disorders. Prerequisite: 90.
3 units (Horowitz) not given 1999-2000
1-3 units (Eberhard) alternate years, given 2000-01

165. Peace Studies—(Same as Political Science 133.) Interdisciplinary, dealing with the challenges of pursuing peace in a world where the sources of conflict are many, and regional, ethnic, and religious antagonisms are rising. The art of creating and maintaining peace is analyzed from historical, social, psychological, and moral perspectives. Goals: illustrate the current and potential contributions of various academic disciplines and critical analyses to the study of peace; and to prepare students to think critically and to act responsibly and effectively on behalf of peace. Eight sections: challenges, enemies, theoretical understandings, justice, security, non-violence, public peace processes, peace and you. Seminar format once a week. Limited enrollment. GER:3b (DR:9)
3 units, Spr (Bland, Ross, Holloway)

166. Seminar on Personal and Social Change—Analysis of the social cognitive approaches to personal and social change. Applications of sociocognitive theory to the modification of psychological dysfunctions in familial, educational, medical, and organizational settings. Ethical and value issues in behavior change.
3 units (Baudena) not given 1999-2000

167. Seminar on Aggression—Analysis of the causes and modification of individual and collective aggression. Major issues in aggression: social labeling of injurious conduct, social determinants of aggression, effects of the mass media, institutionally sanctioned violence, terrorism, psychological mechanisms of moral disengagement, modification of aggressive styles of behavior, and legal sanctions and deterrence doctrines.
3 units, Win (Bandura)

3 units, Aut (Gross)

170. Seminar on the Psychology of Gender—(Graduate students register for 238.) In-depth coverage of a specified topic related to the psychology of gender. Prerequisite: 162.
3 units (Carstensen) not given 1999-2000

171. Research Seminar on Aging—Two-quarter practicum exposes students to multiple phases of research by participating in a laboratory focusing on social behavior in adulthood and old age. Review of current research and participation in ongoing data collection, analysis, and interpretation. Prerequisites: 1, research experience, and consent of instructor.
4 units, Aut, Win, Spr (Carstensen)

174. African American Psychology—Introduction to ethnic psychology, specifically, the psychological dimensions of the Black experience in America. Lectures and readings. Black psychology from its evolution as a concentration area in the social sciences to present concerns that impact Black Americans' mental health. Students are encouraged to expand on the methodological constructs employed in the study of Black Americans.
3 units, Aut (McCants)

175. Seminar on Topics in Identity Development—Issues affecting identity development from adolescence through adulthood. Lectures/discussion. Topics: the effect of group dynamics on identity; the impact of social factors such as racism, stereotypes, and culture; how a person's identity affects education and self-esteem.
3 units (McCants) not given 1999-2000

176. Carl Jung and Analytical Psychology—Introduction to the person of Jung, his seminal philosophical perspectives, and their impact on modern thought and life. The formation of analytical psychology with regards to Jung's past relationship with Freud and later emergence as a prominent 20th-century thinker. Emphasis is on the archetypal themes of the shadow, animas/animus (feminine/masculine) and puer/senex (youth/elder). The function of dreams and the interplay between the Jungian paradigm and spirituality.
4 units, Aut (Daher)

178. Stigma and Marginality—See 263.
3 units, Win (Eberhard) alternate years, not given 2000-01

180. Social Psychological Perspectives on Stereotyping and Prejudice—Classic and contemporary social psychological approaches to prejudice and stereotyping. Emphasis is on how stereotypes are employed and maintained; and the influence of stereotyping and prejudice on behavior in a variety of domains including education, employment, politics, and law. Limited enrollment. Prerequisites: 1, 10, and 70.
4 units (Eberhard) alternate years, given 2000-01

182. Misunderstanding, Conflict, and Dispute Resolution—See 256.
3 units, Win (Ross, Curhan)

2 units, Spr (Markus, Ross)

194. Reading and Special Work—Independent study. Can be repeated for credit. Prerequisite: consent of instructor.
1-3 units, any quarter (Staff)

195. Special Laboratory Projects—Independent study. Can be repeated for credit. Prerequisites: 1, 101, and consent of instructor.
1-6 units, any quarter (Staff)

196. Contemporary Psychology: Overview of Theory, Research, Applications—For junior and senior psychology majors. The state of the field of psychology in each of the primary areas represented by the department; psychobiology, cognitive neuroscience, cognitive science, developmental psychology, personality and abnormal psychology, and social psychology. Faculty in each area present an overview of current theory, research, and applications in their domain of expertise during weekly lectures, integrating the wide range of knowledge majors have gathered from their more specialized course work. Discussion sections.
3 units, Aut (Zimbardo)

197. Advanced Research—Limited to students in senior honors program. Weekly research seminar, independent research project under the supervision of an appropriate faculty member. A detailed proposal is submitted at the end of Autumn Quarter. Research continues during Winter and Spring Quarters as Senior Honors Research. A report demonstrating sufficient progress is required at the end of Winter Quarter.
1-4 units, Aut (Thomas)

198. Senior Honors Research—Limited to students in the senior honors program. Work includes finishing the research and data analysis, written dissertation, and presentation at the Senior Honors Convention.
1-4 units, Win, Spr (Thomas)

199. Psychological Aspects of Addiction—The medical, psychological, and social issues involved with alcohol and drug abuse and dependence. Students are presented with the etiological theories and psychological perspectives on addiction. Limited enrollment.
3 units, Aut (Matano)

PRIMARILY FOR GRADUATE STUDENTS
Undergraduate students admitted only by consent of instructor.

mechanisms of: vision, attention, memory, language, motor control, emotion, and consciousness. Prerequisite: 207 or consent of instructor. 3 units, Spr (Heeger, Wandell, Gabrieli)

203. Foundations of Vision—The quantitative behavioral and neural aspects of human vision. Image formation by the eye, retinal sampling and wavelength encoding, neural encoding within the retina and cortex; performance measures including spatial contrast sensitivity, localization, color sensitivity, multiresolution representations of image data; color, motion, and depth perception. 1-3 units, Wandell alternate years, given 2000-01

205. Foundations of Cognition—Advanced survey of cognitive psychology and cognitive science. Major topics: perception, imagery, attention, memory, similarity, categories and concepts, learning, reasoning, judgment, planning, problem solving, language, morality. Central themes: computation, representation, the mind and the brain, modularity, evolution and adaptation, uncertainty. Is the core of cognition learned or innate? Conscious or unconscious? Symbolic or subsymbolic? Rational or irrational? Prerequisite: 207 or consent of instructor. 1-3 units, Aut (Tenenbaum)

206. Behavioral Neuroscience—The biological substrates of behavior, emphasizing topics currently being investigated by resident and visiting neuroscientists at Stanford. Possible topics: neuroanatomical and neurophysiological aspects of vision; audition; motor control, learning, and memory; and hormonal and neurochemical aspects of stress and motivation. 1-3 units, Wandell, Wine alternate years, given 2000-01

207. Proseminar for First-Year Graduate Students—Required of and limited to first-year graduate students in psychology. Survey of major issues in contemporary psychology with their historical backgrounds. 2-3 units, Aut (Steele)

210. Memory and Learning—Major topics in human memory, emphasizing information-processing approaches to short-term memory, organization and long-term memory, forgetting, retrieval processes, prose memory, imagery, emotional memory, autobiographical memory, and memory and hormonal neurochemical aspects of stress and motivation. Prerequisite: graduate standing in psychology or consent of instructor. 4 units, Aut (Bower)

211. Developmental Psychology—Prerequisite: 207 or consent of instructor. 1-3 units, Win (A. Fernald, Flavell)

212. Social Psychology—Prerequisite: 207 or consent of instructor. 1-3 units, M. Lepper, Ross not given 1999-2000

213. Personality—Survey of theory and research in personality. Prerequisite: 207 or consent of instructor. 3 units, Spr (Carstensen)

214. Psycholinguistics—Prerequisite: graduate standing in Psychology or consent of instructor. 1-3 units, Spr (H. Clark)

215. Mind, Culture, and Society—Social psychology from the context of society and culture. Focus: interdependence of psychological and sociocultural processes; how sociocultural factors shape psychological processes; how psychological systems shape sociocultural systems. Conceptualizations of the interdependence of psychological processes and sociocultural context. Use of theoretical developments to understand social issues, problems, and policy. Works of Baldwin, Mead, Asch, Lewin, Burner, and contemporary theory and empirical work on the interdependence of psychology and social context as constituted by gender, ethnicity, race, religion, region of the country, and part of the world. Prerequisite: 207 or consent of instructor. 3 units, Win (Markus, Steele)

217. Graduate Seminar: Special Topics in Early Social Development—Considers long-standing and newer issues in the study of socioemotional development from infancy through middle childhood. Topics: relationships as contexts for social development, universal vs. culturally specific socialization practices, secular influences and changing cultural norms, biological underpinnings of social relationships, social development as the product of gene-environment processes, origins of social knowledge as the basis for emotion regulation, best methods for the study of social development. During each weekly meeting, participants discuss assigned readings and meet with a guest scientist to learn about their current programs of research in social development. Prerequisites: 211 or 212, consent of instructor. 1-3 units, Aut (Lepper)

218. Graduate Seminar in Social Cognition—(Undergraduates register for 164.) Critical overview of social cognition research and theory. Topics: attribution theory, social categories and schemas, social encoding, person memory, affect, attitudes and behavior. Prerequisite: graduate standing in psychology or consent of instructor. 1-3 units, Eberhardt alternate years, given 2000-01

219. Graduate Seminar on Selected Topics in Cognition—Prerequisite: consent of instructor. 1-3 units, Tversky not given 1999-2000

220. Graduate Seminar: Special Topics in Cognitive Development—Prerequisite: graduate standing in psychology or consent of instructor. 1-3 units, Markman not given 1999-2000

221. Applied Vision and Image Systems—Lectures/demonstrations illustrate the design and control of color imaging devices (display, printers, cameras, and scanners). Aspects of human vision relevant to software and hardware design. Topics: digital halftoning, color calibration, color metrics, flicker sensitivity, motion compensation, human spatial resolution, visual masking, JPEG principles, printer design, scanner design, color software architecture. 1-3 units, Win (Wandell)

222. Graduate Seminar in Cognitive Neuroscience—(Undergraduates register for 123.) For students who are already or planning to become involved in research. Critical reviews of theory and ongoing research in human cognitive neuroscience. Prerequisite: consent of instructor. 1-3 units, Aut, Win, Spr (Gabrieli)

223. Psychological Perspectives on the Self—See 159. 1-3 units, Spr (Steele) not given 1999-2000

224. Learning and Inference in Humans and Machines—The connections between computational modeling and experimental studies of learning and inference in several cognitive domains: perception, concepts and categorization, inductive reasoning, causal reasoning. Probabilistic models and statistical inference are unifying themes. Goals: reach a better understanding of human learning in computational terms and bring computational systems closer to the capacities of human learners. Lectures/discussion, with supplementary computer assignments. Final modeling project or paper. Prerequisite: consent of instructor. 1-3 units, Spr (Tenenbaum)

225. Cognition and Aging—See 136. 1-3 units, Spr (Steele)

226. Culture and Self—(Undergraduates register for 160.) Recent perspectives on the nature and functioning of self; anthropological and psychological literature on the self in various cultural contexts; and the
consequences of variation in selfhood for cognition, learning, emotion, motivation, and psychopathology.

1-3 units, Win (Markus) alternate years, not given 2000-01

238. Ion Transport and Intracellular Messengers—See 121.
1-3 units, Spr (Wine)

231. Graduate Seminar: Self-Efficacy—The origins, mediating mechanisms, and diverse effects of people's beliefs in their efficacy to exercise control over events in their lives. Alternative theories of perceived control; the nature and structure of self-efficacy belief systems; major sources of efficacy beliefs; the processes through which they affect human functioning; developmental analysis of efficacy beliefs over life course; the application of self-efficacy theory to cognitive development, health functioning, clinical dysfunctions, organizational functioning, and athletic performance; the exercise of collective efficacy to accomplish social change.
1-3 units, Spr (Bandura)

233. Counseling Theories and Interventions from a Multicultural Perspective—(Enroll in Education 233A.)
3 units (LaFromboise) not given 1999-2000

234. Selected Topics in Affective Disorders—(Undergraduates register for 154.) Current research topics in the study of affective disorders. Topics: epidemiology and phenomenology of affective disorders, psychological theories of depression, gender differences in affective disorders, cognitive and social functioning of depressed persons, psychobiology of affective disorders, depression in children, postpartum depression, suicide issues in the treatment of depression, and cultural aspects of affective disorders. Prerequisite: graduate standing in psychology or consent of instructor.
1-3 units, Spr (Gotlib)

235. Psychology and American Indian Health—(Enroll in Education 340X.)
3 units (LaFromboise) not given 1999-2000

236. Seminar on Psychophysiology—(Undergraduates register for 124.) Overview of psychophysiology, the empirical study of mind-body relations. Focus is on two response systems (electrodermal and cardiovascular) and applications to lie detection, emotions, and health. Critical thinking skills are emphasized; hands-on lab.
4 units (Gross) not given 1999-2000

237. Career and Personal Counseling in Culturally Diverse Settings—(Same as Education 234.) Methods of integrating career and personal counseling with clients and counselors from differing backgrounds. Practice with selected assessment instruments. Cases studies of bicultural role conflict. Informal supervised experience.
3 units, Aut (Krumboltz)

238. Seminar on the Psychology of Gender—See 170. Prerequisite: graduate standing in psychology.
1-3 units (Carstensen) not given 1999-2000

240. Language Acquisition I—(Enroll in Linguistics 240.)
4 units, Aut (E. Clark)

241. Language Acquisition II: Lexicon and Syntax in Acquisition—(Enroll in Linguistics 241.)
1-4 units, Win (E. Clark)

242. Conceptual Organization and Development—(Undergraduates register for 144.) Theories and research in conceptual organization and development, critically evaluated. Topics: the acquisition of categories and category terms informed by the general problem of induction, by philosophical and psychological analyses of the nature of human categories (natural kind terms, family resemblances), by recent arguments how the acquisition of category terms is guided by constraints children place on possible word meanings, and by more traditional theories of cognitive development. Prerequisite: graduate standing in psychology or consent of instructor.
1-3 units (Markman) not given 1999-2000

243. General Development Seminar—Prerequisite: consent of instructors.
1-2 units, Aut (A. Fernald, Flavell)

244. The Psychology of Aging—Critical examination of theory and research in gerontology. Normal and abnormal changes that occur in biological, cognitive, and psychological aging. Emphasis is on the environmental factors that influence the aging process. Prerequisite: graduate standing in psychology or consent of instructor.
1-3 units (Carstensen) not given 1999-2000

245. Social Psychological Perspectives on Stereotyping and Prejudice—Classic and contemporary social psychological approaches to prejudice and stereotyping. Emphasis is on how stereotypes are employed and maintained; and the influence of stereotyping and prejudice on behavior in a variety of domains including education, employment, politics, and law.
3 units, Aut (Eberhardt) alternate years, not given 2000-01

246. Perception Lecture Series—Current research topics in perceptual psychology, visual neuroscience, machine vision, and image processing. Speakers from research institutions in the Bay Area and around the world. Prerequisite: 203.
1 unit, Win, Spr (Heeger)

248. Introduction to Test Theory—(Enroll in Education 252.)
3-4 units, Spr (Haertel)

249A. Problems in Measurement: Item Response Theory—(Enroll in Education 353A.)
3 units (Haertel) not given 1999-2000

252. Statistical Methods for Behavioral and Social Sciences—(Undergraduates register for 103.) For students who seek experience and advanced training in empirical research. Analysis of data from experimental through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through two-way tables. Integrated with the use of statistical computing packages. Prerequisite: 10 or equivalent. (PSE)
1-6 units, Aut (Thomas)

253. Statistical Theory, Models, and Methodology—(Undergraduates register for 103.) Practical and theoretical study of advanced data analytic techniques such as loglinear models, signal detection, meta-analysis, logistic regression, reliability theory, and factor analysis. Prerequisite: 252 or Education 257.
1-3 units, Win (Thomas)

255. Graduate Seminar: Selected Topics in Personality and Abnormal Psychology—Prerequisite: consent of instructor.
1-3 units, Aut, Win, (Horowitz)

256. Misunderstanding, Conflict, and Dispute Resolution—(Undergraduates register for 182.) Discussion of contemporary theory and research on interpersonal and intergroup conflict and misunderstanding, emphasizing barriers to dispute resolution and methods for overcoming them. Additional topics: game theory, bargaining and negotiation, and second-track diplomacy.
3 units, Win (Ross, Curhan)

257. Individually Supervised Practicum—Relevant teaching experience for graduate students as part of their program of study. Can be
258. Graduate Seminar in Social Psychology Research — For students who are already or are planning to become involved in research on social construal and the role that it plays in a variety of phenomena, notably the origin and escalation of conflict.
1-3 units, Aut, Win, Spr (Zajonc)

1-3 units, Aut (Zajonc) alternate years, not given 2000-01

260. Memory Systems — Recent findings indicate different kinds of memory are mediated by separable neural networks. Different patterns of memory failures are seen in a variety of neurological disorders and in terms of functional consequences for normal memory, such as unconscious learning. Prerequisites: 50, 201, or consent of instructor.
1-3 units (Gabrieli) not given 1999-2000

261. Psychology of Problem Solving and Reasoning — (Same as Education 295.) Introduction to the results and methods of research on the cognitive processes of solving problems and reasoning. Focus is on the accomplishments and limitations of research conducted since 1970, including views of cognition as situated activity.
3 units (Greeno) not given 1999-2000

262. Stigma and Marginality — (Undergraduates register for 178.) The perceptions and strategies of the targets of prejudice and discrimination, with emphasis on race and ethnicity. Topics: social perceptions and the judgments of targets, racial identity, behavioral consequences of prejudice and discrimination, and legal/policy implications. Readings from social psychology, African-American studies, sociology, and law. Limited enrollment.
3 units, Win (Eberhardt) alternate years, not given 2000-01

263. Selected Topics in Human Learning — Recent empirical and theoretical analyses of verbal learning, learning from text, learning of concepts, and intellectual skills. Emphasis is on information processing theories of memory and retrieval. Readings from recent research journals with topics determined partly by students' interests. Discussion format. Prerequisite: 210 or consent of instructor.
1-3 units, Win (Bower)

264. Vision and Image Processing — Introduction to image processing through a combination of lectures and hands-on experience in a computer lab. Topics: image representation, sampling and filtering, image segmentation and mosaicing, image warping and morphing, motion analysis, image statistics, restoration, synthesis, and compression.
1-3 units (Heeger) alternate years, given 2000-01

265. Graduate Seminar in Personality Research — Can be repeated for credit. Prerequisite: graduate standing in psychology.
1-2 units, Aut, Win (Horowitz)

266. Applications of Social Psychology — See 156.

267. Special Topics in Psycholinguistics — May be repeated for credit. Prerequisite: consent of instructor.
1-3 units, Win (H. Clark)

268. Graduate Research — Intermediate-level research undertaken with members of departmental faculty. Prerequisite: consent of instructor.
1-15 units (Staff)

269. Computational Neuroscience — Introduction to computational neuroscience: the biophysics of computation; models of vision, audition, learning, and development; self-organizing networks. Emphasis is on theoretical and computational models and how to construct models of neurons and neural systems.
1-3 units (Heeger) alternate years, given 2000-01

270. Seminar on Emotion — (Undergraduates register for 169.) Overview of the scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas.
1-3 units, Aut (Gross)

1-3 units (Steele) not given 1999-2000

272. Doctoral Research — For dissertation. Prerequisite: consent of instructor.
1-15 units (Staff)

273. Practicum in Teaching — Enrollment limited to students serving as teaching assistants in selected psychology courses. Can be repeated for credit.
3-5 units, Aut, Win, Spr (Staff)

274. Interdisciplinary Seminar on Conflict Resolution — (Same as Economics 386, Engineering-Economic Systems and Operations Research 489, Law 611.) Addresses problems of conflict resolution and negotiation from an interdisciplinary perspective. Presentations by faculty and by scholars from other universities.
1-2 units, Win (Alexander, Arrow, Ross, Wilson)

275. Careers in Psychology: Academic and Applied — (Undergraduate students register for 193.) Intended for graduate students and advanced undergraduates who want an opportunity to meet with people who have undertaken academic and nonacademic careers. Speakers discuss their experiences and reflect on their careers and ways in which their graduate and undergraduate education prepared or failed to prepare them for their careers. (AU)
2 units, Spr (Markus, Ross)

276. Methods in Personality and Social Psychology — Focus is on developing and consolidating a set of methodological skills in personality and social psychology and in allied disciplines (sociology, education, and communication). Experimental survey and multivariate methods. Topics: formulating the research problem, experimental and quasi-experimental design, going from abstract ideas to concrete instances, measuring and analyzing change data, observational techniques, handling research artifacts, professional and ethical issues, triangulation, archival and co-relational studies, validity and reliability of measurement, organizing data. Practicum format; students develop a real research proposal.
1-3 units (Staff) not given 1999-2000

277. Seminar for Coterminal Masters' Students — Discussion of contemporary issues and student research. Student and faculty presentations.
1 unit, Aut, Win, Spr (Ross)

278. Contemporary Topics in Social Psychology — Limited to graduate students in social psychology. In-depth analysis of selected issues in contemporary life understood from various social psychological theories and perspectives. Prerequisites: 207, 212.
2-4 units (Zajonc, Zimbardo) alternate years, given 2000-01
Director: Roger Noll  
Associate Director: David Brady (Political Science, Business)  
Affiliated Faculty: Lucius Barker (Political Science), Donald Barr (Human Biology, Jonathan Bendor (Business), Coit Blacker (Institute for International Studies), Timothy Bresnahan (Economics), John Cogan (Hoover Institution), Andrew Creighton (Sociology), Morris Fiorina (Political Science, Hoover), Lawrence Gould (Economics), Mark Hlatky (Health Research and Policy), Daniel Kessler (Business), Michael Kirst (Education), Anne Krueger (Economics), Thomas Macurdy (Economics), Mark McClellan (Economics), Robert McGinn (Science, Technology, and Society), Milbrey McLaughlin (Education), Terry Moe (Political Science), Susan Okin (Political Science, Susan Olizak (Sociology), Leonard Ortolano (Civil and Environmental Engineering), A. Mitchell Polinsky (Law), Nathan Rosenberg (Economics), Geoffrey Rothwell (Economics), Debra Satz (Philosophy), W. Richard Scott (Sociology), Myra Streber (Education), James Sweeney (Engineering-Economic Systems and Operations Research), Barton Thompson (Law), Nancy Tuma (Sociology), Barry Weingast (Political Science), Frank Wolak (Economics), Carolyn Wong (Political Science)  
Lecturers: Roger Printup, Timothy Stanton, Patrick Windham  
Acting Assistant Professor: Scott Wallsten

Government plays an important, ubiquitous role in contemporary society. Moreover, the growing complexity of public policies, the political processes that give rise to them, and the organizations that implement them have created a need in government, business, and the nonprofit sector for people who understand how government operates. The Public Policy Program provides students the foundational skills and institutional knowledge necessary for understanding the policy process, and provides an interdisciplinary course of study in the design, management, and evaluation of public sector programs and institutions. The major in Public Policy is useful as preparation for employment as an analyst in government agencies or business, as a foundation for postgraduate professional schools in business, education, law, and public policy, and as preparation for graduate study in the social sciences, especially economics, political science, and sociology.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The core courses in the Public Policy Program develop the skills that are necessary for understanding the political constraints faced by policy makers, assessing the performance of alternative approaches to policy implementation, evaluating the effectiveness of policies, and appreciating the sharp conflicts in fundamental human values that often animate the policy debate. After completing the core, students apply these skills by focusing their studies in one of several areas of concentration. The areas of concentration may deal with a specific field of public policy, with types of institutions, or with deeper development of the tools of policy analysis. A list of recommended courses for each concentration is available in the Public Policy Program office. Areas of concentration are:

- Advanced Methods of Policy Analysis
- Business Policies
- Design of Public Institutions
- Development and Growth Policies
- Education
- Environment, Resources, and Population
- Health Care
- International Policies
- Law and the Legal System
- Science and Technology Policy
- Social Policy: Discrimination, Crime, Poverty
- Urban and Regional Policy

Completion of the program in Public Policy requires 88 units of course work:

1. Forty-five units of prerequisite courses: For students who declared the major by the Autumn Quarter, 1998, these courses are: Political Science 1 or 10; Economics 1, 51, 52, 80, 102; Sociology 160 or Industrial Engineering 100; and sufficient calculus to satisfy the prerequisites of Economics 51 (that is, Mathematics 51, Economics 50, or Economics 180). For students who declared after Autumn Quarter, 1998, or who wish to satisfy the new prerequisites, these courses are: Political Science 1 or 10; Economics 1, 50, 51, 52, 80, and 102; Sociology 160 or Industrial Engineering 100; and either Mathematics 19 or 20, or 41. In addition, students are encouraged to take at least one course in linear algebra.

2. The 25-unit sequence of 5-unit core courses, which students should plan to complete by the end of their junior year (see below for descriptions 101-105). To satisfy the core requirement in Organizations, students may take Public Policy 102A or 102B, and to satisfy the core requirement in Philosophy students may take Public Policy 103A or 103B.

3. During the senior year, majors must complete 15 units of course work in a problem-focused area. The 15 units of post-core course work must be approved by an adviser, who is appointed when the student selects an area of concentration. This usually is done midway through the junior year, and must be done no later than the end of the second week of Autumn Quarter in the senior year.

4. Seniors are required to participate in one quarter of the Senior Seminar (Public Policy 200). Majors also must submit at least one research paper during the senior year and present it before the Senior Seminar. The senior paper may be a term paper for either the senior seminar or another course, or an honors thesis.

5. A maximum of 10 units may be taken on a satisfactory/no credit basis in the prerequisite courses for the Public Policy core. All courses required for Public Policy majors must be taken for a letter grade.

6. Students must complete the Public Policy core and their concentration area courses with a grade point average (GPA) of 2.0 or higher.

7. To become a major in Public Policy and to be nominated for the A.B. degree, students must complete an application, available in Building 60, room 61B. For additional information, drop by or phone (650) 723-3452.

The Public Policy Program offers a two-quarter course sequence to prepare students for making effective academic use of an internship (Public Policy 182A and B). Students may also participate in the Integrated Scholar Intern Program, combining directed reading and research with an internship.

MINORS

The Public Policy Program offers a minor that is intended to provide students with interdisciplinary training in applied social sciences. Students who pursue the minor are required to take at least three of the five core courses, and a total of 35 units in Public Policy and its supporting disciplinary departments. Because University rules prohibit double-counting of courses, the requirements for a minor differ according to the student’s major requirements.

For students whose major department or program requires no courses in economics, political science, or sociology, the requirements for a Public Policy minor are:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 1, 50, 51; Public Policy 104</td>
<td>20</td>
</tr>
<tr>
<td>Public Policy 101 or 102</td>
<td>5</td>
</tr>
<tr>
<td>Sociology 160 or Industrial Engineering 100; Public Policy 102</td>
<td>10</td>
</tr>
</tbody>
</table>

For students who are Economics majors or who satisfy a major requirement by taking Economics 51, but no courses in political science, the requirements for a Public Policy minor are:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political Science 1 or 10; Public Policy 101</td>
<td>10</td>
</tr>
<tr>
<td>Public Policy 103</td>
<td>5</td>
</tr>
<tr>
<td>Public Policy 104</td>
<td>5</td>
</tr>
<tr>
<td>Public Policy 105</td>
<td>5</td>
</tr>
<tr>
<td>Sociology 160 or Industrial Engineering 100; Public Policy 102</td>
<td>10</td>
</tr>
</tbody>
</table>

For students who are Political Science majors or who satisfy a major requirement by taking either Political Science 1 or 10, but no courses in Economics, the requirements for a Public Policy minor are:
Economics 1, 50, 51; Public Policy 104 20
Public Policy 103 5
Sociology 160 or Industrial Engineering 100; Public Policy 102 10
Public Policy 104 5

For Sociology majors, the requirements for a Public Policy minor are:
Economics 1, 50, 51; Public Policy 104 20
Political Science 1 or 10; Public Policy 101 10
Public Policy 103 5

For students who major in another interdepartmental program (such as International Relations) and who satisfy major requirements by taking both Economics 51 and Political Science 1 or 10, the requirements for a Public Policy minor are:
Economics 102; Public Policy 105 10
Public Policy 101 5
Public Policy 103 5
Public Policy 104 5
Sociology 160 or Industrial Engineering 100; Public Policy 102 10

HONORS PROGRAM

The Public Policy Program offers students the opportunity to pursue honors work during the senior year. In order to graduate with honors in Public Policy, a student must:

1. Apply for admission to the honors program no later than the end of the second week of Autumn Quarter of the senior year.
2. Complete the requirements for the A.B. in Public Policy and achieve a grade point average (GPA) of 3.3 in the following courses: the Public Policy core, the student’s concentration area courses, the Senior Seminar, and Public Policy 199 (senior research). Courses not taken at Stanford are not included in calculating the GPA.
3. Enroll in at least 8 but no more than 15 units of Public Policy 199 during the senior year and receive a final grade on the senior thesis of at least a ‘B+.’

Students who intend to pursue honors work should plan their academic schedules so that most of the core courses are completed before the beginning of the senior year, and all of the core and concentration courses are completed by the end of Winter Quarter of senior year. This scheduling gives students both the time and the necessary course background to complete a senior research project in Spring Quarter. In addition, juniors who may wish to pursue a senior thesis are encouraged to enroll in Public Policy 197 (Junior Honors Seminar) during Winter Quarter. This course focuses on developing a research plan and the research skills necessary to complete a thesis.

To apply, a student must submit a completed application to the Public Policy Program office with a brief description of the thesis. The student must obtain the sponsorship of a faculty member who approves of the thesis description and who agrees to serve as a thesis adviser. Students intending to write a thesis involving more than one discipline may wish to have two advisers. To be admitted to the honors program, students must:

1. Submit a completed application for honors work to the Public Policy Program office by the end of the second week of Autumn Quarter of the senior year.
2. Achieve a GPA of at least 3.3 in Public Policy courses by the end of the junior year.

The honors thesis must be submitted to both the thesis adviser and the Public Policy Program office. Graduation with honors requires that the thesis be approved by both the adviser and the Director of the Public Policy Program. The role of the director is to assure that the thesis deals with an issue of public policy and satisfies the standards of excellence of the program. However, the grade for the honors thesis is determined solely by the adviser. The thesis adviser sets the deadlines for receiving the final draft of the thesis; the director sets the deadline for theses to be considered for University and department awards. In order to graduate with honors at the Spring commencement, a student must submit a final bound copy of the thesis to the Public Policy Program office no later than Friday, June 2. In order to be considered for awards given to outstanding senior theses, a student must submit a copy of the thesis to the Public Policy Program office no later than Wednesday, May 17.

Members of the core faculty in Public Policy are listed above and are available to provide assistance in selecting a senior thesis topic. For additional information, contact the Public Policy Program office.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

3 units, Spr (Noll)

101. Politics and Public Policy—(Same as Political Science 101P.) The domestic policy-making process, emphasizing how elected officials, bureaucrats, and interest groups shape government policies in various areas including tax, environmental, and social-welfare policy, given their goals and available tactics. How public policies are formulated and implemented. The results of this process using equity and efficiency criteria. Prerequisite: Political Science 1 or 10.
5 units, Spr (Staff)

102A. Organizations and Public Policy—(Same as Sociology 166/266.) Concepts and methods for analyzing the influence of organizations on the setting and implementation of public policy. Varying conceptions of organizations as corporate actors and as social contexts. The roles of organizations in relation to public policy; organizations as decision makers and problems solvers, as change agents, and as clients. Prerequisite: Sociology 160 or Industrial Engineering 100. GER:3b (DR:9)
5 units, Win (Creighton)

102B. Organizations and Public Policy—Analysis of public organizations, stressing problems of effective management and incentives in a non-market environment. Prerequisite: Sociology 160, or Industrial Engineering 100.
5 units, not given 1999-2000

103A. Introduction to Political Philosophy/Theory—(Same as Philosophy 30.) Critical introduction to issues of state authority, justice, liberty, and equality. The issues are approached through major works in political philosophy. Topics: human nature and citizenship, the obligation to obey the law, democracy and economic inequality, equality of opportunity and affirmative action, religion and politics. Readings: Aristotle, Locke, Rousseau, Mill, Marx, Rawls, the U.S. Constitution, some Supreme Court cases. GER:3a (DR:8)
5 units, Aut (Okin)

103B. Ethics and Public Policy—(Same as Science, Technology, and Society 110.) Ethical issues in science- and technology-related public policy conflicts. Develops the capacity for rigorous critical analysis of complex, value-laden policy disputes. Topics: the nature of ethics and morality; the natures of and rationales for liberty, justice, and human rights; and the use and abuse of these concepts in recent and current policy disputes. Cases from: biomedicine, environmental affairs, the technical professions, communications, and international relations. GER:3a (DR:8)
5 units, Win (McGinn)

104. Economics and Public Policy—(Same as Economics 150.) The relationship between macroeconomics and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Readings: theoretical foundations of policy making and analysis, and applications to the adoption and implementation of
105. Quantitative Methods and their Application to Public Policy—
Applications of statistical methods, rather than methodology per se. Risk
assessment in the evaluation of biohazards and medical technologies and
technologies; comparisons of such information-gathering techniques as
surveys, experiments, or simulation studies; methods of expressing and
evaluating uncertainty; and the interpretation of such quantitative tech-
niques of data analysis as regression. Prerequisites: Economics 80 and
102.  
5 units, Spr (Rothwell)

160. Comparative West European Institutions—(Same as Interna-
tional Relations 160, Political Science 120A.) How institutions shape
politics and policies in Western Europe. Electoral laws, parliamentary
systems, and government institutions at the national level influence the
quality and nature of representation, political competition, and policy
outcomes. Institutional developments at the subnational level and within
the European Union challenge the domestic politics and policies of the
European nation states.  
5 units, Win (Alter)

161. Comparative Political Economy of Post-Socialist Transitions—
(Same as International Relations 161, Political Science 121A.) The post-
Socialist economic and political transitions ongoing in Eastern Europe
and the former Soviet Union, investigating attempts to build market
economies and democratic governments. The politics of constitutional
choice and variation in reform strategies and outcomes across the cases.
5 units, Spr (Alter)

182A,B. Policy Making and Problem-Solving at the Local and
Regional Level—In an era of devolution and calls for "integrated
service-provision," much innovative policy formulation and implement-
tion takes place at the local and regional level. The theory and practice
of these processes, focusing on Silicon Valley as a case study. The social,
institutional, and organizational landscape within metropolitan regions,
and theories of metropolitan politics; alternative theories of community
and economic development; collaboration as an approach to policy-
making and problem-solving. Weekly seminars; a speaker series; and
internships with collaborative community and economic development
efforts in Silicon Valley. Enroll both quarters. Prerequisite: consent of
instructor after formal application.  
5 units, Win, Spr (Stanton)

185. Managing Public Policy—The role of public administration in
contemporary government. Major issues: administrative structure, con-
trol, relations with other branches of government, the problems of
internal organization and management, methods of innovation and
change, budgeting, and personnel. Prerequisite: course in American
politics.  
5 units, Spr (Printup)

191. Business Skills for the Social Sector—Recommended for students
taking 192. Introduces core concepts in marketing, financial decision
making, organizational effectiveness, operations management, and strat-
yey. Focus is on the adaptation of these concepts for use in the social
sector, exploring the limits of using business-based methods to serve
social objectives. Conceptual articles and some case studies. Prerequi-
tites: Economics 1, junior or senior standing.  
4 units, Win (Dees)

192. Social Entrepreneurship—The search for innovative responses to
social needs, the role of private initiatives, for-profit and not-for-profit,
and the challenges associated with these initiatives. Theoretical issues:
defining the social good and assessing the role of market forces, philan-
thropy, and government. Practical issues: recognizing specific opportu-
nities for social improvement, forming an enterprise that responds to
these opportunities, developing organizational and funding strategies,
evaluating performance, managing the enterprise, and creating sustained
positive impact. Readings: business school cases and a range of theoretical
and practical articles. Prerequisites: Economics 1, junior or senior
standing.  
5 units, Spr (Oll)

194. Technological Policy—The evolution of U.S. technology policy
and the way in which policy is made. Students rigorously analyze
technology policy issues. Topics: federal technology policy before and
after WW II, the debate over using R&D programs and other measures
to promote economic growth and competitiveness, the impact of federal
policy on the development of the Internet and biotechnology, and nuclear
waste disposal and genetic privacy as examples of controversies over the
environmental and social impact of technological activities. Prerequi-
ties: Economics 1 and Political Science 1 or 10.  
5 units, Win (Windham)

195. Business and Public Policy—The multi-faceted relationships
between business, government, and interest groups, with emphasis on
companies and interest groups as strategic actors in the "nonmarket
environment." Companies attempt to shape public policy through gov-
ernment processes and international politics; interest groups attempt to
shape public policy through government processes and by exerting direct
influence on businesses; politicians attempt to mediate conflicts of
interest between and among businesses and interest groups. Each rela-
tionship transcends the conventional view of a business as an exclusively
or predominantly market focused entity that takes as given government
actions and ignores interest groups and their collective actions. Modules:
media and private collective action, business strategies in government
arenas, international business and the nonmarket environment, and
corporate responsibility and ethics.  
5 units, Spr (Wiseman)

196. The Political Economy of the Federal Budget—Applies the tools
of economic analysis to study how the federal government makes its
budgetary decisions. The factors that have contributed to the growth in
federal spending, taxation, and the national debt; congressional and
executive branch budget processes and their effects on government
policymaking; spending programs (Social Security, Medicare, welfare,
and infrastructure programs), Prerequisites: Economics 51,52 (Econom-
ics 52 may be taken concurrently).  
5 units, Win (Cogan)

197. Junior Honors Seminar—Primarily for students who expect to
write an honors thesis. Weekly sessions discuss writing an honors thesis
proposal (prospectus), submitting grant applications, and completing the
honors thesis. Readings focus on writing skills and research design.
Students select an adviser, outline a program of study for their senior
year, and complete a prospectus by the end of the quarter. Seniors
working on their theses also may enroll and present their research to
the seminar participants. Seniors are required to make substantial progress
on their thesis by the end of the quarter.  
3 units, Win (Rothwell)

198. Directed Readings in Public Policy
1-5 units (Staff)

199. Senior Research
1-15 units (Staff)

200A,B,C. Senior Seminar—Designed to give Public Policy students
the opportunity to make oral presentations and to write a seminar-length
paper on a topic in public policy. Topic and methods of analysis used are
determined by student in consultation with instructor. A limited number
of lectures and seminars deal with the question of how to conduct "good"
research in public policy. Prerequisites: completion of core courses in
Public Policy or consent of the instructor.  
200A. 3 units, Aut (Wallsten)
Acting Instructor: David Stewart
Associate Professor: Linda Hess

upper-division course in either international economics or the politics of concentration. Relevant courses listed in one area may, with the written concentration across these (or other) areas, again in consultation with the religion; or religion, culture, and comparative studies. Religious tradi-
tion in one of three areas: religious traditions; ethics and philosophy of

Professors: Carl W. Bielefeldt, Arnold M. Eisen, Bernard R. Faure,

Chair: Arnold M. Eisen
Professors: Carl W. Bielefeldt, Arnold M. Eisen, Bernard R. Faure, Robert C. Gregg, Thomas Sheehan, Lee Yearley
Associate Professor: Hester G. Gelber
Assistant Professors: Rudy V. Busto, Eric Lawee, Brent Sockness
Lecturer: Linda Hess
Visiting Associate Professor: Ebrahim Moosa
Visiting Assistant Professors: Angelika Cedzich, Barbara Pitkin
Acting Instructor: David Stewart

The purpose of Religious Studies is to understand and interpret the history, literature, thought, and social structures of various religious traditions and cultures. The department offers courses at several levels, described below.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

The general requirements for an A.B. in Religious Studies are 60 units of course work in the department (no more than 10 units of which can be taken satisfactory/no credit), including 9 to 15 units in introductory courses (numbered 1-89). At least two introductory courses must be in diverse religious traditions (see below). At least 40 units are to be taken in courses numbered above 100, including no fewer than three seminars numbered above 200. All majors are required to take 290, Majors Seminar. Up to 10 units of directed reading may count towards the major.

In meeting these requirements, a student is expected to structure a coherent program of study in consultation with his or her adviser. This may be done in a number of ways. The student may choose to concentrate in one of three areas: religious traditions; ethics and philosophy of religion; or religion, culture, and comparative studies. Religious traditions consists of three sub-fields: East Asian religions, Judaism, and Christianity. Alternatively, the student may construct a self-designed concentration across these (or other) areas, again in consultation with the adviser.

The student is expected to take a minimum of 25 units in the area of concentration. Relevant courses listed in one area may, with the written consent of the undergraduate director, be counted in another. Approved courses offered by other departments may also be counted.

MINORS

The minor requires at minimum seven courses of 3 or more units for a minimum of 30/maximum of 36 units of graded work. Students must complete two introductory courses (numbered 1-89), at least two topics in religion courses (numbered 101-189) and at least one seminar (numbered 201-289). Remaining units must be taken in courses numbered 101 and above. One course in directed reading (199) may count towards the minor, and students may petition for other Stanford courses to fulfill minor requirements. Students are strongly encouraged to focus their program of study in one of the established department areas of concentra-
tion, but may also design the minor to supplement their major. Exam-

Examples of minor concentrations are available from the department admin-
istrator. Minors must take courses from at least two Religious Studies faculty members. Students must declare the minor no later than the last day of the quarter two quarters before degree conferral.

It is possible for minors to write a senior essay in Religious Studies, but only with the consent of the undergraduate director and the student's major adviser. Students writing the senior essay are required to complete 197 (Senior Essay) in addition to the minor course requirements, and should plan on one directed reading course as part of their program requirements (199).

SENIOR ESSAY/HONORS

Majors in Religious Studies (RS) are encouraged to write a senior essay in Religious Studies. The essay allows students to apply knowledge and skills learned in the classroom to a topic of personal interest. It also provides a focused research experience under the tutelage of a Religious Studies faculty member, thereby offering students a chance to improve research and writing skills indispensable to graduate work in the humanities and useful in a wide variety of professions.

The essay may be on any approved topic in Religious Studies. Stu-
dents should begin conversations about the senior essay with Religious Studies faculty and the undergraduate director soon after declaring the Religious Studies major. While the bulk of the essay is generally written during the senior year, students are advised to begin conceptualizing a project at the end of the junior year in order to take advantage of summer research opportunities. Students unsure about which faculty member would be most knowledgeable in the area of interest should ask the under-
graduated assistant in the department for a copy of the leaflet, Religious Studies at Stanford. A proposal for the senior essay, consisting of a completed application form, a copy of the transcript, and a one-to-two page description of the topic signed by the prospective essay adviser, should be submitted by the end of Spring Quarter of the junior year, and in no case later than the end of third quarter prior to graduation. The applica-
tion is then reviewed by the undergraduate director who either approves the project or requests resubmission with revisions.

Students must take RS 197 (Senior Essay) for a letter grade and 3 to 5 units in the senior year while writing the thesis. These units are in addi-
tion to the total number of units (60) required for successful comple-
tion of the major. Students are allowed up to 10 letter grade units in se-

Senior essays of exceptional merit are submitted to the Religious Studies faculty for honors consideration. There is no honors essay in Religious Studies; rather, all senior essays are eligible for receiving the honors distinction if the essay receives a grade of 'A' or 'A-.' Those who successfully earn honors are acknowledged publicly during the depart-
ment's commencement exercise, and the honors distinction is also record-
ed on the final University transcript.

Further details and guidelines for the senior essay are available from the department undergraduate assistant.

MAJOR IN RELIGIOUS STUDIES AND PHILOSOPHY

The departments of Religious Studies and Philosophy jointly nomi-

nate for the A.B. students who have completed a major in the two disci-

plines. See a description of this joint major under the "Philosophy" sec-
tion of this bulletin, or in the guidelines available from the undergraduate
director of either department.

**GRADUATE PROGRAMS**

**MASTER OF ARTS**

University regulations pertaining to the A.M. are listed in the “Gradu-
ate Degrees” section of this bulletin. The following requirements are
in addition to the University’s basic requirements.

The student completes at least 36 units of graduate work at Stanford
beyond the A.B. degree, including a required graduate seminar (304A
or B). Residence may be completed by three quarters of full-time work
of the equivalent.

The student’s plan of courses is subject to approval by the graduate
director. No field of specialization is expected, but students may focus
work in particular areas. Advanced and graduate courses in other depart-
ments may be taken. No thesis is required; a thesis, if elected, may count
for as many as 9 units.

Each student demonstrates reading knowledge of at least one foreign
language.

**DOCTOR OF PHILOSOPHY**

University regulations regarding the Ph.D. are found in the “Gradu-
ate Degrees” section of this bulletin. The following requirements are
in addition to the University’s basic requirements.

Residence—Each student completes three years (nine quarters) of full-
time study, or the equivalent, in graduate work beyond the A.B. degree,
and a minimum of 72 units of graduate course work (excluding the dis-
sertation).

Field of Study—The Ph.D. signifies special knowledge of a field of
study and potential mastery of an area of specialization within it. The
faculty of the department has established certain fields of study in which
its strengths and those of other Stanford departments cohere. They are:

- East Asian religions: Buddhist, Confucian, Taoist, Hindu, and modern
- Western religious thought: Christianity, Judaism, Islam, Eastern religions

Stages of Advancement—The three stages through which the student
advances to the degree are: (1) in the first two years, the student refines
an area of specialization within the chosen field of study in preparation
for candidacy; (2) after attaining candidacy, the student concentrates on
the area of specialization in preparation for the qualifying examination;
(3) the student writes a dissertation and defends it in the University oral
examination.

Languages—Each student demonstrates a reading knowledge of two
foreign languages, including French or German. Each student also dem-
strates reading knowledge of other ancient or modern languages neces-
sary for the field of study, area of specialization, and dissertation topic.

Courses—Each student satisfactorily completes the two graduate
seminars (304A and B) before the candidacy decision. Other courses are
taken with the approval of a faculty adviser in consideration of the stu-
dent’s field of study.

Candidacy—At the end of each academic year, the department’s fac-
ulty recommend second-year students for candidacy on the basis of all
relevant information, and especially on the student’s candidacy dossier
which includes the approved declaration of an area of specialization,
certification for one foreign language, and two substantial papers writ-
ten for courses during the previous two years.

Teaching Internship—At least one teaching internship under the
supervision of faculty members is undertaken at a time negotiated with
the graduate director. Students receive academic credit for the required
internship, which is a project of academic training and not of employment.

Qualifying Examination—To qualify for writing a dissertation, the
student must successfully pass a comprehensive examination in the cho-

Dissertation—The dissertation contributes to the humanistic study of
religion and is written under the direction of the candidate’s dissertation
adviser and at least two other members of the Academic Council. The
University oral examination is a defense of the completed dissertation.

**PH.D. MINOR IN RELIGIOUS STUDIES**

Candidates for the Ph.D. in other departments may select a Ph.D.
minor in Religious Studies. The minor requires at least 24 units in Reli-
gious Studies at the 200 level or above. Four of the 24 units should be in
“Theories and Methods.”

**JOINT PH.D. IN RELIGIOUS STUDIES AND HUMANITIES**

Religious Studies participates in the Graduate Program in Humanities
leading to the joint Ph.D. in Religious Studies and Humanities, de-
scribed in the “Interdisciplinary Studies in Humanities” section of this
bulletin.

**COURSES**

Course levels:

1-89 Introductory (4 units)
101-189 Undergraduate Lecture Courses (4 or 5 units)
197-199 Undergraduate Directed Reading (variable units)
201-290 Undergraduate Seminars (4 or 5 units)
299 Graduate Directed Reading (variable units)
301-399 Graduate Seminars, Research, and Teaching (variable units)

**INTRODUCTORY**

1. Introduction to Religion—Cross-disciplinary approach to the beliefs,
practices, experiences, and institutions that, to individuals of diverse
epochs and cultures, have comprised the phenomenon called religion.
Issues: prophets and founders; God and the gods; scriptures and their
interpretation; annual and life-cycle rituals; faith, reason, and mysticism;
the impact(s) of modernity. GER: 3a (DR: 8)
4 units, Aut (Gregg)

2N. Stanford Introductory Seminar: Prophecy and Politics in America—
The Religious Thought of Abraham Joshua Heschel and Martin Luther King, Jr.—Preference to freshmen. Examination of the
religious beliefs and political activities of two pre-eminent religious
figures in 20th-century America, each now considered a hero in his own
religious community and beyond. Both brought together disparate source-
s in their personal theologies: King synthesizing Baptist roots with a
diverse body of thought studied during his dissertation years in Boston;
Heschel synthesizing Hasidic roots with a diverse body of thought studied
during his dissertation years in Berlin. Each took the mandate of the
Hebrew Bible prophets with utmost seriousness, convinced that God
demanded action to transform the social order. GER: 3a (DR: 8)
3 units, Aut (Eisen)

5N. Stanford Introductory Seminar: The Trickster in East Asia—
Preference to freshmen. The trickster, a subversive, mischievous, and
boundary-crossing figure, is a well-known motif in N. American myth
and folklore. Trickster-like figures are also found in mythologies and
religions throughout the world. After examining a few famous tricksters
in American and European cultures (from Coyote to Hermes and Fal-
staff), the focus is on the nature and function of tricksters and other holy
fools in Asian cultures, emphasizing how some Asian cultures have put
transgression and folly at the center of religious life. GER: 3a (DR: 8)
3 units, Aut (Faure)

6N. Stanford Introductory Seminar: Readings in Asian Religions—
Preference to freshmen. Classic texts from diverse cultural settings and
religious traditions: Bhagavadgita, a formative treatise of early Hindu-
ism; the Chuang Tzu, a classic statement of philosophical Taoism; and
the Shobho genzo, a collection of essays on Zen Buddhism. The texts are
placed in historical and intellectual context, exploring the philosophical
and religious teachings as responses to issues posed by earlier tradition.
Notions of self and self-cultivation, and the relationships between
personal and social ethics, follow from these notions. GER: 3a, 4a (DR: 2
or 7 or 8)
3 units, Win (Bielefeldt)
11. Religious Classics of Asia—Important texts from S. Asia, including discussion of the idea of text; culture-specific ways of receiving and interpreting texts; interactions of such categories as oral and written, classical and folk, elite and popular in Indian traditions. Texts: Upanisads, Sattipathana Sutta, Bhaqavad Gita, Ramayana, Devi Mahatmya, devotional poetry, and drama. Emphasis is on Hinduism, with materials from S. Asian Buddhism, Jainism, and Islam.

4 units, Win (1999-2000)

12. Religions of India—The history of religious traditions in the Indian subcontinent (including indigenous or "tribal" religions, Hinduism, Buddhism, Jainism, Islam, Sikhism, and Christianity), representative texts and practices, and some issues of religious identity and conflict in modern India. GER:3a (DR:8)

4 units, Win (1999-2000)

14. Introduction to Buddhism—Introduction to the life and teachings of the canonical Buddha, and to the various Buddhist cultures that have drawn inspiration from the movement he created. Materials from India, China, Japan, and Tibet are examined in terms of their doctrinal content, institutional basis, ritual context, and implications for the changing Buddhist understandings of the path to liberation. GER:3a (DR:8)

4 units, Win (1999-2000)

15. The Hebrew Bible—GER:3a (DR:8)

4 units, Spr (1999-2000)

18. Zen Buddhism—Introduction to classical Zen thought in China, its background, origins, and development. GER:3a,4a (DR:2 or 8)

4 units, Spr (1999-2000)


4 units (1999-2000)

23. Introduction to Judaism—The historical development of Jewish religious thought and practice, from the biblical period to the present. Various kinds of texts reflecting that development: scriptural, liturgical, midrashic, legal, historical, and philosophical. The Sabbath, and yearly festivals and sacred days. GER:3a (DR:8)

4 units, Win (1999-2000)

24. Introduction to Christianity—The historical development of Christian religious thought and practice from Jesus to the present. Emphasis is on the formation of Christianity's major teachings and their transformation and diverse expressions in the medieval, reformation, and modern periods. Readings focus on primary texts. GER:3a (DR:8)

4 units, Spr (1999-2000)

25. Introduction to New Testament Literature—The more important writings in the New Testament (and several non-canonical early Christian works) and recent scholarly treatment of this literature. Emphasis is on the historical and social dynamics which influenced the New Testament's leading ideas, including its differing portraits of Jesus and its several understandings of divine action.

4 units (Gregg) not given 1999-2000

26. Early Christianity—The Christian movement to 600 A.D., emphasizing its distinctive beliefs and practices, the importance of Christianity to changes within the late-Roman world, and emergent beliefs and practices that distinguished Christians from other groups and among themselves. Primary documents (ancient texts in translation) and surviving art and architecture show early Christianity's modes of community organization, debates about orthodoxy and heretical teaching, and interaction with other religions. Thematic interest concerns deployment of "holy power" in people, places, rituals, objects.

5 units (Gregg) not given 1999-2000

27. Introduction to Islam—The beginning of Islam as a religious tradition and its unfolding into a world religion. Focus is on the history of the founder and the elements that constitute a Muslim world view: beliefs, rituals, scripture, and prophecy. Some tools and insights to understand contemporary Islam.

GER:3a (DR:8)

4 units, Aut (1999-2000)

29. Imagining Jewish Civilization—(Same as History 88.) Interdisciplinary introduction to the various forms of Jewish self-expression, literature, religion, and history from the Biblical period to the present. Topics: power and powerlessness, conflicting notions of the divine, evil, beauty, community, gender, and learning through the ages. Guest lectures, films, reading of primary and secondary texts.

5 units (1999-2000)

30. Modern Christian Theology: Issues and Problems—Challenges to Christian belief posed by modernity (e.g., the historical reliability of Christian scriptures, the rise of secularism as a world view, the historicization of human thought and culture, the quest for political justice and liberation, the rise of protest atheism, the presence of "other" religions, the meaning of religious discourse in a scientific age) and responses to these challenges by classic and contemporary Christian thinkers since the Enlightenment. Specific issues and figures rotate.

GER:3a (DR:8)

4 units, Win (1999-2000)

42. Philosophy of Religion—Classic and modern questions in the philosophy of religion are traced through Western and Eastern traditions: the coherence of theism, relativism, verification and ethics of belief, and implications of science. Readings from traditional and modern texts.

GER:3a (DR:8)

4 units, Win (1999-2000)

53. Jews and Judaism in America—The interaction between the character of the American Jewish community and the forms of Judaism developed in this country is examined against the background of American ethnicity, historical, literary, sociological, and theological materials are used.

GER:4b (DR:3)

4 units (1999-2000)

55. Introduction to Chinese Religions—Confucianism, Daoism, Buddhism, and the interchange among these belief systems and institutions. Set against the background of Chinese history, society, and culture, with attention to elite and popular religious forms.

GER:3a (DR:8)

4 units, Win (1999-2000)

65. Introduction to Christian Ethics—The concepts, sources, and methods employed in the ethical reflections of major Christian thinkers from traditional to contemporary (e.g., Augustine, Aquinas, and Stanley Hauerwas). Their understandings of society, the meaning of our lives, the
kind of people we ought to be, and how we make practical moral judgments.

4 units, not given 1999-2000

**77. God in the Modern and Postmodern World**—The dialogue of philosophy and religion from Kierkegaard’s leap of faith to Heidegger’s pious agnosticism, and beyond.

4 units, Win (Sheehan)

**80. Introduction to Rabbinic Culture**—The genres of rabbinic culture and the issues which have shaped its worldview in different times and places. Selections (in English translation) from midrash, Mishna, Talmud, codes, and responses. The legitimacy of rabbinic authority, the value of oral Torah, discipleship, the lure of the hyposthetica, the relationship between custom and law, the nature and place of dissent, the creeping expansion of the realm of norms, the challenge of modernity.

4 units, not given 1999-2000

**UNDERGRADUATE LECTURES**

**ASIAN RELIGIONS**

**113. Introduction to the Daoist Religion**—The major schools and practices of Daoism, China’s indigenous higher religion. The historical framework, with the texts of Laozi and Ao Wuangzi, cosmology, and a variety of beliefs and practices of various periods. Modern Daoist liturgy and its relationship with popular religion.

4 units, Aut (Cedzich)

**116. Japanese Buddhism**—The history and teachings of Buddhism in Japan, emphasizing the early and medieval periods.

5 units, not given 1999-2000

**117. Syncretism and Sectarianism in Chinese Buddhism**—Dialectical relationships between sectarian and syncretic tendencies, conservative and subversive elements, and orthodoxy and heterodoxy in the development of Chinese Buddhism. Prerequisite: consent of instructor.

5 units (Faure) not given 1999-2000

**118. Ritual in East Asian Buddhism**—Rituals and symbolic representations of the relationship between the sacred and profane in E. Asian religious traditions.

4 units (Faure) not given 1999-2000

**119. Gandhi and Non-Violence**—M. K. Gandhi, widely known as “Mahatma” (saint or holy man), is one of the most influential figures of the 20th century and is especially associated with the development of ahimsa (nonviolence) as a political force and social ideal. Violence/nonviolence in Hinduism, Buddhism, and Jainism. Gandhi, his life, ideas, and influence, through his own autobiography and writings, and through writings by others. GER:3a,4c (DR:8t)

4 units, Aut (Hess)

**124. Religion in Japan**—The history and characteristics of Japanese religious tradition. Limited enrollment.

5 units, not given 1999-2000

**136. Buddhist Yoga**—Introduction to Buddhist models of spiritual practice, with emphasis on issues in the interpretation of the contemplative path. Limited enrollment.

4 units (Biehfeldt) not given 1999-2000

**150. Mahayana Buddhism**—Introduction to the Lotus school of Mahayana; its Indian sources, Chinese formulation, and Japanese developments. GER:3a (DR:8)

3 units, Aut (Biehfeldt)

**156. Religious Lives of South Asian Women**—Emphasis is on religious texts and practices in which women are the main actors and the principal or only participants. The process of making “women’s spaces” and the circumstances in which women experience and exercise their own agency. The boundaries of these spaces, the implied contrasts with mainstream traditions, and constructions of gender from various perspectives. Hindu, Muslim, Sikh, and Jain communities. Student research projects on any religious tradition in any S. Asian country.

4 units, not given 1999-2000

**CHRISTIANITY**

**109. God and Gender: Christianity through the Eyes of Women**—Introduction survey of contemporary feminist critiques and revisions of traditional Christian beliefs and practices. Recent contributions by womanist, Mujerista, and Asian feminists. GER:3a,4c (DR:8t)

4 units, Win (Pitkin)

**126. Protestant Reformation**—16th-century evangelical reformers (Luther, Calvin) and reform movements (Lutheran, Reformed, Anabaptist) in their medieval context.

4 units, not given 1999-2000

**145. Protestantism: Ethics and Community**—The structure and development of ethical thought in the Protestant theological tradition(s), from the Reformation to the 20th century. Readings in primary texts of representative authors: e.g., Luther, the Anabaptists, Spener, Edwards, Schleiermacher, Trelitz, Barth, R. Niebuhr, Gustafson.

4 units (Sockness) not given 1999-2000

**146. Power in the Blood: Evangelical Christianity in the United States**—The history, theology, and subculture of Protestant Evangelicalism. Topics: the rise of fundamentalism, biblical interpretation, missions, politics, the Second Coming, Christian music, parachurch organizations, charismatic movements, televangelism, biblical feminism.

4 units (Busto) not given 1999-2000

**167. Medieval and Renaissance Religious Philosophy**—Survey of medieval and Renaissance philosophy, focusing on God, world, and human freedom. How do divine will and foreknowledge determine the events of this world? Do events at any level remain contingent and free from divine determinism? What is the nature of the human will that it might remain free? How much freedom might God have in creating the world that exists? Is it eternal or does it have a beginning? Could God create more than one? Are there other worlds? Questions like these engaged a number of medieval thinkers. Readings from Augustine, Anselm, Aquinas, Scotus, and Ockham, etc. GER:3a (DR:8)

4 units, Aut (Gelber)

**168. Divine Justice in Medieval Thought and Literature**—Medieval ethical beliefs through legends, myths, saints’ lives, literature, and the ethical theories of medieval scholars.

4 units (Gelber) not given 1999-2000

**172. Sex, Body, and Gender in Medieval Religion**—Anxiety about sex and the body increased markedly during the early years of Christianity, while the doctrine of the Incarnation put the human body at the center of religious concern. Ideals of virginity, chastity, aesthetic self-denial of necessities like food, sleep, and freedom from pain were central to lay and clerical piety. The religious theory and practice associated with questions about sex, body, and gender in the Middle Ages as constructed in
JUDAISM

173A. Religion in the Age of Reason—Western religious thought during the European Enlightenment (1650-1800). Figures and movements: the Deists, Locke, and Hume in England; the philosophers, Voltaire, and Rousseau in France; Pietism, Protestant Orthodoxy, Leibniz and Kant in Germany.
4 units (Sockness) not given 1999-2000

177. Religious Existentialism—Introduction to the influence of existentialism on religious thought since Kierkegaard. GER:3a (DR:8)
5 units, not given 1999-2000

186. 20th-Century Christian Thought—Introduction to systematic theology in the 20th century through the study of the main proponents of “dialectical” or “Neo-Orthodox” theology: Karl Barth, Rudolf Bultmann, Reinhold Niebuhr, and Paul Tillich.
4 units (Sockness) not given 1999-2000

189. Vatican II and Beyond: Continuity and Change in the Catholic Church—The debates, decisions, and documents of the Second Vatican Council (1962-65), in light of theological ferment that preceded it, cultural changes that prompted Pope John XXIII to convene it, and the subsequent impact on Church doctrine, discipline, polity and popular practice through the pontificates of Paul VI and John Paul II. Core texts are Council documents, supplemented by implementing decrees, theological/cultural assessments, and historical primary sources.
4 units, Spr (DuMaine)

JUDAISM

112. Sexual Politics in the Ancient World—Study of biblical and classical texts that indicate sources of gender bias. Topics: construction of gender and social reality in ancient texts; the female divine in biblical religion; ways in which changing social attitudes, especially issues of gender and sexuality, challenge the traditional values expressed in the Bible. Biblical stories of Sarah and Hagar, Ruth, Esther, Deborah, Judith; classical texts include Homer, Hesiod, Euripides' The Bacchae, Aristotle.
5 units, not given 1999-2000

5 units (Staff) not given 1999-2000

128. Women and Judaism—The role and image of women in classical Judaism; responses of modern Jewish women to traditional conceptions of women and femininity. Recent attempts to create a feminist Judaism.
5 units, not given 1999-2000

161. Modern Jewish Thought—Key texts and thinkers in 20th-century Jewish thought that focus on God, the self, love, death, the quest for goodness and the meaning of Jewish existence. Thinkers include Buber, Heschel, Kook, Levinas, and Savelitchik.
5 units (Eisen) not given 1999-2000

166. Myth and Ritual in Judaism—Festivals in the Jewish tradition.
5 units, not given 1999-2000

5 units, not given 1999-2000

184. Spirit and the Law—Throughout much of post-biblical history, Torah and the commandments have been dismissed as devoid of spirit. Critiques of the Law as formulated by Paul, Aquinas, Spinoza, and Kant. Jewish perspectives on the spirituality of the commandments through readings from talmudic, philosophical, kabbalistic, Hasidic, and contemporary sources. GER:3a (DR:8)
4 units, Win (Fishman)

ISLAM

110. Islam in the Modern World—Critical and controversial issues in modern Islam. The beginnings of Islamic reforms in the 19th-century Middle East and the ideas of key modern thinkers. Some thematic issues, such as the notion of an Islamic state, women's liberation, and the move towards the Islamization of education.
4 units, not given 1999-2000

110A. Updating Tradition: Law and Gender in Modern Islam—Women, gender, and tradition in Islam. Theory and case studies from different Muslim communities inside the traditional Islamic world and outside it. Experiences in N. America, the Middle East, Africa and S. Asia. Gender theory is combined with case studies and critical applications, explored through the prism of law and religion; how it impacts on the lives of women, family, and community in the contemporary world. GER:3a (DR:8)
4 units, Spr (Moosa)

THEORETICAL AND COMPARATIVE STUDIES

121. Peoples of the Book: Mates, Mothers, and Daughters—Significant women in the traditions of Judaism, Christianity, and Islam, with attention to Eve, Sarah and Hagar, the Queen of Sheba, "the women of" Noah and Lot, and Mary (mother of Jesus) in the Bible; Qur'an and early rabbinic, patristic, and Muslim commentaries. GER:3a, 4c (DR:8f)
3-4 units, Aut (Gregg)

122. Wealth and Poverty in the Biblical Tradition
4 units, Spr (Stewart)

143. Chicano/a Religious Traditions—The religious traditions that created and continue to influence the history, politics, and formation of Mexican American communities. Topics: ancient Mesoamerica, Mexican Catholicism, Movimiento indigenismo, Evangelicos, Latino theology, Chicana innovations.
4 units (Busto) not given 1999-2000

148. Social Theory and Religion
5 units (Eisen) not given 1999-2000

149. Theories of Religion—The origin and persistence of religious behavior and belief in the modern period. Philosophical, sociological, historical, and psychological theories, “classic” and contemporary. 5 units, not given 1999-2000

155. Asian/Pacific American Religious Traditions—The role of religion in Asian American and Pacific Islander communities since the 19th century. Topics: the impact of immigration laws on religious life, WWII internment, the transformation of Asian traditions, Christian evangelicalism, Asian American theology, the controversy over “American Buddhism.” Prerequisite: consent of instructor.
4 units (Busto) not given 1999-2000

157. Readings in Greco-Roman Religion—Texts present philosophical and religious thought and point towards activities of discrete groups.
5 units (Gregg) not given 1999-2000

163. Religion and Ethnicity—Religion and issues of race, class, and gender in the history and development of racially ethnic communities. Religion as promoting or resisting assimilation. Issues: revitalization, theologies of liberation, dissent, and transformation within traditions.
5 units (Busto) not given 1999-2000
165. Religious Ritual—Classical and contemporary theories of religious ritual with case studies from a variety of traditions.
   5 units (Faure) not given 1999-2000

171. Faith and Politics in the Middle Ages—Does God have politics? Are politics a human evil or divine good? These questions and their cognates are explored from the perspective of medieval Christian, Muslim, and Jewish thought on the relation between spiritual and temporal powers, and between reason and revelation as it pertains to the political order.
   4 units (Lawee) not given 1999-2000

179. Religion in Science Fiction and Fantasy—What religion is to us can be discerned in the ways we imagine it to be. The place of religion in the modern literary imagination through science fiction texts and films, assessed in conjunction with theoretical texts that define religion in the academic imagination. Students construct a fictional religion or religious situation.
   5 units (Gelber) not given 1999-2000

183. The Death of God: Between Hegel and Marx—The radical transformations in Western notions of God between the death of Hegel and the birth of historical materialism, arguing that questions about theism and atheism, humanism, and history formulated in the period 1831-1846 are still pertinent today. Texts from Hegel, the Young Hegelians, Feuerbach, and Marx on issues of God, history, and the social dimensions of human nature. GER: 3a (DR: 8)
   4 units, Aut (Sheehan)

   4 units, Busto (Sheehan)

UNDERGRADUATE DIRECTED READING

197. Senior Essay—Prerequisite: consent of instructor and of the department.
   Aut, Win, Spr (Staff)

199. Individual Work—Prerequisite: consent of instructor and of the department.
   Aut, Win, Spr (Staff)

UNDERGRADUATE SEMINARS

ASIAN RELIGIONS

206. Popular Chinese Religion—Beliefs and practices centered around life, death, and the afterlife; concepts of divinity and the structure of the popular pantheon; communication with the divine; ritual celebrations and specialists; messianic movements; popular religious arts: performative, literary, and visual.
   4 units, Aut (Cedzich)

210. Speech and Writing in the Buddhist Traditions—Using Western “literature” on writing and morality (Derrida, Ong, Goody), examines various conceptions of speech and writing found in E. Asian religions, specifically the way writing has transformed the Chan/Zen tradition, and our interpretation of it.
   4 units (Faure) not given 1999-2000

212. Interpreting Confucian Texts—Illustrates the critical importance of historical and philosophical issues to the task of interpretation. Introduction to Chinese commentarial tradition. Seminar; pace and range determined by constituents. Prerequisite: consent of instructor.
   5 units, not given 1999-2000

221. Ch’uan/Zen and Local Religion—The relationships between the Ch’uan/Zen tradition and Chinese or Japanese local religion, focusing on forms of symbolic mediation (ritual, meditative techniques, etc.) in both religious traditions. Prerequisite: consent of instructor.
   5 units (Faure) not given 1999-2000

230A. Zen Buddhism Seminar—Selected topics in Ch’uan and Zen; may be repeated for credit.
   5 units (Bielefeldt) not given 1999-2000

256. Japanese Buddhism Seminar—Selected topics. May be repeated for credit.
   4 units (Bielefeldt) not given 1999-2000

257. East Asian Buddhist Texts
   4 units, Win (Faure)

   5 units, Spr (Bielefeldt)

CHRISTIANITY

203. The End of the World: Apocalypse Then, Now, and to Come—Close reading of the classical Jewish and Christian texts on eschatology, and an analysis of their relevance at the turn of the new millennium.
   4 units, Win (Sheehan)

234. The Virgin Mary and Images of Power—Through art and literature, the emergence of the Virgin Mary as a symbol of religious and cultural values from earliest legends to the modern era. Emphasis is on the Middle Ages.
   5 units (Gelber) not given 1999-2000

240. Jews, Pagans, and Christians in Late Antiquity—Investigation of the distinctive expressions of Judaism, Roman polytheism, and Christianity from 100-450 A.D., emphasizing interactions between the groups. Primary documents and new studies of late Roman religious-political competition and conflict.
   4 units (Gregg) not given 1999-2000

241. Asceticism in Pagan and Christian Antiquity
   4 units (Gregg) not given 1999-2000

242. Wrestling with the Text: Perspectives on the Bible in the Age of Reform, 1400-1600—Significant and often conflicting developments in the interpretation and use of the Bible by Renaissance humanists, Roman Catholics, and Protestants from the late medieval period through 1570. Issues of translation, the canon, and the authority of sacred texts.
   4 units, not given 1999-2000

244. Religious Studies and the Humanities: Reconstructing Religion—Friedrich Schleiermacher—Idealist philosopher, Moravian pietist, religious skeptic, hospital chaplain, charter member of the Romantic movement, head preacher at Trinity Church, co-founder of the University of Berlin, translator of Plato’s works, opponent of Hegel, pioneer in hermeneutical theory, “father of modern theology.” Examination of this multifaceted 19th-century German thinker, who reconceived the meaning of religion in the West and pioneered an approach to theology attuned to the sensibilities of modern science and history.
   5 units (Sockness) not given 1999-2000

268. Model Selves: Francis of Assisi—The formation of the model self in myth and history in the Western tradition, emphasizing Francis of Assisi, with reference to other model selves, masculine and feminine in Eastern and Western traditions.
   5 units (Gelber) not given 1999-2000

271A.B. Dante and Aquinas—Focus is on the different ways Dante and Aquinas both treat human excellencies, such as love and courage, and
human deformations, such as pride and anger. Students may take the 271A without B.

271A. 4 units, Win (Yearley)
271B. 4 units, Spr (Yearley)

273. Aquinas’ Ethics—Thomas Aquinas’ general theory of human flourishing and his analysis of specific human excellences (e.g., love, courage, and magnanimity) and human deformations (e.g., vanity, pride, and envy). Limited enrollment.

5 units (Yearley) not given 1999-2000

274. From Kant to Kierkegaard—The main currents of religious thought in Germany from Kant’s critical philosophy to Kierkegaard’s revolt against Hegelianism. Emphasis is on the theories of religion; the epistemological status of discourse about God; the role of history, especially, the figure of Jesus; and the problem of alienation/reconciliation in four seminal modern philosophers: Kant, Schleiermacher, Hegel, and Kierkegaard.

5 units, Spr (Sockness)


5 units, not given 1999-2000


5 units (Harvey) not given 1999-2000

280. Schleiermacher—The “father of modern theology.” Friedrich Schleiermacher (1768-1834) holds a monumental place in the history of Western religious thought since the Enlightenment. Exploration of his controversial conception of the theological enterprise through a study of his most significant religious writings.

4 units (Sockness) not given 1999-2000

THEORETICAL AND COMPARATIVE STUDIES

208. Feminist Theology—Seminar examining contemporary feminist critiques, rejections, and revisions of traditional Western, principally Christian, beliefs and practices.

4 units, not given 1999-2000

211. Science and Religion—From Galileo and Newton to Einstein, religion and science have been deeply intertwined, yet science now challenges traditional religious belief. The questions science raises justifies of moral truth claims?

5 units (Busto) not given 1999-2000

260. Contemporary Jewish Thought: Jewish Feminism and Jewish Tradition—Jewish women’s relationship to Jewish tradition, and the theology and religious practices of contemporary Jewish feminism. Topics: gender in traditional Jewish society; traditional women’s spirituality, rituals, and liturgy; gender and Jewish modernity; the feminist critique of Jewish tradition and the creation of alternative traditions; the “feminization of Judaism.”

5 units, not given 1999-2000

261. Modernization/Secularization—Reexamination of these two fundamental concepts in light of recent historical, sociological, anthropological, and philosophical developments.

5 units (Eisen) not given 1999-2000

262. Back to the Sources: Close Readings of Classical Jewish Texts—Examination of selected rabbinic, mystical, philosophical, and exegetical texts. Sources are read in translation and in Hebrew.

4 units, not given 1999-2000

264. Hasidism and Modernity—Hasidism, a Jewish pietist movement in late 18th-century Eastern Europe, can be viewed as a blend of the traditional and the modern. Primary sources and secondary literature show this polarity in historiographies and representations of Hasidism, the zaddic as an alternative type of Jewish leader, the roles of textual and non-textual authority in Hasidic culture, Hasidism’s relationship to kabbalah and Sabbateanism.

4 units, not given 1999-2000

282. Classics of Medieval Jewish Thought—Close study of medieval Hebrew theological writings in translation (with an optional Hebrew component), focusing on issues such as reason and revelation, prophecy, the final human end, scriptural interpretation and rabbinic exegesis, and messianism. Topic: Moses Maimonides’ Guide of the Perplexed and its medieval and modern interlocutors.

5 units, not given 1999-2000

283. Jerusalem Holy Places—Religious Studies majors register for 290. Studies of four “monuments” in the old city: the Temple (the history of the 1st and 2nd western wall, with surrounding excavations today), the Church of the Holy Sepulchre (in Byzantine and Crusader periods, and in the present), and (on the temple mount/Haram) the Dome of the Rock and al-Aqsa Mosque. Literature, art, and archaeology concerning these buildings, sacred to Judaism, Christianity, and Islam, with attention to their uses as religious centers, and their importance and development as places of worship and pilgrimage. Opportunity for travel-study to Jerusalem at Spring Break.

4 units, Win (Gregg)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>286</td>
<td>Character and the Good Life—Is it possible or desirable to revive classical notions of good character and the good life? Are such ideals irrelevant to modern pluralistic societies? These questions are pursued in modern works that analyze the issues and classical definitions, Western and Chinese, of human excellence. Limited enrollment. 5 units (Yearley) not given 1999-2000</td>
</tr>
<tr>
<td>290</td>
<td>Majors Seminar—Required for Religious Studies majors and suggested for joint RS/Philosophy majors to discuss critical issues in the study of religion, and to work on senior essays in progress. Topic for 1999-2000: Jerusalem holy places (see 283). (WIM) 4 units, Win (Gregg)</td>
</tr>
<tr>
<td>306</td>
<td>Early Daoist Ritual—The evolution of ritual in organized Celestial Masters Daoism between the late second through fifth centuries, focusing on Tao Hongjing’s work, Dengzhen yinjue. The development of Daoist ritual during the first centuries of its formation. 4 units, Spr (Cedzich)</td>
</tr>
<tr>
<td>310</td>
<td>Buddhist Studies Proseminar 5 units (Bielefeldt) not given 1999-2000</td>
</tr>
<tr>
<td>311A,B</td>
<td>Buddhist Studies Seminar 5 units, Win, Spr (Staff)</td>
</tr>
<tr>
<td>315</td>
<td>Ch’ an Studies: Methodological Issues—The relevance of recent developments in “theory” (hermeneutics, structuralism, post-structuralism, critical theory) for the study of the Ch’ an and Zen tradition. Readings from Foucault, Derrida, Ricoeur, Bourdieu, and Ch’ an/Zen classics. Prerequisite: consent of instructor. 4 units (Faure) not given 1999-2000</td>
</tr>
<tr>
<td>319</td>
<td>East Asian Religions—Directed research. (Bielefeldt, Faure, Yearley)</td>
</tr>
<tr>
<td>321</td>
<td>Graduate Seminar in Modern Judaism—In-depth examination of two recent developments of major importance in Jewish life and thought: spirituality and feminism. Prerequisite: consent of instructor. 4 units, Spr (Eisen)</td>
</tr>
<tr>
<td>322</td>
<td>Medieval Jewish Biblical Exegesis—Historical and literary approaches to the tradition of scriptural commentary and its bearing on issues of faith and reason, the authority of the past, and inter-religious dialogue and dispute. 4 units (Lawee) not given 1999-2000</td>
</tr>
<tr>
<td>329</td>
<td>Near Eastern Religions—Directed research. (Bach, Eisen, Gregg)</td>
</tr>
<tr>
<td>338</td>
<td>Mystics and Mysticism—(Same as Interdisciplinary Studies in Humanities 312.) The western Middle Ages are a laboratory for exploring accounts of mystical experience. Medieval mysticism was diverse: a neo-Platonic strand wound from Augustine and Pseudo-Dionysius to Meister Eckhart, Nicholas of Cusa, and John of the Cross. An emotive, passion-filled version found voice among the Cistercians, Franciscans, and the women mystics of the period, culminating in the Carmalites Teresa of Avila, and again, John of the Cross. Initial focus is on Christian tradition; participants explore the mystical literature of other traditions (Islam, Judaism, Buddhism) in cross comparison with medieval Christian accounts. 4 units, Win (Gelber)</td>
</tr>
<tr>
<td>342</td>
<td>Religious Challenges of the Postmodern—Seminar analyzes and criticizes defining philosophical texts of the postmodern, and probes their possible consequences for religion and theology. Representative texts from Nietzsche, Heidegger, Derrida, Levinas, and Nancy. 4 units, Win (Gregg)</td>
</tr>
<tr>
<td>345</td>
<td>Comparative Religious Ethics 5 units, Win (Yearley)</td>
</tr>
<tr>
<td>370</td>
<td>Graduate Seminar in Religious Ethics—The difference “religious” makes in religious ethics and how it affects issues of genre. A treatment of theoretical analyses with examples from the West and East Asia. Prerequisite: consent of instructor. 4 units (Yearley) not given 1999-2000</td>
</tr>
<tr>
<td>373</td>
<td>Historicism and its Problems—The emergence, varieties, and crises of historicism as a world view and approach to the study of religion in the 19th and 20th centuries. The implications of historical reason and historical consciousness for the philosophy of religion, ethics, and Christian theology. “New historicism” in contemporary religious studies (e.g., Stout, MacIntyre). 4 units (Sockness) not given 1999-2000</td>
</tr>
<tr>
<td>379</td>
<td>Religious Thought—Directed research. (Bielefeldt, Eisen, Gelber, Yearley)</td>
</tr>
<tr>
<td>389</td>
<td>Theory of Religion—Directed research. (Eisen, Faure, Yearley)</td>
</tr>
<tr>
<td>390</td>
<td>Teaching in Religious Studies—Required supervised internship. 4 units, Aut, Win, Spr (Staff)</td>
</tr>
<tr>
<td>392</td>
<td>Candidacy Essay—Prerequisite: consent of graduate director. variable units, Aut, Win, Spr (Staff)</td>
</tr>
<tr>
<td>395</td>
<td>Master of Arts Thesis 2-9 units (Staff)</td>
</tr>
</tbody>
</table>

**Affiliated Courses**

**Cultural and Social Anthropology**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>253A</td>
<td>“Fundamentalism” in the Modern World 5 units, Win (Delaney)</td>
</tr>
<tr>
<td>253C</td>
<td>Millenial Fever 5 units, Aut (Delaney)</td>
</tr>
</tbody>
</table>

545
1. Two core courses: one on Russia/Soviet Union, one on Eastern Europe, to be selected by the student from an annual list of qualifying courses issued by CREES.

2. At least four additional REES courses, totaling at least 20 units.

3. The student’s courses, core and additional, must be distributed among at least three departments; that is, the student takes at least one course in each of three departments. In addition to REES courses in the departments of History, Political Science, and Slavic Languages and Literatures, REES courses in Cultural and Social Anthropology, Economics, Sociology, and so on, when offered, may qualify. The CREES academic coordinator determines which courses qualify for the minor.

4. A “capstone” experience in REES, including, but not limited to, one of the following:
   a) A departmental seminar course for advanced undergraduates
   b) Directed reading and research with a Stanford faculty member or a CREES-approved resident or visiting scholar
   c) Participation in the Stanford Moscow Overseas Studies campus

Foreign Language—The REES minor has no language requirement, but the participating student is strongly encouraged to attain working competence in Russian or another relevant language. Courses at the third-year level or above in Russian or another language of the former Soviet Union or Eastern Europe (excluding German) count towards the REES minor, up to a maximum of 3 units per academic quarter, 9 units total.

Additional Information—The total number of courses applied to the REES minor must be at least six, but the minor should total no more than 36 units. Courses counting towards the REES minor may not be counted towards the student’s major. Courses taken at Stanford overseas campuses (particularly the Moscow campus) may count towards the REES minor, with prior approval; at least three courses for the minor must be taken in residence at Stanford.

Approval of CREES Academic Coordinator—Students interested in pursuing the REES minor should consult the CREES academic coordinator, and then complete the Minor Declaration Form. Students declaring the REES minor must do so no later than five quarters prior to their intended quarter of degree conferral. Approval of minor declarations and certification of requirements are made by the CREES academic coordinator.

Students pursuing the REES minor work with the CREES academic coordinator, who is responsible for determining that requirements for the minor are satisfied. Questions about which courses count towards the minor, which courses taken overseas count towards the minor, what project counts as a “capstone” experience, and so on, are also handled by the academic coordinator.

**CORE COURSES**

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hist. 120A. Early Modern Russia, 1400-1762</td>
<td>3</td>
</tr>
<tr>
<td>Hist. 120B. Imperial Russia, 1762-1917</td>
<td>3</td>
</tr>
<tr>
<td>Hist. 120C. 20th-Century Russian and Soviet History</td>
<td>3</td>
</tr>
<tr>
<td>Slavic Lang. &amp; Lit. 133: Literature and Culture in East-Central Europe, 1945-2000</td>
<td>34</td>
</tr>
<tr>
<td>Slavic Lang. &amp; Lit. 145. The Age of Experiment (1820-1850)</td>
<td>34</td>
</tr>
<tr>
<td>Slavic Lang. &amp; Lit. 146. The Age of Transgression: Russian Literature from Turgenev through Tolstoy</td>
<td>34</td>
</tr>
</tbody>
</table>
To qualify for a coterminal A.M. degree in Russian and East European Studies, a student must, besides completing University requirements for the A.B. degree:

1. Submit a coterminal application for admission to the program no earlier than the beginning of the eighth quarter, and no later than the end of the 11th quarter of undergraduate study. Students with advanced placement and transfer credit must apply at least four quarters before the expected master’s degree conferral date. Applications may be obtained from Degree Progress, the Registrar’s Office. The deadline for all applications to the A.M. program in Russian and East European Studies is January 4, 2000. The Admissions Committee considers coterminal applications at the same time that it reviews applications from outside Stanford and from other graduate degree programs within the University.

2. Include in the application a program which outlines, by quarter, the schedule of courses the student plans to complete toward the A.M. degree. The student should seek the advice of the CREES academic coordinator in drafting this schedule. The application also should include: (a) a current Stanford transcript, (b) a one-page statement of purpose, and (c) two letters of recommendation from Stanford professors. Applicants must have a grade point average (GPA) of at least ’B’ (3.0). Coterminal applications must take the General Test of the Graduate Record Examination and have the results sent to Graduate Admissions, the Registrar’s Office.

3. Complete 15 full-time quarters or the equivalent, or three quarters in full-time residence after completing 180 units; and complete, in addition to the 180 units required for the bachelor’s degree, a minimum of 40 units for the master’s degree.

The same courses may not be counted to meet both undergraduate and graduate requirements, and no courses taken before the junior year may be used to meet the course requirements for the master’s degree. Requirements for completion of the A.M. degree are summarized below; a more detailed description of the program and requirements is available from the center.

**SLAVIC THEME HOUSE**

Slavianskii Dom, at 650 Mayfield Avenue, is an undergraduate residence which houses 50 students and offers them a wide variety of opportunities to expand their knowledge, understanding, and appreciation of Russia and Eastern Europe.

**OVERSEAS STUDIES PROGRAMS**

Undergraduate students interested in the study of the languages, history, culture, and social organization of Russia and Eastern Europe can apply to study at Stanford centers in Berlin and Moscow. For information about these programs, contact the Overseas Studies Office in Sweet Hall.

**GRADUATE PROGRAMS**

**MASTER OF ARTS**

CREES offers a one-year intensive interdisciplinary master’s degree program in Russian and East European Studies for students with a strong prior language and area studies background. Students have flexibility to pursue their particular interests, while also taking a required core curriculum that addresses 20th-century and contemporary processes of change in the former Soviet Union and Eastern Europe.

**ADMISSION**

Applications may apply electronically or request an application from the Registrar’s homepage, http://www.stanford.edu/dept/registrar/admissions/. An application may also be obtained by writing to: Graduate Admissions, Registrar’s Office, Stanford University, Stanford, CA 94305-3005. In addition, prospective applicants are strongly encouraged to consult with the academic coordinator at CREES regarding the application process.

The materials in the application packet provide detailed instructions for applying. To qualify for admission to the program, the following apply:

1. Applicants must have earned an A.B. or B.S. degree, or the equivalent.
2. Applicants must have completed at least three years of college-level Russian language study or the equivalent prior to beginning the program. Other languages of Eastern Europe or the former Soviet Union may be accepted on a case-by-case basis.
3. Applicants whose native language is not English are ordinarily expected to take the Test of English as a Foreign Language (TOEFL) and have the results sent to Graduate Admissions, the Registrar’s Office.
4. All applicants must take the general test of the Graduate Record Examination and have the results sent to Graduate Admissions, the Registrar’s Office.

The deadline for submission of applications for admission and for financial aid is January 4, 2000. Admission is normally granted for Autumn Quarter, but requests for exceptions are considered.

The successful applicant generally demonstrates the following strengths: adequate foreign language study, course work in Russian and East European studies in various disciplines, outstanding grades in previous academic work, high GRE scores (particularly verbal and analytical), strong letters of recommendation, and a persuasive statement of purpose explaining why and how the program fits the applicant’s academic and career goals.

**DEGREE REQUIREMENTS**

Candidates for the A.M. degree must meet University requirements for an A.M. degree as described in the “Graduate Degrees” section of this bulletin.

The A.M. program in REES can ordinarily be completed in one academic year by a well-prepared student; longer periods of study are permitted.

Requirements to complete the interdisciplinary A.M. degree are principally ones of distribution, with the exception of three required core courses, as described below. Each student, with the advice of the CREES academic coordinator, selects courses according to the student’s interests, needs, and goals.

All students in the A.M. REES program must complete a minimum of 40 academic credit units within the following guidelines.

1. Language Study: students in the program must study Russian or another language of the former Soviet Union or Eastern Europe. Credit towards the 40-unit minimum (maximum 3 units per quarter, 9 units total) is allowed for advanced language work; in the case of Russian, “advanced” is defined as third-year Russian language instruction and above. Similar standards apply for other languages.

2. **Interdisciplinary Course Work:** a minimum of five graduate courses in Russian and East European studies must be completed and distributed among at least three departments. All course work applied to the 40-unit minimum must deal primarily with Russian/Soviet/post-Soviet or East European studies.

3. **Core Courses:** a required core course is designated each academic quarter; students must complete three quarters of core courses.

4. **Training workshop:** CREES organizes a regular, usually twice-a-month, workshop for students in the A.M. program. Its goals are to acquaint students with Stanford’s resources and faculty, to survey current issues in Russian and East European Studies, and to introduce students to the methodologies, challenges, and opportunities of studying the 20th-century former Soviet Union and Eastern Europe.

5. All course work qualifying for the 40-unit minimum must have a grade of ‘B’ or higher. (‘B-’ does not count for degree credit.)

6. Students are expected to complete introductory course work in Russian and East European studies in the disciplines of history, literature, and politics. Courses taken prior to graduate work at Stanford are
considered on a case-by-case basis towards satisfying this requirement.

7. Students are expected to do course work in both Russian/Soviet/post-Soviet studies and in East European studies. Course work completed prior to graduate work at Stanford is considered in determining whether this requirement has been satisfied.

8. All courses counting towards the 40-unit minimum must be approved by the CREES academic coordinator, who ensures that planned course work satisfies requirements towards the degree. The CREES faculty director and steering committee determine the specific requirements.

A description of the A.M. program is also available on the Web at http://www.stanford.edu/dept/CREES/ and by request from the Center for Russian and East European Studies.

CORE COURSES

CREES designates one core course each academic quarter as required of all A.M. students from among departmental offerings, typically in History, Political Science, or Slavic Languages and Literatures. Courses so designated as core courses examine subject areas of fundamental importance within modern Russian, Soviet, post-Soviet, and East European studies, and address questions of research, methodology, and current scholarship. Courses so designated for 1999-2000 are:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Qtr. and Units</th>
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<tbody>
<tr>
<td>Hist. 324A. Stalinism in Eastern Europe</td>
<td>S 5</td>
<td></td>
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<tr>
<td>Hist. 323B. 20th-Century Russia</td>
<td>A 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poli. Sci. 218L. Seminar: Ethnicity and Nationalism in Soviet and Post-Soviet Politics</td>
<td>W 5</td>
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</tbody>
</table>

FINANCIAL AID

Subject to funding, CREES may have a limited amount of financial aid to offer in the form of Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents and must enroll in Russian language courses at Stanford at the appropriate level. Applicants in the A.M. program have priority in the annual FLAS competition; in recent years CREES has also awarded FLAS fellowships in the Graduate School of Business and the School of Law. Consult the CREES academic coordinator for further information about the application and award process. Applications for FLAS fellowships are available from the Center for Russian and East European Studies.

CONCURRENT DEGREE PROGRAMS

The Center for Russian and East European Studies collaborates with the schools of Business and Law to allow students simultaneously to pursue concurrent degrees in Russian and East European Studies (A.M.) and the respective professional field (J.D., M.B.A.). Students must apply to and be independently admitted to each degree program. For additional information about specific plans of study and degree requirements, contact the Center for Russian and East European Studies.

DOCTORAL PROGRAMS

Since the University does not offer a Ph.D. in Russian and East European Studies, students wishing to pursue a REES-related doctoral program must apply to one of the departments offering a Ph.D. with an emphasis on Russia, the former Soviet Union, or Eastern Europe, such as the departments of History, Political Science, or Slavic Languages and Literatures.

COURSES

200. Directed Individual Study—For students engaged in special interdisciplinary work that cannot be arranged by a department.

1-5 units, Aut, Win, Spr (Staff)

AFFILIATED DEPARTMENT OFFERINGS

The courses listed below by department deal at least in part with Russia, the Soviet Union, or Eastern Europe. See the respective department listings for course descriptions. Additional relevant courses by resident or visiting faculty may be offered; for updated information, consult the quarterly Time Schedule or contact the Center for Russian and East European Studies. Students in the area studies A.M. program must have their course list approved by the department prior to enrollment.

ECONOMICS

120. Socialist Economies in Transition

5 units, Spr (Earle)

217. Money and Finance in Economic Development

5 units, Aut (McKinnon)

HISTORY

175. Sources and Methods Seminar: Participants in Socialist Construction—Perception and Memory in Soviet History

5 units, Win (Livschitz)

19N. Stanford Introductory Seminar: Peter the Great—The Individual Shaping History, History Shaping the Individual

4 units, Win (N. Kollmann)

21S. Sources and Methods Seminar: Citizens becoming Soldiers—Military Mobilization in WW I and WW II

5 units, Spr (Stronski)

22N. Stanford Introductory Seminar: Ethnic Cleansing in 20th-Century Europe

4 units, Aut (Naimark)

24S. Sources and Methods Seminar: History and Cinema in East Central Europe

5 units, Spr (Kunicki)

88S. Sources and Methods Seminar: Transformation of Jewish Identity in Eastern Europe, 1881-1939

5 units, Win (Moss)

102A. The International System

5 units, Win (Naimark, Simons)

120A. Early Modern Russia, 1400-1762

5 units, Spr (N. Kollmann)

120B. Imperial Russia, 1762-1917

5 units, Win (Emmons)

120C. 20th-Century Russian and Soviet History

5 units, Aut (Patenaude)

189B. The Ottoman Empire

5 units, Aut (Rodrigue)

222C/322C. Colloquium: Nationbuilding in Eastern Europe

4-5 units, Win (Suppan)

222D/322D. Colloquium: National Conflict in Eastern Europe

5 units, Spr (Suppan)

223/323. Colloquium: Honor, the Law, and Modernity in Early Modern Europe

4-5 units, Aut (N. Kollmann)

224/324. Colloquium: Stalinism in Eastern Europe

4-5 units Spr (Naimark)

300W. Graduate Directed Reading

units by arrangement (Staff)

306B. Design and Methodology for International Field Research

1 unit, Win (N. Kollmann)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Terms</th>
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<tbody>
<tr>
<td>321A</td>
<td>Graduate Colloquium: Topics in Early Modern Russian Historiography</td>
<td>4-5</td>
<td>Spr(N. Kollmann)</td>
</tr>
<tr>
<td>322</td>
<td>Historical Research in Russia, 17th-20th Centuries: Sources, Archives, Paleography</td>
<td>5</td>
<td>Spr (Kamenskii)</td>
</tr>
<tr>
<td>325B</td>
<td>Graduate Core Colloquium: 20th-Century Russia</td>
<td>4-5</td>
<td>Aut (Patenaude)</td>
</tr>
<tr>
<td>331G</td>
<td>Graduate Core Colloquium on Modern Europe</td>
<td>4-5</td>
<td>Win (Naimark)</td>
</tr>
<tr>
<td>126A,B,C</td>
<td>Beginning Turkish</td>
<td>3</td>
<td>Aut, Win, Spr (Ayanoglu)</td>
</tr>
<tr>
<td>164A,B,C</td>
<td>Beginning Czech</td>
<td>3</td>
<td>Aut, Win, Spr (Staff)</td>
</tr>
<tr>
<td>167A,B,C</td>
<td>Beginning Polish</td>
<td>3</td>
<td>Aut, Win, Spr (Staff)</td>
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<tr>
<td>173A,B,C</td>
<td>Beginning Hungarian</td>
<td>3</td>
<td>Aut, Win, Spr (Szabo)</td>
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<tr>
<td>15</td>
<td>Academic Internship</td>
<td>4-5</td>
<td>Aut (Bratersky)</td>
</tr>
<tr>
<td>16</td>
<td>Tutorial</td>
<td>3-5</td>
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</tr>
<tr>
<td>21</td>
<td>Ethnic Moscow</td>
<td>3</td>
<td>Aut (Abashkin)</td>
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<tr>
<td>27</td>
<td>Modernist Composers in Russian Music</td>
<td>3-4</td>
<td>Aut (Orbelian)</td>
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<tr>
<td>28</td>
<td>Music Internship with Moscow Chamber Orchestra</td>
<td>5</td>
<td>Aut (Orbelian)</td>
</tr>
<tr>
<td>119X</td>
<td>Russian Politics</td>
<td>5</td>
<td>Aut (Bratersky)</td>
</tr>
<tr>
<td>120X</td>
<td>Economic Reform and Economic Policy in Modern Russia</td>
<td>5</td>
<td>Aut (Mau)</td>
</tr>
<tr>
<td>121V</td>
<td>Russia in the Age of Nobility 1700-1840: State, Society, and Culture</td>
<td>5</td>
<td>Aut (Rogov)</td>
</tr>
<tr>
<td>146X</td>
<td>Contemporary Issues of Russian Society</td>
<td>4</td>
<td>Aut (Bratersky)</td>
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<tr>
<td>178/278</td>
<td>Individual Vocal and Instrumental Instruction</td>
<td>3</td>
<td>Aut (Orbelian)</td>
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<tr>
<td>225V</td>
<td>Aspects of Soviet Political History</td>
<td>4</td>
<td>Aut (Emmons)</td>
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<tr>
<td>226V</td>
<td>History of Moscow through its Architecture</td>
<td>4</td>
<td>Aut (Emmons)</td>
</tr>
<tr>
<td>10M</td>
<td>Intensive First-Year Russian</td>
<td>10</td>
<td>Aut (Staff)</td>
</tr>
<tr>
<td>51M</td>
<td>Second-Year Russian I</td>
<td>6</td>
<td>Aut (Kuznetsova)</td>
</tr>
<tr>
<td>52M</td>
<td>Second-Year Russian II</td>
<td>6</td>
<td>Win (Kuznetsova)</td>
</tr>
<tr>
<td>111M</td>
<td>Third-Year Russian I</td>
<td>6</td>
<td>Aut (Boldyreva)</td>
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<tr>
<td>112M</td>
<td>Third-Year Russian II</td>
<td>6</td>
<td>Win (Boldyreva)</td>
</tr>
<tr>
<td>177M</td>
<td>Fourth-Year Russian I</td>
<td>6</td>
<td>Aut (Shimanskaya)</td>
</tr>
<tr>
<td>178M</td>
<td>Fourth-Year Russian II</td>
<td>6</td>
<td>Win (Shimanskaya)</td>
</tr>
<tr>
<td>121A</td>
<td>Comparative Political Economy of Post-Socialist Transitions</td>
<td>5</td>
<td>Spr (Alter)</td>
</tr>
<tr>
<td>138</td>
<td>International Security in a Changing World</td>
<td>5</td>
<td>Win (Blacker, Perry, Sagan)</td>
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<tr>
<td>218L</td>
<td>Seminar: Ethnicity and Nationalism in Soviet and Post-Soviet Politics</td>
<td>5</td>
<td>Win (Lapidus)</td>
</tr>
<tr>
<td>13N</td>
<td>Stanford Introductory Seminar: Russia, Russian, Russians</td>
<td>3-4</td>
<td>Spr (Schupbach)</td>
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<tr>
<td>110</td>
<td>Russian “Crash” Course for Departing Students</td>
<td>1</td>
<td>Spr (Schupbach)</td>
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<tr>
<td>133/233</td>
<td>Literature and Culture in East-Central Europe, 1945-2000</td>
<td>3-4</td>
<td>Spr (Frick)</td>
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<tr>
<td>142/242</td>
<td>Literature and Formation of State Mythology in Russia from Catherine II to Nicholas I</td>
<td>4</td>
<td>Win (Zorin)</td>
</tr>
<tr>
<td>145/245</td>
<td>The Age of Experiment (1820-1850)</td>
<td>3-4</td>
<td>Aut (Fleishman)</td>
</tr>
<tr>
<td>146/246</td>
<td>Age of Transgression: Russian Literature from Turgennev through Tolstoy</td>
<td>3-4</td>
<td>Win (Safran)</td>
</tr>
<tr>
<td>147/247</td>
<td>The Age of Revolution: Russian Literature and Culture since 1917</td>
<td>3-4</td>
<td>Spr (Fleishman)</td>
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<tr>
<td>148/248</td>
<td>The Factory of the Eccentric Actor (1921-1929): Between Theater and Film, Avant-Garde, and Trivial Genres, East and West</td>
<td>4</td>
<td>Spr (Bulgakowa)</td>
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<tr>
<td>151</td>
<td>Dostoevsky</td>
<td>4</td>
<td>Win (Frank)</td>
</tr>
<tr>
<td>155/255</td>
<td>Anton Chekhov and the Turn of the Century</td>
<td>3</td>
<td>Spr (Safran)</td>
</tr>
<tr>
<td>166/266</td>
<td>Russia on the Silver Screen: U.S., Western European and Emigré Russian Cinema</td>
<td>4</td>
<td>Spr (Bulgakowa)</td>
</tr>
</tbody>
</table>

549
168/268. Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present
4 units, Aut (Bulgakowa)

190. Modernism and the Humanities: Tolstoy's Anna Karenina and the Social Thought of Its Time
5 units, Win (Freidin)

221. Modernism and the Jewish Voice in Europe
3-4 units, Aut (Safran, Eshel)

UNDERRADUATE AND GRADUATE LANGUAGE

1A,2B,3C. First-Year Russian
3-5 units, Aut, Win, Spr (Gettys, Staff)

2D. Accelerated Beginning Russian
5-8 units, Win (Staff)

50. Review of Russian Grammar: Repair Russian
3 units, Aut (Schupbach)

51,52,53. Second-Year Russian
5 units, Aut (Gettys, Staff)
Win (Greenhill, Staff)
Spr (Greenhill, Staff)

52B. Second-Year Russian
5 units, Win (Schupbach)

111,112,113. Third-Year Russian
4 units, Aut (Schupbach, Staff)
Win (Schupbach, Greenhill)
Spr (Schupbach, Greenhill)

117B,117C. Russian for Native Speakers
1-3 units, Win, Spr (Gettys)

119A. Technical Translation
3-5 units, Aut (Schupbach)

119B. Belletristic Translation
5 units, Spr (Schupbach)

177,178,179. Fourth-Year Russian
3 units, Aut (Staff)
Win, Spr (Greenhill)

181,182,183. Fifth-Year Russian
3 units, Aut (Staff)
Win (Freidin)
Spr (Gettys)

199. Individual Work
1-5 units, any quarter (Staff)

299. Individual Work
1-12 units, any quarter (Staff)

UNDERRADUATE AND GRADUATE LITERATURE

127/227. Boris Pasternak and the Poetry of the Russian Avant Garde
4 units, Spr (Fleishman)

129/229. Poetry as System: Introduction to Theory and Practice of Russian Verse
4 units, Win (Fleishman)

170B/270B. Pushkin in the Romantic Context
4 units, Aut (Greenleaf)

186/286. 19th-Century Russian Literature
4 units, Win (Zorin)

188. From Alexander Blok to Joseph Brodsky: Russian Poetry in the 20th Century
4 units, Win (Freidin)

200A. Introduction to Library and Archival Research
1-3 units, Aut (Fleishman)

SOCIOLOGY

116/216. Comparative Sociology: Successor States of Soviet Union
5 units, Aut (Timma)

SCIENCE, MATHEMATICS, ENGINEERING CORE

Program Director: Brad Osgood
Track Chairs: Brad Osgood, Robert Simoni, Mark Zoback
Core Faculty: David Botstein (Genetics), Patricia Burchat (Physics), Paul Ehrlich (Biological Sciences), Martin Fejer (Applied Physics), Russell Fernald (Psychology, Human Biology), James Ferrell (Molecular Pharmacology), Anthony Kovescek (Petroleum Engineering), Sharon Long (Biological Sciences), Michael McWilliams (Geological and Environmental Sciences), Richard Myers (Genetics), Brad Osgood (Electrical Engineering), David Siegmund (Statistics), Robert Simoni (Biological Sciences), Virginia Walbot (Biological Sciences), Mark Zoback (Geophysics)

Research Scientist Assistant: Gretchen Daily (Biological Sciences)

The courses in the Science, Mathematics, Engineering (SME) Core provide the opportunity for students to have a serious encounter with the essential ideas of science, mathematics, and engineering, emphasizing the active process of doing science through the exploration of the natural and human-made world. This program is especially designed for students whose primary interests are in the humanities and social sciences.

Each track in the program is taught by faculty teams from departments across the University. All of the tracks address common concepts, but from different points of view. Principles addressed in the Core include: science as a structure of testable hypotheses; the nature of energy in the physical world; the character of physical law based on quantitative, reproducible evidence; the molecular basis for living and non-living things; the interplay between the physical world and biological systems; scaling, emergence, and the idea of going from elementary to complex; the statistical description of populations and complex systems; the design process; pulling together multiple considerations to achieve a practical, manufacturable, durable design of products and systems. Mathematics is woven into the courses in support of solving scientific and technological problems.

The courses include laboratory sections in which students do experiments and projects that develop and explore the concepts discussed in the lectures. The lab sections are small and provide students the opportunity to work in teams.

All of the tracks are three quarters long. Because of the interdisciplinary nature of the courses, students must start Autumn Quarter. All courses are 4 units each quarter. The General Education Requirements (GER) for the areas of science, mathematics, and engineering (Area 2) were designed to encourage enrollment in the SME Core. The University requires a total of three courses in the three scientific and technical areas, with no more than two in any particular area. Taking a year of SME fulfills the requirement completely.

For students thinking of majoring in the humanities or social sciences, this program is an excellent way not only to fulfill these requirements, but also to provide an active understanding of ideas and applications of science, mathematics, and engineering.
**SCIENCE, TECHNOLOGY, AND SOCIETY**

**Emiriti:** James Adams (Industrial Engineering and Engineering Management), Alex Inkeles (Sociology), Walter Vincenti (Aeronautics and Astronautics)

**Co-Directors:** Paula Findlen (History), Robert McGinn (Industrial Engineering and Engineering Management; Science, Technology, and Society; and, by courtesy, Civil and Environmental Engineering)

**Program Committee**

**Faculty:** Francois Bar (Communication), Stephen Barley (Industrial Engineering and Engineering Management), Joseph Corn (History), Sarah Jain (Cultural and Social Anthropology; Science, Technology, and Society), James Jucker (Industrial Engineering and Engineering Management), Timothy Lenoir (History), Eric Roberts (Computer Science), Scott Sagan (Political Science), Sheri Sheppard (Mechanical Engineering), Gavin Wright (Economics)

**Students:** Marita Zirk-Blumberg, Gregory Leung

**Faculty:**

**Affiliated Faculty:** Francois Bar (Communication), Stephen Barley (Industrial Engineering and Engineering Management), Joseph Corn (History), David Freyberg (Civil and Environmental Engineering), Sarah Jain (Cultural and Social Anthropology; Science, Technology, and Society), Pamela Lee (Art and Art History), Timothy Lenoir (History), Gilbert Masters (Civil and Environmental Engineering), Eric Roberts (Computer Science), Nathan Rosenberg (Economics), Scott Sagan (Political Science), Sheri Sheppard (Mechanical Engineering), Paul Turner (Art and Art History), Gavin Wright (Economics)

**Consulting Faculty:** Naushad Forbes (Science, Technology, and Society), Richard Meehan (Civil and Environmental Engineering)

Technology and science are activities of central importance in modern life, intimately bound up with industrial society's evolving character, problems, and potentials. If scientific and technological pursuits are to further enhance human well-being, they and their effects on society and the individual must be better understood by nontechnical professionals and ordinary citizens as well as by engineers and scientists. Issues of professional ethics and social responsibility confront technical practitioners. At the same time, lawyers, public officials, civil servants, and business people are increasingly called upon to make decisions requiring a basic understanding of science and technology and the environmental consequences. Ordinary citizens, moreover, are being asked with increasing frequency to pass judgment on controversial matters of public policy related to science and technology. These circumstances require education befitting the complex sociotechnical character of the contemporary era.

Science, Technology, and Society (STS) is an interdisciplinary program devoted to understanding the nature, consequences, and shaping of technological and scientific activities in modern industrial society. Achieving this understanding requires critical analysis of the interplay of science and technology with human values and world views, political and economic forces, and cultural and environmental factors. Hence, students in STS courses study science and technology in society from a variety of perspectives in the humanities and social sciences. To provide a basic understanding of technology and science, STS majors are also required to achieve either literacy (A.B.) or a solid grasp of fundamentals (B.S.) in some area of engineering or science.

**GENERAL INFORMATION**

Selected STS courses may be used, individually or in groups, for various purposes:

1. To satisfy University General Education Requirements
2. To satisfy the Technology in Society Requirement of the School of Engineering
3. To comprise parts of student-designed concentrations required for majors in fields such as Human Biology and Public Policy
4. To satisfy the requirements of the STS Honors Program complementing any major (see below)
5. To satisfy requirements for majors in STS (see below)
6. To satisfy requirements for a minor in STS (see below)

STS courses are particularly valuable for undergraduates planning further study in graduate professional schools (for example, in business, education, engineering, law, journalism, or medicine) and for students wishing to relate the specialized knowledge of their major fields to broad technology- and science-related aspects of modern society and culture.

**UNDERGRADUATE PROGRAMS**

Degree programs in STS are interdisciplinary curricula devoted to understanding the nature and significance of technology and science in modern society. Majors analyze phenomena of science and technology, in society from ethical, aesthetic, historical, economic, and sociological perspectives. In addition, students pursuing the A.B. degree study a technical field in sufficient depth to obtain a grasp of basic concepts and methods, and complete a structured concentration on a theme, subarea, or problem related to science and technology in society. Those seeking
the B.S. degree complete at least 50 units in technology, science, and mathematics. The particular technical courses chosen reflect the student's special interest in science and technology in society. Specific requirements for the bachelor's degree in STS are as follows:

**BACHELOR OF ARTS**

1. STS Core (eight courses):
   a) Interdisciplinary Foundational course (STS 101)
   b) Disciplinary Analyses (five courses with no more than two courses in each category):
      1) Philosophical perspectives (STS 110, 117, 118)
      2) Historical perspectives (STS 107, 121, 124, 130)
      3) Social Science perspectives (STS 107, 137, 138, 162)
   c) Advanced courses (one course in each category):
      1) Disciplinary analysis (STS 207, 215, 219, 222, 231, 253, 266)
      2) Senior Colloquium (STS 200)

2. Technical Literacy (five courses):
   a) Computer literacy, normally demonstrated by successfully completing Computer Science 105 or its equivalent.
   b) Science or engineering literacy demonstrated by one of the following:
      1) Completing a four-course sequence (minimum of 12 units) in one field of engineering or science (sample sequences available in the STS office).
      2) Completing four of the following "Engineering Fundamentals" courses: Engineering 14, 15, 20, 30, 40, 50, 60, 70 (see the descriptions in the "School of Engineering" section of this bulletin).

3. Thematic Concentration (minimum of 20 units, at least five courses, one from each of those designated on the appropriate concentration course list as "foundational" and "advanced"). Thematic Concentrations are organized around an STS-related problem or area. The following Thematic Concentration topics have been preapproved: the intersections of technology and science with aesthetics, development, history and philosophy, information and society, public policy, social change, and work and organizations.

   Course lists for these concentration topics are available in the STS office. A student selecting one of the certified topics may include one or more courses not on the corresponding course list if they are germane to the concentration and meet the student's special interests. Alternatively, the student may choose to design a Thematic Concentration topic and course package subject to program approval. Each Thematic Concentration, certified or self-designed, requires the signature of an appropriate faculty adviser. See the program chair for details.

**BACHELOR OF SCIENCE**

The student pursuing the B.S. degree shall complete the STS Core and a structured package of at least 50 units of technical courses intended to enable students to understand socially significant technical phenomena in some field of engineering or science. Introductory courses in mathematics or physics (for example, Mathematics 19 or Physics 19) are normally not counted as parts of this technical depth component.

The B.S. candidate follows one of two models in fulfilling the minimum 50-unit requirement:

1. "Focused Depth": at least 24 units and seven courses in a single field of science or engineering, with the remaining units (except for at most two stand-alone courses) grouped in clusters of at least three courses each in other fields of science or engineering. For example, a Focused Depth package might contain eight industrial engineering, three physics, three mathematics, and three computer science courses, and one course each in electrical engineering and chemistry.

2. "Clustered Depth": two or more clusters of at least five courses and 15 units each in different fields of science or engineering, with at most two stand-alone courses, and remaining courses, if any, in sequences of three or more courses. For example, a Clustered Depth package might contain five courses each in computer science, electrical engineering, physics, and one course each in industrial engineering and earth sciences, and three courses in civil engineering.

It is strongly recommended that B.S. majors complete Computer Science 106A or its equivalent.

**MINORS**

Students planning careers in many technical and non-technical fields, including business, education, engineering, science, law, medicine, and public affairs, are faced with important STS issues in their professional practice. Therefore, a minor in STS is likely to prove practically valuable as well as intellectually stimulating.

**Requirements**—The STS minor requires successful completion of six courses satisfying the following four requirements:

1. Foundational Course: STS 101
2. One disciplinary analysis course from each of the following three categories:
   a) Philosophical/Ethical Perspectives (STS 110, 115, 117, 174)
   b) Historical Perspectives (STS 121, 124, 130, 132)
   c) Social Scientific/Policy Perspectives (STS 107, 137, 138, 162, 170, 171, 183)
3. Two advanced courses, from one or two of the following categories, building on courses taken under requirements 1 and 2:
   a) Philosophical/Ethical Perspectives (STS 215)
   b) Historical Perspectives (STS 222, 223)
   c) Social Scientific/Policy Perspectives (STS 207, 219, 231, 266, 279)
4. At least one of the courses taken under requirements 1 to 3 must incorporate a weekly small group discussion.

**Note**—Students wishing to use a course not listed above to satisfy one of the requirements for a minor in STS may petition to do so. For details, inquire at the STS office (Bldg. 370, room 109).

**HONORS PROGRAM**

STS offers a limited number of students an opportunity to achieve honors through in-depth study of the interaction of science and technology with society. The honors program is open to students majoring in any field (including STS). Students accepted for this program carry out an honors project, the work for which normally begins in Spring Quarter of the junior year and is completed by mid-May of the senior year. Usually, this project entails writing an honors essay, although occasionally students have been allowed to produce a technical artifact or carry out some other work that itself represents original thinking. When a project results in a work other than an essay, students must also submit an accompanying scholarly exegesis of the work.

**ADMISSION**

Application for admission to the STS honors program is typically made during the student's junior year. By May 15 of that year, interested students must have completed at least two of the four core course requirements listed below for honors and have submitted a detailed formal proposal for their project to the STS Honors Committee (for details on submitting a proposal, see the brochure, Honors Program Requirements, available in the STS office). Students whose proposals are approved may then take from 12 to 15 units of credit for work on the honors project, distributed so as to best support the student's academic progress. Under exceptional circumstances, students may be admitted to the honors program early in Autumn Quarter of the senior year. STS majors pursuing honors in STS or another honors program take STS 200 for 2 units instead of 4 and do not write a research paper for this course. However, failure to complete the thesis will require additional research work in STS 200.

**REQUIREMENTS**

1. Foundational Course: STS 101.
2. Philosophical and Ethical Perspectives: STS 110, or 117.
3. Historical Perspective: STS 107, 121, 124, or 130.
5. Honors Project: an original critical essay (or investigative project with accompanying explanatory essay) on an STS topic of general impor-
COURSES

101. Science, Technology, and Contemporary Society—(Graduate

students register for 201; same as Engineering 130.) Analysis of the

interplay of science, technology, and society in the contemporary U.S.

Topics: the key social, cultural, and values issues raised by contemporary

scientific and technological developments; distinctive features of science

and engineering as socio-technical activities; major influences of

scientific and technological developments on 20th-century society,

including transformations and problems of work, leisure, human values,

the fine arts, and international relations; ethical conflicts in scientific

and engineering practice; and the social shaping and management of con-

temporary science and technology. GER:3b (DR:9)

4-5 units, Aut (McGinn)

107. Technology and Economic Change—(Enroll in Economics 113.)

5 units, Win (Rosenberg)

110. Ethics and Public Policy—(Same as Public Policy 103B.) Ethical

issues in science- and technology-related public policy conflicts. Devel-

ops the capacity for rigorous critical analysis of complex, value-laden

policy disputes. Topics: the natures of ethics and morality; the natures of

and rationales for liberty, justice, and human rights; and the use and abuse

of these concepts in recent and current policy disputes. Cases from:

biomedicine, environmental affairs, the technical professions, communi-

cations, and international relations. GER:3a (DR:8) (WIM)

5 units, Win (McGinn)

114Q. Stanford Introductory Seminar: Environmental Ethics—

Preference to sophomores. Analysis of ethical issues raised by the ways

humans have altered natural and human-made environments in contem-

orary Western societies. Topics: endangered species, wilderness pres-

ervation, climate change, cross-border pollution, toxic waste disposal,

population growth, genetically engineered animals, traffic congestion,

the proliferation of tall buildings, the technological “soundscape,” and

urban public space. Enrollment limited to 12.

3-4 units (McGinn) not given 1999-2000

115. Ethical Issues in Engineering—(Same as Engineering 131.)

Ethical issues in contemporary engineering practice. Topics: the moral

rights and responsibilities of engineers in relation to society, employers,

colleagues, and clients; cost-benefit-risk analysis, safety, and informed

consent; the ethics of whistleblowing; ethical conflicts of engineers as

expert witnesses, consultants, and managers; ethical issues in engineer-

ning design, manufacturing, and operations; ethical issues arising from

engineering work in foreign countries; and ethical implications of the

social and environmental contexts of contemporary engineering. Use of

real-life case studies, guest practitioners, and field research. Limited

enrollment.

4 units (McGinn) not given 1999-2000

117. Art and Technology—(Enroll in Art and Art History 123.)

4 units (Lee) not given 1999-2000

118. Modern Architecture I—(Enroll in Art and Art History 175A.)

4 units (Turner) not given 1999-2000

121. Technology and Culture in 19th-Century America—(Enroll in

History 115.)

4-5 units, Win (Corn)

123. Undergraduate Colloquium: Many Histories of Science—The

Scientific Revolution—(Enroll in History 206P.)

5 units, Aut (Findlen)

124. American Economic History—(Enroll in Economics 116.)

5 units, Aut (Wright)

125. The Emergence of Modern Medicine—(Enroll in History 13.)

5 units, Win (Findlen)

128. The Rise of Scientific Medicine—(Enroll in History 33A.)

5 units, Spr (Lenoir)

130. The Darwinian Revolution—(Enroll in History 133.)

4 units (Lenoir) not given 1999-2000

132. Undergraduate Colloquium: Yesterday’s Tomorrows—Tech-

nology and the “Future” in History—(Enroll in History 267.)

5 units (Corn) not given 1999-2000

137. U.S. Communication Policy—(Enroll in Communication 137.)

5 units (Bar) not given 1999-2000


Science 138.)

5 units, Win (Blacker, Perry, May, Sagan)

140. Information Revolutions: Technology and Forms of Knowl-

edge—The relationship between the development of information tech-

nologies and intellectual/cultural history from antiquity to the present.

Topics: the shift from orality to literacy (and the invention of early

alphabets and writing) in early civilization; the influence of printing

technologies in the Renaissance, Reformation, and Scientific Revolu-

tion; the culture of print in the modern world; technologies of information

management and control; computers, the Internet, and the contemporary

“age of information.”

3 units, Aut (Pang)

150. Sociology of System Disasters—Seminar on the analysis of actual

and projected breakdowns of socio-technical systems. Topics: high

reliability theory; NIMBY and public risk aversion; accidents as normal

phenomena; the need for engineering, sociological, economic, and

political scientific perspectives. Examples: nuclear power, Y2K, interna-
tional monetary flows, etc. Limited enrollment.

4 units, Win (Perrow)

162. Computers and Interfaces: Psychological and Social Issues—

(Enroll in Communication 169.)

5 units, Spr (Nass)

170. Work, Technology, and Society—(Enroll in Industrial Engineer-

ing and Engineering Management 170.) GER:3b (DR:9)

4 units, Spr (McGinn)

171. The Role of Technology in National Security—(Enroll in Engi-

neering-Economic Systems and Operations Research 193/293.)

3 units, Aut (Perry)
183. Media Economics—(Enroll in Communication 183.)
5 units (Bar) not given 1999-2000

190A. B.C. Honors Project—Project for students in STS honors program.
190A. Submission of Proposal
2-5 units, Aut, Win, Spr (Staff)
190B. Continued Study and Writing
2-5 units, Aut, Win, Spr (Staff)
190C. Final Work on Project
2-5 units, Aut, Win, Spr (Staff)

195. Honors Tutorial
7 units, Aut, Win (Staff)

199. Individual Work
7-5 units, Aut, Win, Spr (Staff)

200. Senior Colloquium—Reading/discussion of key analytical and theoretical texts treating the natures and interplay of science, technology, and society. Prerequisites: STS major with senior standing and four STS core courses, or consent of the instructor.
2-4 units, Win (Pang)

ADVANCED UNDERGRADUATE AND GRADUATE

4-5 units, Aut (McGinn)

207. Science and Technology in Economic Growth—(Enroll in Economics 224.)
5 units, not given 1999-2000

215. Computers, Ethics, and Social Responsibility—(Enroll in Computer Science 201.)
4 units, Spr (Johnson)

219. Management and Organization of Research and Development—(Enroll in Industrial Engineering 220.)
4 units, Aut (Barley)

5 units, Spr (Lenoir)

231. Technology and Work—(Enroll in Industrial Engineering 223.)
4 units (Barley) given 2000-01

253. Undergraduate Colloquium: Body Works—Medicine, Technology, and the Body in Late 20th-Century America—(Enroll in History 274A/374A.)
5 units, Win (Lenoir)

266. Communication Policy in Comparative Perspectives—(Enroll in Communication 166/266.)
5 units (Bar) not given 1999-2000

279. Technology, Policy, and Management in Newly-Industrializing Countries—(Same as Industrial Engineering and Engineering Management 279.) Technology is seen as the key to development and prosperity in most parts of the world. Building technological capability in newly-industrializing countries at the national and firm level. What makes technology special, government intervention that affects technology, the concept of technology leader and technology follower environments, the transfer of technology from "leader" countries, indigenous technological capability, human capital, culture and innovation, the role of small firms and new enterprises in technological capability. Managing innovation in firms: how innovation is different in technology-followers, organizing for shop-floor innovation, building an innovation culture, the special role of R&D in followers, the role of design, technology strategy for followers. Cases from Korea, India, Brazil, Singapore, and other NICs.
2-4 units, Aut (Forbes)

299. Individual Graduate Work
1-5 units, Aut, Win, Spr (Staff)

RELATED DEPARTMENT OFFERINGS
ENGINEERING

1. The Nature of Engineering
3 units, Aut (Freyberg)

HISTORY

152. American Spaces: An Introduction to Material Culture and the Built Environment—(Same as American Studies 152.)
5 units, Spr (Corn)

MATERIALS SCIENCE AND ENGINEERING

159Q. Stanford Introductory Seminar: Research in Japanese Companies
3 units, Spr (Sinclair)

POLITICAL SCIENCE

125. The Rise of Industrial Asia
5 units, Win (Oi, Oksenberg, Rohlen, Rowen, Staff)

OVERSEAS STUDIES

Descriptions of these courses are in the "Overseas Studies" section of this bulletin or at the Overseas Studies office, 126 Sweet Hall.

BERLIN

117V. The Industrial Revolution and its Impact on Art, Architecture, and Theory
5 units, Aut (Neckenig)

119V. Architecture and the City, 1871-1990: Berlin as a Nucleus of Modernity—(Same as Overseas Studies 143U.)
4 units, Spr (Neckenig)

120V. Industry, Technology, and Culture, 1780-1945
4 units, Win (Neckenig)

FLORENCE

125V. The Scientific Revolution: From the Renaissance to the 18th Century—(Same as Overseas Studies 215V.)
4-5 units, Win (La Vergata)

SLAVIC LANGUAGES AND LITERATURES

Emeriti: (Professors) Joseph Frank*, Joseph A. Van Campen; (Assistant Professor) Elisabeth Stenbock-Fermor
Chair: Gregory Freidin
Professors: Lazar Fleishman, Gregory Freidin, Richard D. Schupbach
Associate Professor: Monika Greenleaf (on leave Winter, Spring)
Assistant Professor: Gabriella Safran
Senior Lecturer: Rima Greenhill
Lecturers: Marina Brodskaya, Serafima Getty
Visiting Professors: Oksana Bulgakowa, David Frick, Douglas Hofs-tadter, Andrei Zorin

* Recalled to active duty.

The department accepts candidates for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy. Particular requirements for each degree are described below.
**UNDERGRADUATE PROGRAMS**

**BACHELOR OF ARTS**

The Department of Slavic Languages and Literatures (Slavic) offers two concentrations for undergraduate majors: Russian Language and Literature, and Russian Language, Culture, and History.

**Writing in the Major**—All Stanford undergraduates who entered in 1996-97 or thereafter are required by the University to pass at least one writing-intensive course in their field of concentration in order to graduate. Majors in Russian Language and Literature or Russian Language, Culture, and History may satisfy the writing requirement by enrolling in and receiving a passing grade in Slavic 146.

**Overseas Studies**—The department encourages students to enhance their education with a term abroad. For information about the Stanford-in-Moscow program, see the “Overseas Studies” section of this bulletin or the Overseas Studies office. Most credits earned in Moscow can be applied to both undergraduate concentrations. Cultural awareness and language ability are enhanced by living with a Russian family in Moscow.

**RUSSIAN LANGUAGE AND LITERATURE**

The concentration in Russian Language and Literature is designed for those students who desire to gain a firm command of the Russian language and to study the nation’s literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian literature and related media in the broader context of Russian culture. Students may explore historically related literary traditions (for example, French, German, English), as well as other related fields. The Russian Language and Literature concentration also welcomes students with an interest in Russian and Slavic linguistics.

**Prerequisites**—Successful completion of Slavic 51, 52, 53, or the equivalent, as determined by the results of the department placement examination, is a prerequisite for a concentration in Russian Language and Literature.

**Requirements**

Candidates for the A.B. degree with a concentration in Russian Language and Literature must complete an additional 55 units according to the following distribution.

**Russian Language**—A minimum of 15 units selected from the following Slavic Languages and Literatures courses: 111, 112, 113, 177, 178, 179, 181, 182, 183.

**Russian Literature**—The 20-unit core literature sequence consisting of the following Slavic Languages and Literatures courses: 145, 146, 147, 187, 188.

**Electives**—Students must take 20 units of electives embracing at least two of the following categories: (1) Russian language or linguistics, (2) Russian literature, (3) historically related literatures. These courses are selected in consultation with the undergraduate director. With department permission, work in related academic fields (for example, anthropology, communications, political science, religion, sociology) may apply toward the degree requirements.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of ‘C’ or better in order to receive credit toward the major.

**RUSSIAN LANGUAGE, CULTURE, AND HISTORY**

The concentration in Russian Language, Culture, and History is for students who would like to obtain a firm command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature, other expressive media (including film), as well as cultural traditions and institutions. Emphasis is placed on the relation of the Russian literary tradition to disciplines that have enriched the historical understanding of Russian literature: primarily history, but also anthropology, communications, political science, and sociology.

**Prerequisites**—Successful completion of Slavic 51, 52, 53, or the equivalent as determined by the results of the department placement examination, is a prerequisite for a concentration in Russian Language, Culture, and History.

**Requirements**

Candidates for the A.B. degree with a concentration in Russian Language, Culture, and History must complete an additional 55 units according to the following distribution.

**Russian Language**—A minimum of 15 units selected from the following Slavic Languages and Literatures courses: 111, 112, 113, 177, 178, 179, 181, 182, 183.

**19th-Century Russian Literature and History**—A minimum of 8 units chosen from the following courses or the equivalent: Slavic 145, 146; History 120B and 121. Students must choose one course from Slavic and one course from History.

**20th-Century Russian Literature and History**—A minimum of 8 units chosen from the following or the equivalent: Slavic 147; History 120C. Students must choose one course from Slavic and one course from History.

**Electives**—In order to complete the basic degree requirements, students must take 24 additional units of course work embracing at least two of the following categories: (1) Russian language, (2) Russian literature, (3) Russian history. These courses are selected in consultation with the undergraduate director. With department permission, work in related academic fields (for example, anthropology, communications, political science, religion, sociology) may apply toward the degree requirements.

Majors with a concentration in Russian Language, Culture, and History must earn a GPA of ‘C’ or better in order to receive credit toward the major.

**MINORS**

The Department of Slavic Languages and Literatures offers three undergraduate minor programs in Russian Language, Literature, and Culture.

The minor program is designed for students who, while pursuing a major in another program, seek a comprehensive introduction to Russian culture, whether primarily through (1) Russian language courses; or (2) a combination of minimal proficiency in Russian and courses in the history of Russian culture; or, (3) courses on Russian literature in translation and, depending on the student’s interest, other forms of the country’s cultural expression as well as its social institutions. Students seeking a Slavic minor are particularly encouraged to take advantage of Stanford’s Overseas Studies Program in Moscow.

**RUSSIAN LANGUAGE**

**Prerequisites**—The minor concentration in Russian Language requires the successful completion of Slavic 1A, 2B, 3C (First-Year Russian) and Slavic 51, 52, 53 (Second-Year Russian), or a demonstrated equivalent competence as determined by the departmental Russian language placement examination.

**Requirements**—Candidates for the A.B. degree with a minor concentration in Russian Language must complete 24 units of Russian language and literature courses according to the following distribution: 12 to 15 units selected from Slavic 111, 112, 113, 177, 178, 179, 181, 182, 183. The remaining 9 to 12 units should be selected from Slavic 145, 146, 147, 187, 188, other monograph courses offered by the Department of Slavic Languages and Literatures or, with the approval of the Slavic department’s undergraduate adviser, in history, politics, linguistics, or other relevant programs.

**RUSSIAN LANGUAGE, LITERATURE, AND CULTURE**

**Prerequisites**—The minor concentration in Russian Language, Literature, and Culture requires the successful completion of Slavic 1A, 2B, 3C (First-Year Russian) or the equivalent as determined by the departmental Russian language placement examination.

**Requirements**—Candidates for the A.B. degree with the minor concentration in Russian Language, Literature, and Culture must complete 28 units according to the following distribution:...
1. A minimum of 16 units of courses on literature and culture selected from the following Slavic Languages and Literatures courses: two quarters in the 145, 146, 147 sequence (Russian Literature in English Translation); or one quarter in the 145, 146, 147 sequence and one quarter in the 187, 188 sequence (Russian Poetry; prerequisite: Second-Year Russian); and, at least one monograph course focusing on a single writer.

2. 12 units of elective courses either in the Department of Slavic Languages and Literatures or, with the approval of the Slavic department's undergraduate adviser, in history, linguistics, politics, or other relevant programs.

RUSSIAN CULTURE

Candidates for the A.B. degree with the minor concentration in Russian Culture must complete 36 units according to the following distribution: a minimum of 20 units of courses on literature and culture selected from the following Slavic Languages and Literatures courses—three quarters in the 145, 146, 147 sequence (Russian Literature in English Translation) and two monograph courses focusing on a single writer. In addition, one course in Russian history is selected from History 120B or 120C. No knowledge of Russian is required.

Electives—11 units of elective courses either in the Department of Slavic Languages and Literatures or, with the approval of the Slavic department’s undergraduate adviser, in art, history, linguistics, political science, or other relevant programs.

The deadline for minor declarations in all concentrations is no later than the last day of the third quarter before degree conferral.

HONORS PROGRAM

Students in either concentration with a grade point average (GPA) of ‘B+’ or better in their major courses are eligible to participate in the department’s honors program. In addition to the basic program requirements above, honors students must also complete the following:

1. One advanced course, usually taken during the Spring Quarter of the junior year and related to the area of the student’s expected research. Majors in either concentration who propose a senior project in literature must take a course in literary or cultural theory. Students concentrating in Russian Language, Culture, and History and pursuing a project in cultural history are required to take a course in literary or cultural theory, or a graduate seminar in the area of their topic. Students concentrating in Russian Language and Literature who propose a senior project in Russian language select their course in consultation with the undergraduate director.

2. Slavic 199, Individual Work: a minimum of 8 units during the senior year. To qualify for honors, the candidate must receive a grade of 'B' or better on the thesis or project completed during this period.

COTERMINAL PROGRAM

The department allows a limited number of undergraduates to work for coterminal A.B. and A.M. degrees in Slavic Languages and Literatures with a concentration on Russian. In addition to University requirements for the A.B. degree, the student must:

1. Submit an application for admission by January 31 of the senior year. Applicants must meet the same general standards as those seeking admission to the A.M. program. Applicants must submit: an application for admission; a written statement of purpose; a transcript; and three letters of recommendation, at least two of which should be from members of the Department of Slavic Languages and Literatures faculty.

2. Meet all requirements for both the A.B. and A.M. degrees. They must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 216 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three graduate-level courses.

GRADUATE PROGRAMS

MASTERT OF ARTS

University requirement for the A.M. degree are discussed in the "Graduate Degrees" section of this bulletin.

Admission—The requirements for admission to the master's degree program in Russian are:

1. A Bachelor of Arts degree (or its equivalent) from an accredited college or university.

2. A command of the Russian language sufficient to permit the student to do satisfactory graduate work in an area of specialization.

3. A familiarity with Russian literature sufficient to permit the student to perform adequately in courses at the graduate level.

The applicant’s previous academic training in Russian language and literature must normally serve as a tentative indication of competence. Accordingly, the department does not ordinarily consider applications from students who have not had at least three years of college Russian and some undergraduate training in Russian literature of the 19th and 20th centuries.

Before registering for the first quarter’s work in the department, cataloging graduate students are required to take placement examinations in language and literature. Students who fail to perform satisfactorily on such examinations must register for remedial courses in the areas in which they are deficient. Such remedial courses, normally completed within the first three quarters of residence, carry no credit toward either the A.M. or the Ph.D. degree.

Course Requirements—Candidates for the A.M. who are not also candidates for the Ph.D. should plan course work that ensures adequate preparation for the A.M. final examination at the end of the third quarter of work. Ph.D. candidates with a concentration in language and linguistics should include in the first year’s work any courses needed for the A.M. examination in that area. Ph.D. candidates with a concentration in literature should attempt to include as many of the department’s basic course offerings as possible in the first-year program to ensure sufficient time to complete the A.M. thesis during the fifth quarter of registration. In any case, course work should be planned in consultation with the graduate adviser, whose written approval of the overall course load is required.

Candidates for the A.M. must complete a program of 36 units, of which 27 units must be selected from courses given by the department. The other 9 units may, with approval of the candidate's adviser, be selected from courses in related fields. Of the 27 units in the department, a minimum of 9 must be in language and a minimum of 9 in literature. The remaining 9 may be distributed in accordance with the needs and interests of the student, and with the advice and approval of the department adviser.

No credit toward the A.M. degree is allowed for first- or second-year courses in non-Slavic languages required for the Ph.D. degree.

The A.M. Thesis—A requirement for candidates for a Ph.D., the A.M. thesis represents a complete article-length research paper (6,000-9,000 words) that, in both form and substance, qualifies for submission to English language professional publications in the Slavic field. The A.M. thesis must be submitted to the adviser no later than the fifth quarter and approved no later than the sixth quarter of registration.

Final Examination—Students not enrolled in the Ph.D. program may either submit an A.M. thesis or take a final examination. In the latter case, regardless of the area of specialization, the student must demonstrate in a written examination: (1) command of the phonology, morphology, syntax, and lexicology of contemporary Standard Russian sufficient to teach beginning and intermediate courses at the college level; (2) ability to read contemporary Standard Russian sufficient to assist students studying contemporary Russian poetry or literary prose; and (3) sufficient familiarity with Russian literature of either the 19th or 20th century to handle successfully survey courses dealing with a chosen period of specialization.

The examination should be passed at the end of the final quarter of required course work.
MASTER OF ARTS IN TEACHING

The degree of Master of Arts in Teaching is offered jointly by the department and the School of Education. It is intended for candidates with teaching credentials or relevant teaching experience who wish to further strengthen their academic preparation. Requirements for the degree are outlined in the "School of Education" section of this bulletin. The program includes 45 units, of which 25 must be in the teaching field and 12 in education. Specific language requirements are established in consultation with the department.

DOCTOR OF PHILOSOPHY

University requirement for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

Students enrolled in the Ph.D. program in Slavic Languages and Literatures are expected to fulfill the following requirements:

1. Minor or Related Fields: during the course of study, students must develop substantial expertise in a field contiguous to the area of specialization. A candidate may elect to present a full minor or, in consultation with the graduate adviser, develop a special program in a related field.

   a) Related Field: a student is required to complete a sequence of basic courses (12 units) in a chosen discipline outside the Department of Slavic Languages and Literatures. The choice of patterns is one of the following:
      1) A sequence of three courses in one West European literature, selected in consultation with the adviser, or
      2) three basic courses in comparative literature to be selected in consultation with the graduate adviser and the Department of Comparative Literature.

   b) Minor: if the student elects a minor (for example, French, German, Spanish, or Russian history), he or she should take six graduate courses in that department with a minimum of 20 units at the graduate level, according to the minor requirements established by that department. Students considering minors in other areas, such as Asian languages, English, or comparative literature, should consult with the adviser, the Chair of the Department of Slavic Languages and Literatures, and the chair of the minor department. Students who wish to enroll in the Graduate Program in the Humanities should apply there.

2. Admission to Candidacy: candidates should read carefully the general regulations governing the degree, as described in the "Graduate Degrees" section of this bulletin. No student is accepted as a candidate until the equivalent of the A.M. degree requirements, including the A.M. thesis described above, are completed. (Ph.D. students in literature who may not opt for a written examination.) Admission to candidacy is determined by the end of the fifth quarter of graduate studies. The candidate by that time must have demonstrated commitment to graduate studies by completion of a minimum of 60 quarter units of credit and with a grade point average (GPA) of 'B+' or better. Students specializing in literature, or to Russian intellectual history. (Students specializing in Slavic linguistics are excused from this portion of the examination if they have completed Slavic 211, 212, and 213 with a GPA of 'B-' or better.)

3. Proficiency Test: administered for all entering graduate students, this test determines whether the student's knowledge of Russian language and literature falls below the department's standard. Students who fail to excel in this test are asked to complete appropriate courses in the first year of graduate study.

4. Course Requirements: before qualifying for the department oral and written examinations, a Ph.D. candidate is expected to accumulate at least 72 quarter units of credit for courses taken while in graduate school. No less than half of this course work (36 units) must be done in the Department of Slavic Languages and Literatures, including at least 12 units of credit for seminar-level courses. (All entering graduate students are expected to enroll in Slavic 200.) The candidate must submit to the department's Academic Progress Committee three seminar-level papers completed at the Department of Slavic Languages and Literatures, as well as the A.M. thesis.

5. Foreign Languages: a candidate must demonstrate reading knowledge of French and German by passing written examinations.

6. Examinations: a candidate must pass the departmental general qualifying examinations. The written part covers:
   a) The history and structure of the Russian language and its relationship to the other Slavic languages. (Students specializing in literature are excused from this portion of the examination if they have completed Slavic 211, 212, and 213 with a GPA of 'B-' or better.)
   b) The history of Russian literature, including its relationship to the development of other Slavic literatures, or West European literature, or to Russian intellectual history. (Students specializing in Slavic linguistics are excused from this portion of the examination if they have completed, with a GPA of 'B-' or better, Slavic 221, 222, and either 187 or 188. They should also have taken Slavic 245, 246, and 247, or show equivalent training.)

   The oral portion follows shortly after the successful completion of the written portion. The department oral examination is designed to test the students' knowledge of the major cultural and literary trends in a period of their choice. It can be used most profitably as an opportunity to do intensive reading in the period of a candidate's projected dissertation work. Preparation for the oral should begin immediately following the successful completion of the department's written examination. After consulting with members of the faculty, the student proposes a reading list, which, once approved, serves as the basis for the examination. The exam structure requires that the student make an opening presentation on a topic or set of topics of particular interest or relevance to the period in question. After an open discussion of the presentation, each examiner is given the chance to question the student on other topics related to the reading list.

   Following the department examinations, a candidate must pass a University oral examination which is a defense of a dissertation proposal covering content relevant to the area of study, rationale for the proposed investigation, and strategy to be employed in the research.

   Specialization—Candidates in Slavic Languages and Literatures specialize in literature and related media. Candidates may draw up individual programs of study and research in consultation with the graduate adviser. Requirements vary according to the nature of the specialized program requested.

   Continuation—Continuation in the Ph.D. program is contingent on: for first-year students, a high quality of performance in course work (decided by department evaluation); for second-year students in literature, an A.M. thesis; and, for linguistics students, a written examination based on course materials and a reading list. Both thesis and written examination should be completed no later than the end of the second quarter of the second year.

Course Work, Breadth Requirements, and Overall Scheduling—

1. Candidates for the Ph.D. degree are allowed as much freedom as possible in the selection of course work to suit their individual program of study. However, candidates are held responsible for all of the areas covered by the general examinations, regardless of whether they have registered for the department's offerings in a given field. For this reason, it is strongly recommended that before taking Ph.D. examinations, students specializing in literature complete seminar-level work directly related to the following broad areas:
   a) Russian poetry
   b) the Russian novel
   c) 20th-century Russian literature
   d) 19th-century Russian literature (the Age of Pushkin and after)
   e) 18th-century Russian literature (from the early 1700s to the Age of Pushkin)
   f) medieval Russian literature
g) a monograph course on a major Russian author
h) theory of literature

Students may not normally register for individual work in a given area until they have covered the basic course offerings in that area. First-year students may register for individual work only under special circumstances and must obtain the written approval of the graduate adviser. Those candidates who are also candidates for the A.M. degree should consult the course requirements for that degree in planning their first-year's work. The A.M. thesis or written examination should be completed by the end of the fifth quarter of graduate study at the latest. The remainder of the second year should be devoted to course work preparing the student for the general qualifying examination and to fulfill the requirements of the minor, if any. The department's general qualifying examinations must be taken by the end of the first quarter of the third year of study; they may be taken during the second year if the student and the adviser feel this is appropriate. During the two quarters following the general qualifying examinations, the student should be concerned primarily with preparation for the University oral examination, which should take place no later than the end of the third quarter of the third year. However, students may, if necessary, do limited amounts of course work not directly related to the dissertation proposal. The fourth year should be devoted to completion of the dissertation.

2. Students possessing the equivalent of the Stanford A.M. are normally expected to adhere to the schedule for the second, third, and fourth years of work outlined under item 1 above.

3. Students in the Ph.D. program are required to do four quarters of teaching in partial fulfillment of the requirements of the Ph.D. degree: three quarters of first-year Russian, and one quarter of literature as a teaching assistant to a faculty member (usually for one of the survey courses in translation: 145, 146, 147). While teaching a section of first-year Russian supervised by a faculty member, students are required to enroll in the department's teaching colloquium (Slavic 206A,B,C). In addition, students must enroll in Slavic 207D, the department's TA preparatory course, which is offered to all graduate students in the Spring Quarter preceding their first quarter of language teaching. While enrolled in Slavic 207D, students participate in actual language teaching sections.

Non-Slavic Language Requirements—Credit toward either the A.M. or the Ph.D. degrees is not given for first- or second-year courses in non-Slavic languages. It is assumed that, on entering the program, the student has a reading knowledge of both German and French or, at the very least, one of these languages. The reading examination in one of these languages must be passed by the end of the first year of study. The reading examination in the second language must be passed by the end of the second year of study. Both language examinations must be passed before the candidate takes the University oral examination, that is, before the end of the third year.

JOINT Ph.D. IN SLAVIC LANGUAGES AND LITERATURES AND HUMANITIES

The Department of Slavic Languages and Literatures participates in the Graduate Program in Humanities leading to the joint Ph.D. degree in Slavic Languages and Literatures and Humanities. For a description of that program, see the “Interdisciplinary Studies in Humanities” section of this bulletin.

COURSES

(WIM) indicates that the course meets the Writing in the Major requirements.

(AU) indicates that the course is subject to the University activity unit limitation (8 unit maximum).

For additional offerings in literature, see the “Comparative Literature” section of this bulletin.

Students interested in languages not listed should contact the Special Language Program in the Division of Languages, Cultures, and Literatures.

GENERAL

This curriculum covers topics of general interest. Courses are open to all students and have no prerequisites. Some courses may be taken for graduate credit. Additional work in the original language may be arranged with individual instructors.

The courses:
1. Introduce students to the major authors and texts in the Russian literary and cultural tradition.
2. Offer broad conceptual frameworks for the understanding of the material covered.
3. Demonstrate the dynamic interaction between cultural texts and a variety of contexts (literary, intellectual, and socio-political).

While these goals are pursued to some extent in all of the courses, the general curriculum may be roughly classified according to contextual emphasis to assist students in choosing courses according to their interests.

Literary Movements and Genres: Slavic 133, 145, 146, 147, 155, 156
Literature and Intellectual History: Slavic 151, 190
Literature and Social History: Slavic 141, 142
Media, Gender, Ethnicity: Slavic 148, 158, 161, 162, 163, 166, 167, 168

13N. Stanford Introductory Seminar: Russia, Russian, Russians—Preference to freshmen. The political and cultural history of Russia and the Russians: prominent persons, prominent events, and how these shape current attitudes and society. Five or six short works by famous Russian authors are analyzed/discussed. GER:3a (DR:7) 3-4 units, Spr (Schupbach)

14N. Stanford Introductory Seminar: Oedipus in Russia—Identity Narratives and Generational Conflict in Modern Russian Fiction and Film—Preference to freshmen. Discuss/analyze Freud’s rendering of the Oedipus story by confronting it with the treatment of identity confusion and generational rivalry in modern Russian fiction and film, against the background different from both Freud’s Vienna and Sophocles’ Athens. Can literature and art be seen as an elaboration of the Oedipus Complex with the social displacing the psychological; can Freud’s Oedipus be seen as a displaced elaboration of a modern social drama of dislocation and multiple identity? Works: Freud’s The Origin of Psychoanalysis, Totem and Taboo, Moses and Monotheism; Turgenev’s Fathers and Sons; Chekhov’s Seagull; Babel’s Red Cavalry and “Sunset;”; S. Eisenstein’s Alexander Nevsky (1938) and Ivan the Terrible (1946); Mikhail Bulgakov’s The Master and Margarita (1940). Enrollment limited to 12. not given 1999-2000

65Q. Stanford Introductory Seminar: Art, Music, and Poetry of the Russian Avant-Garde—Preference to sophomores. Interrelations of poetry and other arts during the Avant-Garde era. The impact of the new technological civilization on the character of artistic experiments. Readings of the main works of Russian avant-garde poetry in the context of changes in the language of visual arts (Futurism, Cubism) and music (Scriabin, Prokofiev, Stravinsky). not given 1999-2000

77Q. Stanford Introductory Seminar: Russia’s Weird Classic—Nikolai Gogol—Preference to sophomores. The work and life of Nikolai Gogol, the eccentric founder of “Fantastic Realism,” based on the work written in various genres and created in various stages of his literary career. The relationship between Romanticism and Realism in Russian literature (the so-called “Natural School” of the 1830-40s), and between the popular Ukrainian culture and the “high” Russian and W. European traditions in Gogol’s oeuvre. Gogol’s influence on subsequent Russian literature (Dostoevsky) and the impact of his work on 20th-century modernist literature, painting, theater, music, and art (Vladimir Nabokov’s literature of the absurd, Dmitry Shostakovich, Vsevolod Meyerhold, Marc Chagall). Critical interpretations of Gogol (Freudian, Marxist, formalist, post-modern). Readings: The Bewitched Place, The Portrait...
The Diary of a Madam, The Nose, The Overcoat, the novel Dead Souls, and the comedies The Government Inspector, and Marriage.

100. History of Russian Music—Introduction to Russian culture through the medium of Russian music, and discussed in the context of Russian literature, painting, and societal life. The main periods, styles, and major figures in the history of the Russian musical culture of the 19th (Glinka, Tchaikovsky, Borodin, Mussorgsky) and 20th century (Rachmaninov, Scriabin, Stravinsky, Prokofiev, Shostakovich, and contemporary composers); various genres of orchestral, instrumental and vocal music, opera, and ballet. The relationship of Russian musical culture and European musical schools. The role of oriental traditions, themes, and elements (Jewish, Georgian, Persian, etc.) in Russian classical music. Distinct features of Russian performers (Chaliapin, Rachmaninov, Hefetz, Horowitz, et al.).

110. Russian “Crash” Course for Departing Students—For students taking the Intensive Language Course in Moscow. Overview of the Cyrillic alphabet and grammar and an introduction to Russian life and manners: How does one get from Point A to Point B on the subway? What is the polite way to refuse yet another portion, etc. (AU)

1 unit, Spr (Schupbach)

133/233. Literature and Culture in East-Central Europe, 1945-2000—Focus is on Poland, and the former Yugoslavia and Czechoslovakia. Literature and film through, and in relation to: multi-ethnic states and multi-ethnic cleansing; coming to terms with historiographies of national honor and shame; censorship, “gray zones,” and emigration; the Czech Spring and the Polish August; what to do once “They” have gone. Novels and poems by: Andric, Gombrowicz, Vaculik, Konwicky, Huelle, Miledinovic. Films by Wajda and Forman. (In English)

3-4 units, Spr (Frick)

141/241. Revolution in Russian Theater 1898-1930—Russian dramatic art 1898-1930, exploring the interaction of the aesthetic revolution in theater and the political revolutions of 1905, 1917 and the 1930s (the Stalin Revolution). The new concepts of drama and its mise-en-scene (the director-theater, new forms of theatrical space, “intervention” of the spectators, the interrelationship between sound and image, new concepts acting). Plays by Chekhov, Blok, Khlebnikov, Mayakovsky, Babel, Tretiakov, Erdman, Bulgakov; and the theater-concepts of Stanislavsky and Meyerhold between 1898 and 1930.

not given 1999-2000

142/242. Literature and Formation of State Mythology in Russia from Catherine II to Nicholas I—Dramatic political, cultural, and ideological changes in the 18th century contributed to the deep crisis of traditional religious interpretations of the state and its functions. Russia had to create a new mythology which would legitimize its imperial expansion and new cultural orientation. Literature served rulers and state ideologues as a reservoir of metaphors to formulate their values and projects. The four major attempts at creating a new national ideology starting with the reign of Catherine II. Readings in literary texts, historical documents, and political pamphlets. Recommended: reading knowledge of Russian and French. (In English)

4 units, Win (Zorin)

145/245. The Age of Experiment (1820-1850)—The formative period of Russian literature. Recognized "classics" (“Pushkin’s Eugene Onegin, The Belkin Tales, The Captain’s Daughter; Lermontov’s Hero of Our Time; Gogol’s Petersburg Tales and Dead Souls) are considered in the context of “local” literary and stylistic developments and of contemporary European trends. GER:3a (DR:7)

3-4 units, Aut (Fleishman)

146/246. The Age of Transgression: Russian Literature from Turgenev through Tolstoy—In the half-century before the Russian Revolution, educated people began to debate the reform of human behavior. Censorship inspired some to conceal political messages in fiction. They wrote about murderers, adulterers, and terrorists, whose transgressions challenged social, ethical, and aesthetic boundaries. Dostoevsky’s Crime and Punishment, Tolstoy’s Anna Karenina, and Bely’s Petersburg, are read focusing on their common techniques and themes, especially the idea of the modern city as the locus of crime and self-invention. These novels are contrasted to more provincial texts by masters of short forms (Turgenev, Leskov, and Chekhov). GER:3a (DR:7) (WIM)

3-4 units, Win (Safran)

147/247. The Age of Revolution: Russian Literature and Culture since 1917—Open to all undergraduates. Introduction to modern Russian culture, focusing on literature and other arts in the context of Russia’s Soviet and post-Soviet history. The role of literature and the arts in the creation of Soviet civilization. Post-Soviet Russian culture. Texts in English translation. GER:3a (DR:7)

3-4 units, Spr (Fleishman)

148/248. The Factory of the Eccentric Actor (1921-1929): Between Theater and Film, Avant-Garde and Trivial Genres, East and West—Open to advanced undergraduates and graduate students. The experimental group FEKS (Factory of the Eccentric Actor) was founded in 1921 in Petrograd and worked in theater and film until 1929. They developed a specific system of actor training, near to Meyerhold’s biomechanics, and collaborated with Russian Formalists (Yuri Tynianov, Boris Eikhenbaum, Viktor Shklovsky). Revolution was conceived by the FEKS as a carnival, and the avant-garde had to assimilate, according to their program, trivial genres. FEKS practiced in their films “defamiliarization” of the Russian classics by using the stereotypes of German and American cinema. Gogol’s Overcoat was staged as a German expressionist film, the uprising of Russian aristocrats against the monarchy in 1825 as a melodrama with the elements of the American Western and the Gothic novel. The problem of intertextuality in film. Recommended: knowledge of Russian.

4 units, Aut (Bulgakowa)

151. Dostoevsky—Open to juniors, seniors, and graduate students. Major works in English translation with reference to related developments in Russian and European culture and intellectual history. Lectures and discussion section. GER:3a (DR:7)

4 units, Win (Frank)

155/255. Anton Chekhov and the Turn of the Century—Chekhov’s art in its Russian literary, historical, philosophical, and political contexts. Primary readings from Chekhov’s short stories and major plays; supplemental readings for graduate students from Chekhov’s letters and works by his friends and contemporaries, such as Leskov, Tolstoy, Korolenko, and Gorky. GER:3a (DR:7)

3 units, Spr (Zorin)

156. Nabokov and Modernism—Stories, novels, and film scripts in the context of other modernist writers (Bergson, Proust, Joyce), media (photography and film), and 20th-century events and intellectual discourses (Marxism-Stalinism, avant-garde, Freudianism, American post-war cultural ideology), whose influences Nabokov belittled or ignored. Critical approaches that elude the author’s control. Readings: Despair, Camera Obscura, The Gift, Bend Sinister, Lolita, Pale Fire, excerpts of Eugene Onegin’s Commentary and Speak Memory.

not given 1999-2000

158/258. Sergei Eisenstein—Open to undergraduate and graduate students. His vision of film theory, and its main theoretical models. Through an analysis of his major films (Strike, Battleship Potemkin, October, The General Line, Que viva Mexico!, Alexander Nevsky, and Ivan the Terrible), radical innovations of the medium are explored: new modes of narration, editing, and acting; audiovisual synchronization; and deep-focus composition and an unfolding foreground of the film image. This film-poetics interrelates with other arts of the Avant-Garde era (Futurism
and Cubism in painting, Constructivism in architecture and theater, new schools of expressive movement in ballet, the modernist literary experiments of Joyce). The film theoretician Eisenstein creates for these films a rich systematic context that includes new theories in psychology and psychoanalysis, linguistics, and anthropology.

not given 1999-2000

161/261. Poetess: The Grammar of the Self when the Poet is a Woman—Seminar. Readings of lyrical works by women poets from the U.S., Russia, Eastern Europe, and Germany (Dickinson, Moore, Brooks and the Harlem Renaissance, Bishop, Akhmatova, Tsvetaeva, Sachs, Plath, Cisneros, Angelou, Graham, Howe, and Szymborska). The historical and cultural context enriches our understanding of such theoretical and practical issues as “breaking and entering” the male preserve of “high poetry” in different eras; the interaction of written and oral, political and performative modes of expression; new representations of the feminine body and experience in the visual arts; and the development of a female lineage and modes of poetic legitimation, association, and inspiration.

not given 1999-2000

162/262. Gender Images in Film—Seminar, open to undergraduate and graduate students. Film creates permanent new images of femininity. One of its conscious prerequisites is the notion of social stereotypes, whose alternation is caused by the arrival of a new historical epoch. The development of enduring images of the film heroine between 1914 and 1990, through comparison of the Russian, American, and W. European cinema, and analytical approaches to them from feminist film theory.

not given 1999-2000

163. Beyond Fiddler on the Roof: The Jewish Experience in Eastern Europe through Literature and Film—Examines stereotypes about Jewish life in Eastern Europe in the last two centuries. Rather than looking at Eastern European Jews as living in a pattern that changed only when interrupted by revolution, emigration, or Holocaust, there was a constant play of forces of rebellion and reaction; rather than imagining Jewish communities as isolated, there were interactions among Jews and non-Jews. Readings: Yiddish classics by Sholem Aleikhem, L. Peretz, B. Singer, and recently rediscovered women writers; Russian and Polish texts by Jewish writers (Osip Mandelstam, Isaac Babel, Felix Roziner, Bruno Schulz, and Hanna Krall); stories by non-Jews, (Eliza Orzeszkowa and Anton Chekhov); and four films in Russian, Polish, Yiddish, and English.

not given 1999-2000


not given 1999-2000

166/266. Russia on the Silver Screen: U.S., Western European, and Emigre Cinema—The fantasy of “Russia” in German, French, and American cinema, 1920-90. Films created by Russian emigrés in Berlin, Paris, and Hollywood as odd models, constructing the imaginative national identity according to different cultural stereotypes of “Russia.”

4 units, Spr (Bulgakowa)

167/267. Models of Film Analysis—Open to undergraduates and graduate students. Introduction to the aesthetics of film, its topics, basic principles of film form, and different approaches to them. The objects of study are fictional and non-fictional (American, East and West European) films, the genre-system narrative and non-narrative films; the artistic possibilities of primary film technique (mise-en-scene, image, editing, and sound); and different models of analysis (structuralism, psychoanalysis, feminism).

not given 1999-2000

168/268. Documentary Film and Fiction in Russian and Western Cinema, 1920 to the Present—Documentary films from Dziga Vertov and Robert Flaherty to the present. The marks and conventions of “documentary” and “fiction” in different periods, the “impression of reality,” the technique of its representations, and “boundary works” between genres.

4 units, Aut (Bulgakova)

169. Seminar: Voice and Literature in Russia and America—Introduction to the comparative study of literature through voice and text. In the modern era, prose and poetry have drawn from the productive tension between the spoken words and the objectification of language in writing. The shifting relationships between these modes of expression and the changing representation of voice in text have defined forms of social and cultural identity (gender, race, class, nation) and the notion of literature itself. Concepts from theoretical readings are explored in active dialogue with literary texts from several national traditions and genres.

not given 1999-2000

190. Modernism and the Humanities: Tolstoy’s Anna Karenina and the Social Thought of its Time—A “close reading” of Tolstoy’s novel in historical context, followed by a discussion of the novel as a polemic with contemporary social thought: Marx and Engels, John Stuart Mill, Nietzsche, Freud, Emile Durkheim, and Max Weber. Confrontation of modernity and tradition, changes in the institution of family, the question of gender and sex equality; rational thought and religious sentiment, crisis of authority and legitimacy; charisma and routinization; the rise of individualism, estate society vs. class; capital and the modern city; autonomy of art and ideological engagement. GER:3a (DR:7 or 8)

5 units, Win (Freidin)

220A. Verse Translation: From Intuition to Artistry—Seminar focusing on the challenge of translating into modern English from poems in various languages, selected by the student from: Francois Villon, Victor Hugo, Paul Verlaine, Armand Silvestre, Edmond Rostand, Clement Marot, and other French poets; poems by Alexander Pushkin, especially stanzas from his novel in verse Eugenii Onegin, works by Goethe, Rilke, Schiller, Christian Morgenstern, and other German poets; excerpts from Dante’s Inferno, Horace’s Ode to Pyrrha, Wang Wei’s La zhai, a haiku by Basho; etc. Works in English: Shakespeare’s sonnets, poems by Dylan Thomas, and e.e. cummings, which could be translated either into verse in contemporary English or into verse obeying a different set of constraints.

4 units, Spr (Holfstuder)

221. Modernism and the Jewish Voice in Europe—(Same as German Studies 221A.) Open to advanced undergraduate and graduate students. Some of the most haunting literary voices of the 20th century emerged from the Jewish communities of Eastern and Central Europe. The Jewishness of the modernists is thematized, asking whether it contributed to shared attitudes toward text, history, or identity. Their works are situated in specific linguistic traditions, Yiddish, Hebrew, Russian, Polish, or German. Primary readings from Ansky, Bialik, Mandelstam, Babel, Schultz, Kafka, Celan, and others; secondary readings in history, Eastern European literature, and theory, including Marx, Freid, Benjamin, and Arendt.

3-4 units, Aut (Safran, Eshel)

UNDERGRADUATE AND GRADUATE LANGUAGE

By special arrangement with the department, courses numbered 100-159 can be taken for graduate credit. Students are urged to take all three quarters of first-, second-, and third-year language series consecutively in the same academic year.

FIRST- AND SECOND-YEAR LANGUAGE

Note—Students registering for the first time in a first- or second-year course must take a placement test if they had any training in Russian before entering Stanford. All entering students must take Part I (written) of the placement test on-line during the summer, followed by Part II (oral).
to be administered on campus 9/19/99. Consult the Stanford Language Center for further information or see http://language.stanford.edu.

3-5 units, Aut, Win, Spr (Gettys, Staff)

**2D. Accelerated Beginning Russian**
5-8 units, Win (Staff)

**50. Review of Russian Grammar: Repair Russian**—"Mainstreams" the skills of students who do not fit easily into the basic language program, e.g., those whose performance on the Placement Exam is not sufficient to justify placement in 51, or native speakers of the language whose reading and writing skills are impaired, etc. Students successfully completing 50 normally proceed directly into 52; others, particularly "heritage" speakers may enter 112 or 178.
3 units, Aut (Schupbach)

**51,52,53. Second-Year Russian**—Reviews the more difficult areas of the grammar, e.g., numbers, verb conjugation, and aspect, etc., enriches the students’ vocabulary and understanding of the language, and improves their speaking skills.
51.—Grammar is presented through well-known short stories by the leading 19th- and 20th-century Russian writers.
5 units, Aut (Gettys, Staff)
52.—Continuation of 51.
5 units, Win (Greenhill, Staff)
53.—Continuation of 52 with an emphasis on Russian history.
5 units, Spr (Greenhill, Staff)

**52B. Second-Year Russian**—For students returning from the Overseas Studies Program in Moscow.
5 units, Win (Schupbach)

**99. Language Specials**—With consent of department only. See instructor for section number.
1-5 units, Aut, Win, Spr (Staff)

**111,112,113. Third-Year Russian**
111.—Emphasis is on grammar, writing, and conversation. Grammar is presented through readings from an edited version of the *The Golden Calf* (L’ija ì’àì’èêàì’ë ìêàì’ì’àêèì’) Petrov’s humorous and "right-on" view of the Russians at their best and worst. Conversation emphasizes material from contemporary Russian periodicals, films, music, radio, and TV programs.
4 units, Aut (Schupbach, Staff)
112.—See 111.
4 units, Win (Schupbach, Greenhill)
113.—See 111.
4 units, Spr (Schupbach, Greenhill)

**178. Second-Year Russian**—For students returning from the Overseas Program in Moscow.
5-8 units, Win (Staff)

**179. Fourth-Year Russian**—Interactive mini-course in culture, history, and current events. Films, readings from classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Discussions, role-playing, and creative assignments improve oral and written skills. Review and “fine-tuning” of grammar and idiomatic usage. Prerequisites: 111-113, or equivalents.
3 units, Win (Greenhill)

**181,182,183. Fifth-Year Russian**
181,183. The Russians: What Makes Them Different?—Language proficiency maintenance for undergraduates and graduates with four years of Russian or equivalent; appropriate for majors and non-majors with language experience overseas. Content-based advanced language skills are expected for conducting discussions, oral presentations, and writing essays on important issues on contemporary Russia. The Russians’ world: outlook; “folk” psychology; the way Russians see themselves and the rest of the world in ways, habits, and traditions through contemporary prose, newspaper articles, films.
3 units, Aut (Staff)
3 units, Spr (Gettys)
182. See 188.
3 units, Win (Freedlin)

not given 1999-2000

**196. Advanced Topics in Russian Grammar II: Morphology and Syntax**—Problems in government and agreement: verbs, prepositions, quantifiers, and adjectives. Lectures with coordinated exercises. Students not possessing a solid control of Russian morphology must take remedial work. Recommended: at least two years of college Russian or the equivalent.
not given 1999-2000

**198. Comparison of Russian and English**—The ways in which these two languages are similar and different. Starting from Old English and Old Russian, what events have led to their present structures and interaction.
not given 1999-2000

**199. Individual Work**—Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.
1-5 units, any quarter (Staff)

**206A,B,C, Practicum in Teaching Russian as a Foreign Language**—Curriculum and lesson planning. Observation and discussion of class-
room techniques in conjunction with teaching beginning Russian. (AU)
1-2 units, Aut (Gettys, Schupbach)
Win, Spr (Gettys)

207D. Introduction to Teaching Russian as a Foreign Language—
Practical approach to teaching Russian to non-native speakers, focusing
on a survey of the features of Russian which present particular difficulties
for students. A survey of the Slavic Languages from the standpoint of
Russian. Preparation of lessons for classes and tutoring of an individual
learning to speak Russian.
3 units, Spr (Gettys, Schupbach)

211. Introduction to Old Church Slavic
not given 1999-2000

212. Old Russian and Old Church Slavic
not given 1999-2000

213. History of the Russian Literary Language—Major structural and
semantic changes from the 10th to the 19th centuries. Prerequisites: 211,
212.
not given 1999-2000

299. Individual Work—For graduate students in Slavic working on
theses or engaged in special work. Prerequisite: written consent of
instructor.
1-12 units, any quarter (Staff)

UNDERGRADUATE AND GRADUATE LITERATURE

115. Humor and Russian Literature—The history of Russian literature
from the standpoint of the humor that it contains, from Old Russian
times to the present. Lectures are in English and may be taken separately
from the discussion sections. (In Russian)
not given 1999-2000

127/227. Boris Pasternak and the Poetry of the Russian Avant
Garde—Pasternak’s work is examined within a broad cultural context to
identify and analyze characteristic features of the Russian avant garde
poetics. Readings in Russian.
4 units, Spr (Fleishman)

129/229. Poetry as System: Introduction to Theory and Practice of
Russian Verse—The history and theory of Russian versification from
the 17th to the 20th century. GER:3a (DR:7)
4 units, Win (Fleishman)

170B/270B. Pushkin in the Romantic Context—(Same as Compara-
tive Literature 170B/270B.) Open to students from comparative and
other literatures, including advanced undergraduates. The ways Pushkin
used current European aesthetic and literary discourses to fashion and
refashion autoportraits in ironic and dynamic interaction. A theoretical
and comparative textual framework is derived from comparative litera-
ture’s study of Romanticism, integrating a variety of perspectives.
Topics: the “fragment” as the quintessentially modern poetic genre; the
morbid elegy as the “genre of entry” for young poets; the real narrative
innovations of Byronism; Russian male “identity” and disempowerment
through the oriental erotic tale; Pushkin’s use of Shakespeare’s chronicle
plays to rewrite Karamzin’s history of Boris Godunov, and his renova-
tion of Gothic conventions for Russian uses; the ability of the concept
“Romantic irony” to shed new light on Eugene Onegin, “Egyptian
Nights,” and Pushkin’s relation to Romanticism.
4 units, Aut (Greenleaf)

185/285. Writing Russia in the Age of Catherine the Great—The
Enlightenment’s boldest experiment: Catherine the Great’s use of west-
ern “regimes of description” (textual and visual) to imagine a legal
Russian state, interactive public spheres and literary culture, and the
parameters of the Russian subject’s interior domain. Catherine’s own
writings, from Shakespearean comedies at the heart of her conception of
a national theater, to her fantasy-impersonations of Europe’s ideal
monarch and her boundary-crossing Autobiography read in the context
of late 18th-century Russian writers’ efforts to produce Golden Age
Culture.
not given 1999-2000

186/286. 18th-Century Russian Literature—Lecture/seminar exam-
ining period literature (poetry, prose, and drama) in its specific cultural
and historical context, with an emphasis on the creation of “modern
Russian literature” as a social institution. The generic diversity of
Russian literature and its relation to Western European models. Close
reading of selected works by major authors, including Lomonosov,
Prerequisite: good reading knowledge of Russian.
4 units, Win (Zorin)

187. Russian Poetry of the 18th and 19th Centuries—Required of all
majors in Russian language and literature; open to undergraduates who
have completed three years of Russian, and to graduate students. The
major poetic styles of the 19th century as they intersected with late
classicism, the romantic movement, and the realist and post-realist
traditions. Representative poems by Lomonosov, Derzhavin, Zhuk-
ovskii, Pushkin, Baratynskii, Lermontov, Tютчев, Некрасов, Пес, So-
loviev. Lectures/discussions in Russian.
not given 1999-2000

188. From Alexander Blok to Joseph Brodsky: Russian Poetry of the
20th Century—(Same as 182.) Required of all majors in Russian
literature. Developments in Russian poetry of the 20th century including
Symbolism, Acmeism, Futurism, and literature of the absurd from
Zinaida Hippius and Andrey Bely to Marina Tsvetaeva and Joseph
Brodsky. Emphasis is on close readings of individual poems. Discuss-
sions in Russian. GER:3a (DR:7)
4 units, Win (Freidin)

189/289. Literature of Old Rus’ and Medieval Russia—From the
earliest times through the 17th century. Lectures on the development of
literary and historical genres and on links between literature and art,
architecture, and religious culture. Readings in English; graduate stu-
dents read in the original.
not given 1999-2000

199. Individual Work—Open to Russian majors or students working on
special projects. May be repeated for credit. Prerequisite: consent of
instructor.
1-5 units, any quarter (Staff)

200. Proseminar in Literary Theory and Study of Russian Litera-
ture—Required of first-year graduate students in Slavic. Introduction to
graduate study in Slavic languages and literatures. Discussion of the
profession, discipline, and literary theory complement theoretical read-
ings and practical exercises in versification and narrative analysis.
4 units, Aut (Freidin)

200A. Introduction to Library and Archival Research in Slavic
Studies—Familiarizes students with major Western language sources
and search methodologies pertaining to the Russian and E. European
are studies. Recommended: knowledge of Slavic languages.
1-3 units, Aut (Freidin)

223A,B. Graduate Seminar: Russian Literature and the Literary
Milieu of the NEP Period—The Problem of Authorship (1921-
1928)—Texts (primarily journal fiction and criticism) deal with the
problem of authorship and are examined in the contemporary literary and
socio-historical context. Emphasis is on non-Party authors (Babel, Eikhe-
baum, Mandelstam, Olesha, Tynianov, Zamiatin, and Zoshchenko).
not given 1999-2000

not given 1999-2000

230C. 20th-Century Russian Literary Theory from Symbolism and Formalism to Semiotics—Survey of Russian theoretical works on literature. The scholarship of Alexander Vesebovsky, Potsevny; theories of Symbolism and Formalism. Symbolist authors (Bely, Blok, Bryusov, Vyacheslav I. Ivanov) are seen in the fusion of their theoretical and poetical work, as the Formalists' school is understood in its correlation to post-Symbolist (Futurists and Acmeist) poetical movements. Postformalist studies of the '30s and '40s (Bakhtin, Florensky, Freydenberg, Polivanov, Propp, etc.) in their relation to contemporary studies of the Prague Circle and the later Moscow-Tartu semiotics school.

not given 1999-2000

240A. Topics in Soviet Civilization: Stalinist Culture in Soviet Russia, 1928-1990—Open to advanced undergraduates and graduates. Seminar on the Stalin era: the First Five-Year Plan in 1928, the Great Retreat and the Great Terror of the second half of the 1930s, the cataclysm of WW II, and the culture of High Stalinism in the postwar period. Focusing on the entire quarter century of Stalinist rule, provides the vicissitudes of an aesthetic and ideological system that was characterized by certain fixed elements and that witnessed significant variations over time. Analysis of the artifacts of Stalinist culture (primarily works of literature, visual arts, and film) in relation to the institutions and elites that produced them and the audiences for which they were intended. The interplay of "texts" (written, visual, and otherwise) and contexts (historical, social, political) is informed by an eclectic set of theoretical perspectives, drawn from the humanities and social sciences. Recommended: knowledge of Russian.

not given 1999-2000

240B. Topics in Soviet Civilization: Stalinist Culture in Soviet Russia, 1928-1953—Open to students who took 240A or equivalent. Guided research and bi-weekly meetings are devoted to the discussion of students' and individual research projects.

not given 1999-2000

270. Pushkin—Pushkin's major poems and prose are accompanied by detailed examination of his cultural milieu. Emphasis is on essential changes in the understanding of literary concepts relevant to this period of Russian literature (poetic genres, the opposition between poetry and prose, Romanticism, etc.).

not given 1999-2000

270C. Pushkin and the Moderns—Graduate seminar pairs a close analysis of Pushkin's major poetic texts with a study of "the Pushkin function" in specific works of 20th-century Russian literature. Prerequisite: knowledge of Russian.

not given 1999-2000

272. Mandelstam and the Modernist Paradigm—His poetry, prose, critical writings, and reception in the context of contemporary letters, scholarship, and politics. The function of poetry in Modern Russian culture. Mandelstam's Acmeist paradigm in Soviet civilization.

not given 1999-2000

278. Tolstoy—Open to exempt undergraduates. Tolstoy's creative evolution from his early and late short fiction (Childhood, The Sevastopol Tales, The Kreutzer Sonata, etc.) and notification (Confession and Anna Karenina), together with the appropriate critical texts. Readings in Russian.

not given 1999-2000

292. Graduate Workshop in Design and Method of Research Projects in Literary and Cultural Studies—Weekly meeting with graduate students working in the area of Russian literature and culture to discuss their nascent and ongoing dissertation projects (A.M. and Ph.D.).

not given 1999-2000

299. Individual Work—For graduate students in Slavic working on theses or engaged in special work. Prerequisite: written consent of instructor.

1-12 units, any quarter (Staff)

305. Russian Critical Traditions—The Russian intelligentsia invested its literature with the highest esthetic and ethical value, then developed a set of critical apparatuses that have inspired Western approaches to text. Readings in theorists from the early 19th to the late 20th century and from the most positivist to the entirely formalist. Possible topics: 19th-century radicals (Belinsky and Dobrolyubov) Future manifestos, the Formalists, Freudian and Marxist models, Bakhtin, and the Tartu semioticians. Readings in English; some familiarity with the Russian canon is presumed.

not given 1999-2000

399A,B,C. Advanced Research Seminar in Russian Literature—Offered as follow-up to 200- or 300-series seminars, as needed. 2-4 units, Aut, Win, Spr (Staff)

AFFILIATED OFFERINGS

HISTORY

322. Graduate Colloquium: Historical Research in Russia, 17th-20th Centuries—Sources, Archives, Paleography 5 units, Spr (Kamenskii)

SOCIOLOGY


Chair: Andrew Walder

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Sociology is concerned with the full spectrum of social behavior (of individuals, small groups, large organizations, communities, institutions, and societies) and provides a strong intellectual background for students considering careers in the professions or business. Students may pursue degrees in sociology at the bachelor's, master's (coterminate), or doctoral levels.

UNDERGRADUATE PROGRAMS

Sociology offers two programs leading to the A.B. degree: the general sociology major and the specialized major. Both are designed around a core curriculum, the intent of which is to ensure adequate coverage of basic sociological knowledge and to provide enough flexibility for tailoring the degree program to fit individual needs and interests. The general major consists of the core curriculum plus a selection of additional
courts intended to provide breadth of exposure to the variety of areas encompassed by sociology. The specialized major consists of the core curriculum plus a concentrated set of courses in one area of sociology. Areas of concentration include Social Psychology and Interpersonal Processes, Organizational Studies, Social Stratification and Inequality, and Political, Economic and Comparative-Historical Sociology. If a specialized major is completed, the student’s transcript will reflect his or her specialized field of study. These programs and the requirements for each are described below.

CORE CURRICULUM AND GENERAL SOCIOLOGY MAJOR

All recipients of the A.B. degree in Sociology must complete a minimum of 60 units of course work in the major. All courses taken to satisfy this 60-unit requirement must be taken for a grade of ‘C-’ or better (except for Sociology 190-193). Related course work from other departments may fulfill part of this requirement, but such work must be approved in advance by a department adviser and must not exceed 15 units. All degree candidates must fulfill the following core requirements:

1. Introduction to Sociology (5). It is recommended that students take it early in their program. It is also suggested for students who are considering a major in Sociology.
2. Methods for Sociological Research (180), or its equivalent.
3. An introductory course in statistics, such as Sociology 181B, Statistics 60, Psychology 60, or equivalent.
4. Classics of Modern Social Theory (170), or an equivalent course in social theory.
5. At least three foundation courses, each from a different area of concentration.
6. Senior Seminar: Honors (200) or Senior Seminar for Majors (201), to be taken by majors during their senior year.

To complete the general Sociology major, the student must complete 20 additional units of work.

SPECIALIZED SOCIOLOGY MAJOR

The department recognizes that some students may wish to engage in more in-depth study than that provided by the major in general Sociology. The specialized Sociology major permits students to pursue a more focused program in one of the four areas of concentration described below. To complete the requirements for the A.B. degree in Sociology with a field designation in Social Psychology and Interpersonal Processes, Organization Studies, Political and Comparative-Historical Sociology, or Stratification and Inequality, the student must (1) complete all the core and foundation curriculum, and (2) complete 20 units of course work in the selected area of concentration.

CONCENTRATION AREAS

Each area identifies a specialized area of inquiry, a set of skills within sociology, and basic preparation for a variety of careers. A brief description of each area follows.

Social Psychology and Interpersonal Processes—This area of inquiry focuses on the social organization of individual identity, beliefs, and behavior; upon social structures and processes which emerge in and define interpersonal interactions. Processes studied include social acceptance and competition for prestige and status, the generation of power differences, the development of intimacy bonds, the formation of expectations which govern performance in task oriented groups, and social pressures to constrain deviance. Foundation courses emphasize the effect of social processes on individual behavior and the analysis of group processes. This area provides excellent training for careers having a significant interpersonal component, including law, management, business, advertising and marketing, medicine and health, education, or social work.

Organizational Studies—This area studies individual behavior within organizations and the behavior of organizations as collective actors, and the factors that affect them. Organizations are the primary tool by which specialized goals are pursued in modern societies; they are found in every sector of modern life. Organizations studied include private profit-making firms and public organizations; voluntary associations and total institutions such as prisons; and small, single purpose companies as well as giant diversified corporations. Foundation courses stress the environmental and technological factors that shape the structure of organizations and the social psychological and interpersonal processes that shape the behavior of individuals within organizations. Careers related to this study include all areas of management and administration: public, business, education; management consulting and analysis; and organizational development.

Social Stratification and Inequality—This area offers a comprehensive overview of various forms of social inequality. It examines the shape and nature of social inequalities; the competition for power; the allocation of privilege; the production and reproduction of social cleavages; and the consequences of class, race, and gender for such outcomes as attitudes, political behavior, and lifestyles. Many courses emphasize changes in the structure of social inequalities over time, and the processes which produce similarities or differences in stratification across nations. Topics include educational inequality, employment history, gender differences, income distributions, poverty, race and ethnic relations, social mobility, and status attainment. Careers related to this field include administration, advertising, education, foreign service, journalism, industrial relations, law, management consulting, market research, public policy, and social service.

Political, Economic, and Comparative-Historical Sociology—This area concerns the emergence, reproduction, and change of political and economic institutions, especially focusing on why and how different political and economic systems appear in different times and places, and how varied are the systems referred to with simple descriptions such as “democracy” or “capitalism.” Transitions among democracy and dictatorship or socialism and capitalism are related to historical patterns and to social structure and organization. The origins and significance for change of social movements, including nationalism and revolutions, are studied in comparative and historical perspective. Careers related to this area include law, government service, and national and international business applications.

CONCENTRATION AREA COURSES

Many of the department courses can be categorized as primarily oriented to one of the four areas of concentration; a few courses are relevant to more than one area. Within each area of concentration, one or more undergraduate foundation courses are identified which provide a general introduction to the area or some portion of it. Courses, classified by area, are as follows:

1. Social Psychology and Interpersonal Processes
   Foundation Courses: 120, 121
   Other Courses: 132, 142, 150, 155, 220-229
2. Organization Studies
   Foundation Course: 160
   Other Courses: 110, 130, 161-169, 260-268
3. Social Stratification and Inequality
   Foundation Course: 140
   Other Courses: 132, 134, 139, 141-149, 150, 240-249
4. Political and Comparative-Historical Sociology
   Foundation Courses: 110, 114, 130
   Other Courses: 111-119, 133, 138, 210-219, 230

MINORS

The minor in Sociology is intended to familiarize students with the basic concepts and methods of the discipline. In addition to ensuring considerable breadth of exposure to the fundamental issues and approaches of the field of sociology, students are encouraged to obtain some depth of exposure to one of the specialized areas of study. The requirements for a minor in sociology are as follows:

<table>
<thead>
<tr>
<th>Course No. and Subject</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Sociology 1: Introduction to Sociology</td>
<td>5</td>
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<tr>
<td>Sociology 180: Methods for Sociological Research</td>
<td>5</td>
</tr>
<tr>
<td>Two Foundation Courses, one each from two of the four concentration areas (e.g., Social Psychology; Organizations; Stratification; Comparative-Historical Sociology)</td>
<td>10</td>
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All courses qualifying for the minor must be taken for a letter grade and receive a grade point average (GPA) of 'C-' or higher.

HONORS PROGRAM

Students desiring to undertake an independent scholarly project under the direction of a faculty member are encouraged to apply for admission to the department's honors program. To enter the program, the student must be accepted by a faculty member of the department who agrees to advise on the research and writing of the essay. It is possible in some cases for students to work with faculty advisers in other departments, but such arrangements must be approved by the chair of the Undergraduate Studies Committee. Admission to the program requires a grade point average (GPA) of 'B+' or higher in courses taken within the major, and an overall GPA of 'B' or higher in all undergraduate course work.

Work on the project can begin earlier, but ordinarily is initiated in connection with meeting the course requirements of Sociology 200, Honors Senior Seminar. Students are encouraged to begin designing their honors project in connection with this seminar, in consultation with the seminar leader and a faculty member who is willing to serve as sponsor for the honor's project. If admitted to the program, the work can then be completed during Winter and Spring Quarters.

To formally enter the program, a student must complete an application form from the department office. The form requires the endorsement of the faculty sponsor and is to be accompanied by a brief description of the project to be undertaken and a copy of the student's undergraduate transcript. Prospective candidates must submit the copy of the completed application to the chair of the Undergraduate Studies Committee no later than the end of the third quarter before graduation (typically Autumn Quarter of the senior year).

Honors students may earn up to 12 units credit for work leading to completion of the required honors thesis (excluding units associated with the Senior Seminar). To be eligible for an honors degree, a grade of 'A-' or better must be earned on the honors thesis. If an 'A-' is not earned, the thesis credit counts toward meeting the standard major requirements.

Successful completion of honors in Sociology requires (1) completion of all requirements for the major; and (2) completion of a thesis of honor's quality (a grade of 'A-' or higher). The thesis is due on or before the beginning of the End-Quarter period in the student's final quarter before graduating. If the thesis has been sponsored by a faculty member outside the department, it must be submitted to both that sponsor and to the chair of the Undergraduate Studies Committee, who appoints a departmental reader to evaluate the paper. Both the sponsor and the reader must agree that the paper merits honors. In every case, two copies of the final paper must be submitted. One is retained by the department and becomes a part of the department's permanent collection.

COTERMINAL MASTER'S PROGRAM

Stanford undergraduate students who wish additional training in sociology (whatever their undergraduate major), and who have a good academic record (ordinarily a GPA of at least 'B+' in their previous undergraduate work), may apply to the coterminal master's program as described in the "Undergraduate Degrees" section of this bulletin.

To apply for admission to the coterminal program, students should submit with the coterminal application the following: (1) a statement of purpose providing the rationale for the proposed program of study, (2) a proposed program that specifies at least 45 units of course work relevant to the degree program and at least 36 units in Sociology, (3) a current undergraduate transcript, and (4) two letters of recommendation from Stanford faculty familiar with the student's academic work.

All 45 course units to be counted toward the graduate degree must be at or above the 100 level; at least 18 course units must be above the 200 level. Because the acquisition of research skills is an important component of graduate training in the social sciences, it is recommended that coterminal students take one or more research methodology courses, for example, Sociology 281A and 281B. A grade of 'B-' or better must be secured in each course satisfying the 45-unit requirement. Most coterminal students propose programs that concentrate on one of the four areas of concentration offered by the department: Social Psychology and Interpersonal Relations; Organization Studies; Political, Economic, and Comparative-Historical Sociology; or Stratification and Inequality. This approach helps to ensure program coherence.

GRADUATE PROGRAMS

University requirements for the A.M. and Ph.D. degree are described in the "Graduate Degrees" section of the bulletin.

Admission—Applicants to the graduate program should have some undergraduate preparation in sociology; however, the department does consider for admission those without such preparation. Each applicant must submit results from the general Graduate Record Examination. The GRE Advanced Tests in Sociology is not required. In addition, foreign students must take the TOEFL exam (a minimum score of 600 is required by the University to be considered for admission). Submission of a writing sample (social sciences paper is preferred) and three letters of recommendation are also required. Admission forms can be obtained from Graduate Admissions, Registrar's Office, Old Union, Stanford University, Stanford, CA 94305-3005. Completed forms should be returned to the Department of Sociology. Students are admitted once each year for graduate study beginning in the Autumn Quarter. The University deadline for receiving applications for admission is January 5, 2000.

MASTER OF ARTS

The department does not admit students who are candidates solely for the A.M. in Sociology. This degree is, however, granted as a step toward the fulfillment of Ph.D. requirements. To receive the A.M., 45 units of approved work must be completed with a grade point average (GPA) of 'B-' or better. All course work must be at 100 level or above; 18 units must be above the 200 level.

Students enrolled in business, education, law, medicine or any other advanced degree program at Stanford may wish to obtain a master's degree in Sociology. In this instance, the usual admission requirements are waived, but course requirements are determined in consultation with the Sociology adviser for doctoral candidates from other departments and schools. All 45 units must be taken in Sociology courses at Stanford. Interested students should contact the department for advance approval of their programs.

DOCTOR OF PHILOSOPHY

The department admits only those students who appear to have the aptitude and qualities to complete the Ph.D. program in the Department of Sociology successfully. The curriculum and degree requirements are designed to provide students with the necessary knowledge and skills to become proficient as both scholars and teachers. The courses and requirements also provide faculty with essential information on the progress of each student and on areas of difficulty or deficiency requiring attention and improvement.

Students must complete the following department requirements for the Ph.D. degree in Sociology:

1. In order to receive a thorough introduction and orientation to the field of sociology, the department, and the faculty, each student must enroll in the Graduate Proseminar. The proseminar is a one-quarter course given during the Autumn Quarter of the first year of residence. One unit of credit is given for this course; grading is on a satisfactory/unsatisfactory basis. The proseminar leader also serves as the academic adviser for all first-year students. After the first year, students are allowed to select their academic adviser from among members of the department's faculty.

2. As partial preparation for becoming an accomplished researcher, each student must complete three quarters of research experience, working under the supervision of faculty members. The experience may involve paid work as a Research Assistant (RA), or unpaid work as a research apprentice, carried out to obtain research experience. Stu-
Students may work with only one, or more than one, faculty member to satisfy the requirement. With the approval of the chair of Graduate Studies, research experience may be acquired by involvement in research projects outside the department, e.g., the American Institute for Research or the Veteran’s Administration Hospital. It is recommended that students complete their research requirements early in their graduate program; the requirement must be completed by the end of the fourth year of residency.

3. As partial preparation for becoming an accomplished teacher, each student must complete three quarters of teaching apprenticeship in departmental courses, serving as a Teaching Assistant (TA) working under the supervision of a faculty member, or as a Teaching Fellow (TF). All students are required to take one–quarter TA training course offered by the department during their first year. In addition, students are expected to take advantage of the department’s and University’s teacher training programs during their first few years of residence. Students for whom English is a second language are expected to acquire sufficient facility in English to be an effective teacher.

4. In order to demonstrate command of a range of sociological literatures, students must take four broad survey courses offered by department faculty. Each year the department specifies which courses meet this requirement, and will undertake to ensure that an adequate selection of such courses is offered. Students should consult with their advisor to ensure that the combination of courses selected to meet this requirement exhibits sufficient breadth. This requirement must be met by the end of the third year of residency.

5. In order to obtain a thorough grounding in sociological theory, each student must take two courses in theory, one in classical sociological theory (Sociology 370 or equivalent), and a course on the development of theory and research design (Sociology 372 or equivalent).

6. In order to obtain a thorough grounding in research methods, each student must complete four courses in methodology (281A, 382, 383, and 384). Students with little background in statistics are encouraged to take Sociology 281B or equivalent.

7. In partial preparation for a career of writing scholarly papers, each student must complete a paper by May 15 of the second year of residency. This second-year paper may be on any sociological topic, and may address theoretical, empirical, or methodological issues. The paper is expected to reflect original work and is considered an important piece of evidence in the decision to advance to candidacy. A two-person committee that includes the primary adviser evaluates the paper. Other faculty outside the department may serve as secondary advisers, but the reading committee must consist of two regular faculty members of the department.

8. In order to demonstrate the ability to conduct independent scholarly work, each student must prepare a dissertation prospectus and pass the University oral examination. The oral exam is intended to evaluate the dissertation prospectus or a partial draft of the dissertation and to assess the student’s knowledge of the relevant theory and research in the area in which the project intends to contribute.

9. Each student must complete a doctoral dissertation. Assessment of satisfactory completion is determined by the student’s doctoral committee members. All students are invited to present their dissertation findings at an informal department colloquium.

The faculty assumes the responsibility to provide students with timely and constructive feedback on their progress toward a degree. In order to evaluate student progress and to identify potential problem areas, the department’s faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring Quarters and again at the end of Spring Quarter. These reviews at the beginning of Winter and Spring Quarters are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough: Each student’s performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first year are usually allowed to complete the requirements to receive an A.M. degree, if this does not involve additional residence or financial support. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strengths and potential weakness.

At the end of the sixth quarter of residency, the faculty again reviews the progress of all doctoral students in the program. Students who are performing well, as indicated by their course work, teaching and research apprenticeship performance, and second-year paper, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are still on probation at this stage may be (1) advanced to candidacy; (2) retained on probation with specification of the steps still required to be removed from this status; or (3) terminated from the program.

Ph.D. MINOR

Sociology offers a minor for School of Education doctoral students. Students must complete a minimum of 30 graduate-level units with a grade point average (GPA) of ‘B’ or better. All 30 units for the minor are to be taken in Sociology courses or in courses taught by Sociology faculty, the exception being statistics or methods courses. Research and directed reading courses are acceptable, but must be approved in advance by the chair of the Graduate Studies Committee. The specific program must be approved by a Sociology adviser and filed with the Department of Sociology.

JOINT PROGRAM WITH THE SCHOOL OF LAW

The faculties of the School of Law and the Department of Sociology conduct joint programs leading to either a combined J.D. or J.M. degree with an A.M. degree in Sociology or to a combined J.D. or J.M. degree with a Ph.D. in Sociology.

Normally, the student interested in pursuing an A.M. degree in Sociology completes one full year of the law program, applying for admission to the Department of Sociology during the first year of law school. If admitted, the student must complete regular Department of Sociology master’s degree requirements. Applications for a joint program must be approved by the Research and Interdisciplinary Studies Committee of the School of Law and by the Department of Sociology. Faculty advisers from both the department and the school participate in the planning and supervise the study program of students admitted to joint degree status.

The joint J.D.-Ph.D. degree program is designed for students who wish to prepare themselves for research or teaching careers in areas relating to legal and sociological concerns. Participation requires application to both the School of Law and the Department of Sociology and acceptance by each. Upon admission, students may elect to begin their study program in either the School of Law or the Department of Sociology. Normally, the student spends the first full year in one program and the second full year in the other. Thereafter, the student may take courses concurrently until requirements for both degree programs have been met.

COURSES

Courses are open to all students without prerequisites, unless specifically indicated. Courses numbered 200-299 are open to advanced undergraduate and graduate students. Courses numbered 300 and above are normally offered to graduate students only. Courses with an ‘X’ suffix are taught at an overseas campus only.
OPEN TO ALL STUDENTS

INTRODUCTORY

1. Introduction to Sociology—Introduces the central concepts, methods, and theoretical orientations of the discipline. Sociological imagination is illustrated by recent theory and research. Possible topics: the persistence of class cleavages; ethnic, racial, and gender inequalities; religious beliefs and the process of secularization; functions and dysfunctions of educational institutions; criminology and social deviance; social movements and social protest; production and reproduction of culture in a changing world. Enrollment limited to 16.

6D. Stanford Introductory Seminar: Transformation of Health Care Systems—Preference to sophomores. Recent changes in the ways health care systems are organized. Readings/discussions of what changes are underway. Each student examines empirically a specific topic or problem by, e.g., tracing the development of one medical care organization as it has attempted to adapt to the new conditions in this sector. Enrollment limited to 12.

5 units, Spr (Scott)

POLITICAL AND COMPARATOR HISTORICAL SOCIOLOGY

110. Politics and Society—(Graduate students register for 210.) Themes of political sociology, the origins and expansion of the modern state, linkages between state and society, the impact of the modern world system on national policies, internal distribution of power and authority, and the structure of political group formation and individual participation in modern states. Emphasizes modern empirical literature. GER:3b (DR:9)

5 units, Spr (McAdam)

112. Comparative Democratic Development—(Enroll in Political Science 116L.)

5 units, Spr (Diamond)

13. Institutional Theories of Nation-States and other Organizations—(Graduate students register for 213.) Reviews the institutional theories and research on the impact of wider environments (including world society as a whole) on nation-state structures, and on organizational forms arising within national societies. Prerequisite: previous work in comparative or political sociology.

5 units (Meyer) given 2000-01

10. The Nature of Health—(Enroll in Human Biology 12.)

3 units, Spr (Barr)

12A. Transitions in World Society: Towards the Global Citizenship—Introduction to the sociological understanding of a changing world environment. The political, economic, and cultural domain issues of the global society and their implications on everyday life.

5 units, Win (Staff)

12B. Transitions in World Society: Immigration and its Urban Context—Builds on 12A, examining immigration as an urban phenomenon in different U.S. cities; immigrants' disproportionate concentration in the central cities and their contribution to the changing economic and ecological characteristics of cities; and interactions between new immigrants and existing racial and ethnic groups in a shared urban space.

5 units, Spr (Staff)

22N. Stanford Introductory Seminar: The Roots of Protest—Preference to freshmen. Comparison of the women's, environmental, peace, and civil rights movements, and race/ethnic conflict in the U.S., Western Europe, South Africa, and other settings. Enrollment limited to 16.

5 units, Spr (Olzak)

25N. Stanford Introductory Seminar: Understanding the Sixties—Preference to freshmen. A grounded sociological explanation for the political and cultural turbulence that marked the 1960s and its ambiguous contemporary legacy. Enrollment limited to 16.

5 units, Win (McAdam)

40N. Stanford Introductory Seminar: Gender and Interaction in the U.S.—Preference to freshmen. The diverse effects of gender on patterns of interaction, and the role of these interactional patterns in the maintenance of gender inequality in U.S. society. Enrollment limited to 16.

5 units, Win (Ridgeway)
socialist economy; the reorganization of rural society and urban work-places; the emergence of new inequalities of power and opportunity; and
the new forms of social conflict during Mao’s Cultural Revolution of
1966-69 and its aftermath. GER:4a (DR:2)
5 units, Win (Walder)

118. Social Movements and Collective Action—(Graduate students
register for 218.) Contemporary research on social movements and
collective action. The strategies used by researchers for collecting and
analyzing information on collective events, protests, conflicts, and social
movements organizations. Analysis of different theories and methods
that try to account for the rise and fall of social movement activity over
time. GER:3b (DR:9)
5 units, Spr (Olszak)

119. Political, Social, and Economic Structures of Modern States—
(Graduate students register for 219.) The basic features of the political,
social, and economic structures of modern states and alternative theories
of how these structures evolve and are related to one another. Case
studies of major states elucidate various theories and arguments. Empha-
sis is on the former socialist states and their attempts to forge new
political and economic structures. Comparisons of these transformations
to one another and to the structures in democratic states with established
markets, and the issues concerning the interdependencies of societal
structures.
5 units, given 2000-01

130. Education and Society—(Graduate students register for 230; same
as Education 220C.) The effects of schools and schooling on individuals,
the stratification system, and society. Education as socializing individu-
als and as legitimizing social institutions. The social and individual
factors affecting the expansion of schooling, individual educational
attainment, and the organizational structure of schooling. GER:3b (DR:9)
4-5 units, Aut (Staff)

131. World, Societal, and Educational Change: Comparative Perspec-
tives—(Graduate students register for 231; same as Education 136.)
Analysis of the relations between educational and societal developments
from a comparative perspective. Readings on various theoretical perspec-
tives and empirical studies on the structural and cultural sources of
educational expansion and differentiation, and on the cultural and
structural consequences of educational institutionalization. Research
topics: education and nation-building; education, mobility, and equality;
education, international organizations, and world culture.
3-5 units, Aut (Ramirez)

133. Computers and Interfaces: Psychological and Social Issues—
(Graduate students register for 233; enroll in Communication 169.)
5 units, Spr (Nass)

136. Law and Society—(Graduate students register for 236.) Sociologi-
cal approaches to the study of law and the legal system; lectures on
theoretical perspectives with examples from legal settings. Topics:
central philosophical debates in the sociology of law; the social-psycho-
lological foundations of legal behavior; relations between law and the
economy, stratification, culture, ideology, and social change. Contem-
porary legal issues (crime, litigiousness, civil rights, etc.) provide oppor-
tunities to link sociological theories with current events. Prerequisite: 1.
5 units, Spr (Creighton)

138. American Indians in Comparative-Historical Perspective—
(Graduate students register for 238.) Comparative historical framework
surveys the demographic, political, and economic processes and events
that shaped relations between Euro-Americans and American Indians
from 1600 to 1890. How the intersection of these processes affected the
outcome of conflicts between these two groups, and how this conflict was
decisive in determining the social position of American Indians in the late
19th century and the evolution of the doctrine of tribal sovereignty.
GER:4c (DR:1)
4-5 units, Win (Ramirez)
139. American Indians in Contemporary Society—(Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions, e.g., tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history. GER:4b (DR:3)
5 units, Spr (Snipp)

140. Introduction to Social Stratification—(Graduate students register for 240.) Introduction to social stratification theory and research. The shape and nature of social inequalities; competition for power; allocation of privilege; production and reproduction of social cleavages; and the consequences of class, race, and gender for such outcomes as attitudes, political behavior, and lifestyles. Topics: distribution of educational opportunities and cultural capital; labor market segmentation by race, ethnicity, and gender; status attainment and occupational mobility; income inequalities and urban poverty; class differences in consciousness, values, and lifestyles. GER:3b (DR:9)
5 units, Aut (Tatoma)

141. Introduction to Social Networks—(Graduate students register for 241.) Introduction to social network theory, methods, and research. Basic network concepts (e.g., density, homogeneity, and centrality) are defined and applied to a variety of substantive areas. The impact of social network structure on individuals and groups in such areas as communities and neighborhoods, families, work life, and innovations.
5 units, given 2000-01

142. Sociology of Gender—(Graduate students register for 242C.) Gender inequality in contemporary American society with different explanations for how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Three analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes. Arguments and evidence for each approach. The social consequences of gender inequality, e.g., the feminization of poverty and problems of interpersonal relations. GER:4c (DR:+)
3-5 units, Spr (Ridgeway)

144. Inequality: Theoretical and Comparative Perspectives—(Graduate students register for 244.) Surveys the main classical and modern explanations of political, social, and economic inequality, investigating how well these explanations fit a wide range of societies. Cases: technologically simple African tribes, the Indian caste system, social class, poverty and the "underclass" in the U.S., and changing systems of inequality in the former socialist societies as they undergo transition to more market-like economies. Issues: the relative importance of economic vs. political forces creating and sustaining inequality, the significance of ethnicity and gender, and the possible role of social policy in reducing inequality.
5 units, Win (Granovetter)

145. Race and Ethnic Relations—(Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. Analysis of the processes that render ethnic and racial boundary markers (e.g., skin color, language, culture) salient in interaction situations. Explanations of why only some groups become targets of ethnic attacks. Analysis of the social dynamics of ethnic hostility and ethnic/racial protest movements. GER:3b (DR:9)
5 units, Win (Olzak)

149. The Urban Underclass—(Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Analysis of ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor. GER:3b (DR:9)
5 units, given 2000-01

151A. Asians in America: Trends and Issues—Introduction to selected topics and issues facing contemporary Asian American communities, including debunking the model minority stereotype, economic sociology of Asian Americans, and panethnic identity and political empowerment.
5 units, Spr (Staff)

ORGANIZATIONAL STUDIES

5 units, Aut (Freelander)

161. Organizational Ecology—(Graduate students register for 261.) Recent research on populations of market and non-market organizations. The processes determining when new organizations emerge, what forms they assume, and how long they last. Relations between organizations and the environment, and the competitive, commensal, and symbiotic relations that tie organizations together.
5 units (Hannan) given 2000-01

161A. Theory and Practice of Formal Organizations—(Graduate students register for 261A.) Within the framework of organizational theories, how organizations seek to adapt to their environments in consideration of the following issues: What are the mechanisms used by organizations to find out the demands of society? How do organizations determine their goals? What are the mechanisms of organizational learning and change?
5 units, Win (Staff)

162. Organizations: Then, Now, Next—(Graduate students register for 262A.) The sociology of organizations, emphasizing historical changes in social structures. Organizations have become important collective social actors during the last 150 years, and have undergone important changes. The development and spread of organizations, changes in them over time, and their causes.
5 units, given 2000-01

163. Work, Organization and Society—(Graduate students register for 263A.) Introduction to the sociological study of work—its personal, economic, and cultural significance. The types and qualities of work; work’s social and technical organization into projects, firms, unions, and professions; its regulation by the state, and its systemic role in segmenting and stratifying society.
5 units, Win (Staff)

164. Firms, Markets and States—(Graduate students register for 264.) The relationship between business organizations, state economic policies, and market competition. The ways in which state intervention and broad institutional factors influence and delimit the organization of firms. The ways in which such factors create different forms of market competition.
5 units, Win (Freeland)

165. Identity and Organizational Culture—(Graduate students register for 265.) Introduction to the study of organizational culture and identity. What are organizational cultures? What are their functions and characteristics? Can organizational cultures be managed? How do organizational cultures shape their members’ identities and sense of self? How do members cope with the demands of their organizational identities? Guided by theories of culture and identity, the answers are explored in four case studies.
5 units, given 2000-01

166. Organizations and Public Policy—(Graduate students register for 266; same as Public Policy 102A.) Concepts and methods for analyzing the influence of organizations on the setting and implementation of public policy. Varying conceptions of organizations as corporate actors
and as social contexts. The roles of organizations in relation to public policy; organizations as decision makers and problems solvers, as change agents, and as clients. Prerequisite: 160 or Industrial Engineering 100. GER:3b (DR:9)

3 units, Win (Creighton)

169. Health Care in America—(Enroll in Human Biology 160.)
3 units, Aut (Barr)

SOCIOLOGICAL THEORY

170. Classics of Modern Social Theory—The enduring contributions of Karl Marx, Max Weber, and Emile Durkheim to contemporary sociology. Topics: the problem of social order and the nature of social conflict; capitalism and bureaucracy; the relationship between social structure and politics; the social sources of religion and political ideology; and the evolution of modern societies. Examples from contemporary research illustrate the enduring impact of these traditions.

5 units, Win (Freeland)

RESEARCH METHODS

180. Methods for Sociological Research—(Graduate students register for 380.) Introduces the methods used in contemporary sociological research, focusing on strategies for designing research and analyzing data.

5 units, Aut (Mark)

181A. Sociological Methods IA: Computer Assisted Data Analysis—(Graduate students register for 281A.) For Sociology majors only. Introduction to the computer as a research tool and to common data sets in the social sciences. Emphasis is on development of the necessary skills for other courses in sociology methodology. Enrollment limited to 15.

2 units, Aut (Hironaka)

181B. Sociological Methods IB: Statistics—(Graduate students register for 281B.) Emphasizes the statistical methods of principal relevance to sociology: contingency tables, correlation, and regression. Recommended: 181A/281A. GER:2c (DR:4)

5 units, Spr (Staff)

INDIVIDUALIZED LEARNING EXPERIENCES, PRIMARILY FOR UNDERGRADUATE MAJORS

190. Undergraduate Individual Study
1-5 units (Staff)

191. Undergraduate Directed Research—Work on a project of one's own choice under the close supervision of a faculty member. Prior arrangement required.
1-5 units (Staff)

192. Undergraduate Research Apprenticeship—Work in an apprentice-like relationship with specific faculty member(s) on an on-going research project. Prior arrangement required.
1-5 units (Staff)

193. Undergraduate Teaching Apprenticeship
1-5 units (Staff)

196A,B,C. Honors Thesis—Work intensively on an honors thesis project under faculty supervision (see description of honors program). Must be arranged early in the year of graduation, or before.
1-15 units (Staff)

200. Senior Seminar: Honors—For majors accepted in the honors program. The student brings together theory, methods, and substantive courses by illustrating the ways in which sociological problems are framed, linked to theories, and answers pursued through appropriate research designs. (WIM)

5 units, Aut (Bienenstock)

201. Senior Seminar for Majors—Capstone course in which sociological problems are framed, linked to theories, and answers pursued through appropriate research designs.

5 units, Spr (Cook)

FOR ADVANCED/COTERMIMAL UNDERGRADUATES AND GRADUATE STUDENTS

INTRODUCTORY

205. Status, Friendship, and Social Pressure: An Experiential Approach—For graduate students; see 5.

5 units, given 2000-01

POLITICAL AND COMPARATIVE-HISTORICAL

210. Politics and Society—For graduate students; see 110.

5 units, Spr (McAdam)

213. Institutional Theories of Nation-States and other Organizations—For graduate students; see 113.

5 units (Meyer) given 2000-01

214. Economic Sociology—For graduate students; see 114.

5 units, Aut (Granovetter)

215. Topics in Economic Sociology—For graduate students; see 115.

5 units, Win (Granovetter)

216. Comparative Sociology: Successor States of Soviet Union—For graduate students; see 116.

5 units, Aut (Tuma)

217. China's Social Transformation—The implications of China's transition to a market economy for social stratification and mobility, property rights and economic organization, and political organization and authority. Critical overview of recent scholarship, identifying promising questions for further research.

5 units (Walder) given 2000-01

217A. Social Impact of the Chinese Revolution—For graduate students; see 117A.

5 units, Win (Walder)

217B. Seminar: Chinese Communist Revolution—Examines the evolving interpretations of the Chinese Communist Revolution of 1921-1955 against the background of the theoretical literature on the revolutionary process. How have the interpretations of the communist revolution changed over time? Why? What contributions to the theoretical literature on revolution can the Chinese case make, now that such an extensive empirical literature exists?

5 units (Walder) given 2000-01

218. Social Movements and Collective Action—For graduate students; see 118.

5 units, Spr (O EZak)

219. Political, Social, and Economic Structures of Modern States—For graduate students; see 119.

5 units, given 2000-01

230. Education and Society—For graduate students; see 130.

5 units, Aut (Schofer)

231. World, Societal, and Educational Change: Comparative Perspectives—(Same as Education 306D.) For graduate students; see 131.

5 units, Aut (Ramirez)

233. Computers and Interfaces: Psychological and Social Issues—(Enroll in Communication 269.) For graduate students; see 133.

4 units, Spr (Nass)
236. Law and Society—For graduate students; see 136.
5 units, Spr (Creighton)

238. American Indians in Comparative-Historical Perspective—For
graduate students; see 138.
5 units, Win (Snipp)

SOCIAL PSYCHOLOGY AND INTERPERSONAL PROCESSES
220. Interpersonal Relations—For graduate students; see 120.
3-5 units, Aut (Ridgeway)

221. Social Psychology and Social Structure—For graduate students;
see 121.
5 units, Win (Bienenstock)

222. Sociology of Culture—The major theoretical approaches to cul-
ture, including cultural capital theory, rational choice, symbolic inter-
actionism, and structuralism. The adequacy of explanations offered by
different theories for major empirical findings in the sociology of culture.
Emphasis is on the relationship between culture and social structure.
5 units, given 2000-01

223. Gender, Interaction, and Inequality—Seminar on the diverse
effects of gender on patterns of interaction and the role of these interac-
tional patterns in the maintenance of gender inequality in U.S. society.
The empirical evidence for gender effects in interaction, major theore-
tical perspectives for explaining them, and the implications of these
perspectives for analyzing gender inequality. Emphasis is on the critical
evaluation of the theories in light of the evidence. Topics: power and
power use, influence, social emotional behavior, nonverbal behavior,
and language in interaction.
5 units (Ridgeway) given 2000-01

224. Interaction Processes in Education: Design and Evaluation—
(Same as Education 312.) The educational applications of sociological/
social psychological theory and research to classroom processes, staff
relations, teams, and task forces. The principles for the design and
evaluations of group-work for students and teamwork for teaching staff.
Topics: the social process of influence, role differentiation, and evalua-
tion. Methods for systematic evaluation and observation. Students re-
ceive practical experience in using these methods.
4 units (Staff) not given 1999-2000

225. Sociology of Religion—For graduate students; see 125.
5 units, Spr (Mark)

227. Bargaining, Power and Influence in Social Interaction—For
graduate students; see 127.
5 units, Win (Cook)

SOCIAL STRATIFICATION AND INEQUALITY
232. Problems in Sociology of Education—(Graduate students regis-
ter for 330; same as Education 210.) Introduction to sociological ap-
proaches to the educational phenomena. Topics: school organization and
environment, the relationship of education to adult roles, the impact of
social class and ethnicity on classroom learning, and the social structure
of the classroom. Read/evaluate social sciences research. Short written
assignments and individual feedback.
4 units, Spr (Ramirez)

239. American Indians in Contemporary Society—For graduate
students; see 139.
5 units, Spr (Snipp)

240. Introduction to Social Stratification—For graduate students; see
140.
5 units, Aut (Titma)

241. Introduction to Social Networks—For graduate students; see 141.
5 units, given 2000-01

242. Sociology of Gender—For graduate students; see 142.
3-5 units, Spr (Ridgeway)

244. Inequality: Theoretical and Comparative Perspectives—For
graduate students; see 144.
5 units, Win (Granovetter)

245. Race and Ethnic Relations—For graduate students; see 145.
5 units, Win (Olzak)

249. The Urban Underclass—For graduate students; see 149.
5 units, given 2000-01

ORGANIZATIONAL STUDIES
260. Formal Organizations—For graduate students; see 160.
5 units, Aut (Freeland)

261. Organizational Ecology—For graduate students; see 161.
5 units (Hannan) given 2000-01

261A. Theory and Practice of Formal Organizations—For graduate
students; see 161 A.
5 units, Win (Staff)

261B. Women in Organizations—(Same as Business 387R.) Business
cases, exercises, videos, class discussions, and guest speakers are used to
explore issues relevant to women's working experiences in managerial
and professional positions. Topics: cross cultural differences in women's
experiences, women's networking patterns, fair pay and promotion
issues, management styles, and strategies of women entrepreneurs.
4 units, Spr (Martin)

262. Organization and Environment—(Same as Business 672R.) Seminar considers alternative theoretical approaches useful for analyz-
ing organization-environment and inter-organizational relations.
Approaches: resource dependence, population ecology of organizations,
and Williamson's markets and hierarchies. Perspectives analyze merg-
ers and vertical integration, joint ventures, interlocking directorates, and
organizational forms and structures. Prerequisite: consent of instructor.
5 units (Haunschild)

262A. Organizations: Then, Now, Next—For graduate students; see 162.
5 units, given 2000-01

263. Cultures in Organizations—(Same as Business 386R.) Use of
case studies, individual and group papers, exercises, videos, guest
speakers and a field project to decipher the meanings of various cultural
manifestations, including stories, rituals, informal norms, and formal
policies and practices. Cultures in organizations are viewed as sources of
conflict, power, ambiguity, and value consensus.
4 units, Win (Martin)

263A. Work Organization and Society—For graduate students; see 163.
5 units, Win (Staff)

264. Firms, Markets, and States—For graduate students; see 164.
5 units, Win (Freeland)

265. Identity and Organizational Culture—For graduate students; see
165.
5 units, given 2000-01

266. Organization and Public Policy—For graduate students; see 166.
5 units, Win (Creighton)
267. Institutional Analysis of Organizations—Reading and research on the nature, origins, and effects of the modern institutional system. Emphasis is on the effects of institutional systems on organizational structure.
3-5 units, Spr (Scott)

RESEARCH METHODS

281A. Sociological Methods IA: Computer Assisted Data Analysis—For graduate students; see 181A.
2 units, Aut (Hironaka)

281B. Sociological Methods IB: Statistics—For graduate students; see 181B.
5 units, Spr (Staff)

PRIMARILY FOR GRADUATE STUDENTS

GENERAL

300. Workshop: Teaching Development—For graduate students in sociology with little or no teaching experience. Students learn the fundamental principles essential for becoming an effective instructor, advisor, and mentor to undergraduates. Topics: ethics, course organization and syllabus development, issues related to test construction and grading, conflict resolution, common classroom problems, and university policies related to matters such as sexual harassment. Technologies and other topics related to making effective presentations, and campus resources that may be used to improve classroom performance. Roundtable discussions with faculty and advanced graduate students known for teaching excellence. Students may be asked to give a demonstration lecture subject to critique and discussion.
2 units, Spr (Staff)

305. Graduate Proseminar—For first-year Sociology doctoral students only. Introduction and orientation to the field of Sociology.
1 unit, Aut (Staff)

308. Social Demography: Theories, Methods, and Data—For graduate students and advanced undergraduates interested in the study of demography. Topics: models of fertility behavior, migration models, stable population theory, life table analysis, data sources, and measurement problems. How population behavior affects social processes, and how social processes influence population dynamics. Recommended: knowledgeable about sociological research methods, and have a basic understanding of regression analysis and log linear models.
5 units, Spr (Snipp)

POLITICAL AND COMPARATIVE-HISTORICAL

310. Issues in Political and Comparative/Historical Sociology—For Sociology doctoral students only. Major theoretical and empirical issues in macrosociology.
2 units, given 2000-01

311A,B,C. Workshop: Comparative Studies of Educational and Political Systems—(Same as Education 387 A,B,C.) Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor.
2-3 units, Aut, Win, Spr (Ramirez, Meyer)

312A,B,C. Workshop: Collective Action and Social Movements—Issues of research design, data gathering, measurement, and analysis of evidence on the occurrence of race and ethnic collective action. Prerequisite: consent of instructor.
1-5 units, Aut, Win, Spr (Olzak)

313A,B,C. Workshop: Political Sociology in Comparative and Domestic Perspective—Focus is on presentations by workshop participants and guest speakers on their work in the field of political sociology; general discussions of contemporary issues. Prerequisite: consent of instructor.
2-5 units, Aut, Win, Spr (McAdam)

315A,B,C. Workshop: Economic Sociology—Theory, methods, and research in the sociology of the economy. Possible activities: participation in ongoing research projects; instruction in new methods; and presentation of ongoing research by students, faculty, or visiting speakers. Prerequisite: registration in a graduate program or consent of the instructor.
2-5 units, Aut, Win, Spr (Granovetter)

318. Sociological Perspectives on Transitional Societies—Critical examination of the emerging research literature on social change in Eastern Europe, the former Soviet Union, and China, providing a critical understanding of the state of the field, and of the emerging models and new data sources employed in current research.
5 units, Aut (Tuma, Walder)

SOCIAL PSYCHOLOGY AND INTERPERSONAL PROCESSES

320. Foundations of Social Psychology—Major theoretical perspectives in interpersonal processes and social psychology. The basic principles, assumptions, and substantive problems associated with each perspective; techniques of investigation and methodological issues. Perspectives: symbolic interaction, social structure and personality, cognitive, and group processes.
5 units (Ridgeway) given 2000-01

321A,B. Workshop: Social Psychology—Current theories and research agendas, critical reviews of recent publications, presentations of ongoing research by faculty and students. Prerequisite: consent of instructor.
2-5 units, Aut, Win (Ridgeway)

322. Social Interaction, Social Structure, and Social Exchange—Current theoretical perspectives and research on such topics as social cognition and social identity, group processes, bargaining and negotiation, social justice, social dilemmas, and social exchange, and networks and collective action. Students gain a broad knowledge of the sociological perspective on social psychology and a deeper knowledge of the social exchange approach.
5 units, Win (Cook)

324. Social Exchange Theory—A review of the classic exchange theory literature: Homans, Blue, Emerson and Thibaut, Kelley, Malinowski, Mauss, and Levi-Strauss; empirical and contemporary work on exchange illustrates which ideas of the classical theories have survived and how they have evolved.
5 units, Win (Bienenstock)

326A,B. Workshop: Sociology of Culture—Current theories and research agendas, critical reviews of recent publications, presentations of ongoing research by faculty and students. Prerequisite: consent of instructor.
2-5 units, Aut, Win, Spr (Mark)

342. Seminar in Social Networks—Advanced concepts and techniques (e.g., semigroups, block-modeling, duality, structural equivalence) in the analysis of social networks. Examples show their applicability to such topics as success in the art world, the formation and operation of interlocking directorates, the behavior of children in impoverished role structures, and the world system. How to use network concepts and methods to analyze empirical data. Prerequisite: 141 or 241, or consent of the instructor.
5 units (Bienenstock) given 2000-01

SOCIAL STRATIFICATION AND INEQUALITY

330. Problems in Sociology of Education—(Same as Education 310.) For graduate students; see 232.
4 units, Spr (Ramirez)

340. Social Stratification—Classical and contemporary approaches to understanding the differential distribution of valued goods and the social
processes by which such inequality comes to be seen as legitimate, natural, or desirable. Introduction to modern analytic models of the effects of social contacts, cultural capital, and "luck" in generating inequality; the role of educational institutions in perpetuating and undermining modern forms of stratification; the causes and consequences of stratification by race and gender; the structure of social classes, status groupings, and prestige hierarchies in past and present societies; the sources of "labor markets" and their functions in early and advanced industrialism; the implications of social stratification for individual lifestyles, consumption patterns, and personality traits; and the rise of the "new class," the "underclass," and other emerging forms of stratification under post-industrialism.

5 units, given 2000-01

34A, B, C. Workshop: Social Stratification—Stratification theory and research for advanced students. Current theories and research agendas, critical reviews of recent publications, presentations of ongoing research by faculty and students. Prerequisite: registration in a Ph.D. program or consent of instructor.

1-5 units, given 2000-01

343. Workshop on Sociology of Gender—Workshop on current theories and research agendas, critical reviews of recent publications, and presentations of ongoing research by faculty and students. Prerequisite: consent of instructor.

2-5 units, Spr (Ridgeway)

ORGANIZATIONAL STUDIES

361. Seminar: Social Psychology of Organizations—(Same as Business 671R.) Selected curriculum issues in social psychology relevant to behavior in organizations. Prerequisite: consent of instructor.

4 units (Morris)

363. Social and Political Processes in Organizations—(Same as Business 676R.) Focus is on cognition, attitudes, and behavior in organization, drawing on psychological and sociological research at the "meso" level of analysis. Topics vary each year, including organizational learning and decision making; power and conflict; emotions in organizations; mobility and stratification; gender inequality and discrimination; networks; organizational justice and legitimacy; cultural perspectives on organizations, etc. No auditors. Prerequisite: enrollment in a Ph.D. program.

4 units, Win (Martin)

363A. Seminar on Organization Theory—(Same as Education 375A.) For doctoral-level students or equivalents. Provides a thorough grounding in the social science literature on organizations. Readings are organized historically, and introduce the major theoretical perspectives and debates.

5 units, Win (Powell, Scott)

363B. Seminar on Organizations: Theory and Application—(Same as Education 375B.) Continuation of 363A. Focus is on contemporary applications of organization theory in the examination of political, educational, and business organizations.

5 units, Spr (Powell, Scott)

364. Organizations as Governance Structures—Introduction to a body of work that treats organizations as governance structures that coordinate transactions between firms while creating and maintaining cooperation within firms. In-depth reading of economic accounts of the firm (transaction cost economics, agency theory, and related approaches) and of competing explanations of governance that have emerged in the recent sociological literature.

5 units, Aut (Freeland)

366. Workshop on Organizational Ecology—Workshop for designing, collection, and analysis of data on long term change in populations and communities of organizations. Prerequisite: 360, consent of the instructor.

5 units (Hannan)

369. Macro-Sociological Perspectives of Organizations—Core problems in the sociology of organizations, main theoretical perspectives, and research programs directed at evaluating these perspectives. Prerequisite: registration in a Ph.D. program.

5 units (Hannan)

SOCIOLOGICAL THEORY

370. Sociological Theory—Introduces theoretical strategies in sociological analysis selected from among functionalism, historical materialism, human ecology, the theory of action, symbolic interactionism, social phenomenology, decision theory, and behaviorism, illustrated by one or more programs of theoretical research originating in the classical literature (e.g., Durkheim, Marx, Weber, et al) still active in the contemporary literature. Some elementary methods are required to intelligently read and analyze theory.

5 units, Win (Walder)

372. Theoretical Analysis and Design—Teaches skills in theoretical analysis and the logical elements of design, including the systematic analysis of the logical structure of arguments, the relationship of arguments to more encompassing theoretical or meta-theoretical assumptions, the derivation of logical implications from arguments, assessments of theoretically significant problems or gaps in knowledge, etc.

5 units, Spr (Zelditch)

RESEARCH METHODS

380. Introduction to Sociological Research—Same as 180 but restricted to Ph.D. candidates in Sociology or Sociology of Education.

5 units, Aut (Mark)

382. Sociological Methodology II: The General Linear Model—The general linear model for discrete and continuous variables. Introduction to the principles of estimation, model selection, specification error, and assessment of fit. Prerequisites: 281A,B, or equivalents.

4-6 units, Win (Tuma)


3-6 units, given 2000-01

384. Sociological Methodology IV: Advanced Models for Continuous Outcomes—The rationale for and interpretation of static and dynamic models for the analysis of continuous variables. Topics: structural-equation models, latent-variable models, times-series models, and pooled cross-section and time-series models. Evaluation at first class meeting determines whether students have the appropriate background.

4-6 units, Aut (Bienenstock)

385. Seminar: Measurement in the Social Sciences—The principles and problems of measurement in the social sciences within the context of causal modeling. Methodological approaches, from traditional factor analysis methods to recent developments in the causal modeling of error structures. Emphasis is on the utility of multiple indicator approaches to social measurement.

5 units, given 2000-01


5 units (Tuma) given 2000-01
387. Seminar: Frontiers of Quantitative Sociological Research—Advanced topics in quantitative sociological research, especially recently-developed models and methods. Possible topics: robust regression methods, boot-strapping, local likelihood estimation, quantile regression, two-sided logit models, event count models, event sequence models, heterogeneous diffusion models, and models for change in social networks.
3-5 units (Tuma) given 2000-01

388. Advanced Models for Analysis of Tabular Arrays—Analysis of categorical data with log-linear, log-multiplicative, latent class, latent trait, Markov, Rasch, and related models.
5 units, given 2000-01

389. Topics in Mathematical Sociology
5 units (Bienvenido) given 2000-01

GRADUATE INDIVIDUAL STUDY

390. Graduate Individual Study
(Staff)

391. Graduate Directed Reading
(Staff)

392. Research Apprenticeship
(Staff)

393. Teaching Apprenticeship
(Staff)

394. Thesis
(Staff)

395A, B, C. Research Internship—Graduate students engage in internship work and integrate that work into their academic program. Students register in the quarter following internship work and complete a research report outlining their work activity, problems investigated, key results, and any follow-up projects they expect to perform. Meets requirements for Curricular Practical Training for students on F-1 visas. Work completed cannot be counted toward the departmental research assistantship requirement.
(Staff)

OVERSEAS STUDIES

These courses are approved for the Sociology major and taught at the campus indicated. Students should discuss with their major advisers which courses would best meet educational needs. Course descriptions can be found in the "Overseas Studies" section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

OXFORD

117W. Social Change in Modern Britain
4-5 units, Au (Davies)

SANTIAGO

111. Social Heterogeneity in Latin America
5 units, Au (Valdes)

CENTER FOR SPACE SCIENCE AND ASTROPHYSICS


Director: Robert V. Wagener
Associate Directors: Umran S. Inan, Roger W. Romani, Philip H. Scherrer


Associate Professors: Bruce B. Lusignan, Roger W. Romani

Assistant Professors: Sarah Church, Guenther Walther, Jeffrey Willick

Professors (Research): C-W. Francis Evrict, Antony Fraser-Smith, Philip H. Scherrer

Consulting Professors: Alan M. Title, Martin Walt

The center is an interdepartmental organization coordinating teaching and research in space science and astrophysics. Its members are drawn from the Department of Geological and Environmental Sciences in the School of Earth Sciences; the departments of Aeronautics and Astronautics, Electrical Engineering, and Mechanical Engineering in the School of Engineering; the departments of Applied Physics, Physics, and Statistics in the School of Humanities and Sciences; the W. W. Hansen Experimental Physics Laboratory, and the Stanford Linear Accelerator Center.

Research now in progress covers a wide array of investigations and is approached in a variety of ways, including experiments flown on rockets, satellites, and space probes; ground-based observations made from the Hobby-Eberly Telescope, the Wilcox Solar Observatory, and from national observatories; and theoretical research including computer modeling. Topics currently being studied include cosmology, gamma-ray astronomy, gravitation theory and experiments, guidance and control, high-energy astrophysics, ionospheric and magnetospheric physics, microwave and infrared astronomy, planetary sciences, solar physics, solar-terrestrial phenomena, stellar structure, theoretical astrophysics, x-ray and extreme ultraviolet astronomy, and the study of life in the universe. Some of these projects involve opportunities for collaboration with scientists at the Lockheed-Martin Research Laboratory through the Stanford-Lockheed Institute for Space Research, the NASA-Ames Research Center, and the SETI Institute.

Stanford is a member of the Universities Space Research Association, a consortium of universities which operates the Lunar Science Institute in Houston, Texas; the University Corporation for Atmospheric Research in Boulder, Colorado; and the San Diego Supercomputing Consortium.

Stanford is the lead institution for the EGRET experiment at the Compton Gamma Ray Observatory and the Solar Oscillations Investigation on the Solar and Heliospheric Observatory spacecraft (SOHO), and participates in the Soft X-Ray Telescope program on the Japanese Yohkoh spacecraft.

Stanford is also a member of the Hobby-Eberly Telescope Consortium which has constructed a 10-meter telescope at the McDonald Observatory of the University of Texas. Full science operations are scheduled to start in Autumn 1999.

The facilities of the center are available to any interested and qualified student, who must be admitted by and registered in a department. The departments of Aeronautics and Astronautics, Applied Physics, Electrical Engineering, Mechanical Engineering, and Physics offer opportunities leading to an M.S. or Ph.D. degree for work in space science or astrophysics. The center also offers opportunities to undergraduates who may, for instance, participate in research projects in their junior or senior years, on a part-time basis during the school year or on a full-time basis during the summer. The Astronomy Course Program operates a small student observatory where students may gain practical experience in astronomical observing. The course list at the end of this entry includes courses of interest to undergraduates as well as courses primarily of interest to graduate students.

Further information is available from the director.

COURSES

For descriptions, see the listings under the department's section of this bulletin.
AERONAUTICS AND ASTRONAUTICS
213. Atmospheric Entry
236A,B,C,D. Spacecraft Design
279. Space Mechanics
283. Aircraft and Rocket Propulsion
290. Problems in Aeronautics and Astronautics

ELECTRICAL ENGINEERING
106. Planetary Exploration
249. Introduction to the Space Environment
350. Radioscience Seminar
352. Electromagnetic Waves in the Ionosphere and Magnetosphere
354. Introduction to Radio Wave Scattering
356. Elementary Plasma Physics: Principles and Applications
358. Geomagnetically Trapped Radiation

ENGINEERING
235A,B. Space Systems Engineering

PHYSICS
15. The Nature of the Universe
16. Cosmic Horizons
18N. Stanford Introductory Seminar: Revolutions in Concepts of the Cosmos
27. Evolution of the Cosmos
50. Astronomy Laboratory and Observational Astronomy
81Q. Stanford Introductory Seminar: Lookback Time in Cosmology
82Q. Stanford Introductory Dialogue: Expanding Cosmic Horizons
100. Introduction to Observational and Laboratory Astronomy
160. Introduction to Stellar and Galactic Astrophysics
161. Introduction to Extragalactic Astrophysics and Cosmology
260. Introduction to Astrophysics
262. Introduction to Gravitation
301. Astrophysics Laboratory
304. Physics of Astrophysics
361. Stellar and Galactic Astrophysics
362. Extragalactic Astrophysics and Cosmology
363. Solar and Solar-Terrestrial Physics
364. Advanced Gravitation
463. Special Topics in Astrophysics

SPANISH AND PORTUGUESE

Emeriti: (Professors) Fernando Alegria, Aurelio M. Espinosa, Jr., Bernard Gicovate, Isabel Magana Schevill, Sylvia Wynter
Chair: Yvonne Yarbro-Bejarano
Professors: Mary L. Pratt, Michael P. Predmore, Jorge Ruffinelli, Guadalupe Valdes, Yvonne Yarbro-Bejarano, Edwin Williamson (on leave Autumn, Winter)
Assistant Professors: Claire Fox (on leave 1999-2000), Fernando Gomez, Richard Rosa, Lucia de Sa
Professor (Teaching): Maria-Paz Haro
Courtesy Professors: John Felstiner, Hans U. Gumbrecht, Ramon Saldivar
Courtesy Assistant Professor: Paula Moya
Senior Lecturers: Lyris Wiedemann (Portuguese Language Director);
Susan Cashon (by courtesy), Irene Corso
Lecturers: Juana Alicia, Claudia Angelelli, Jeffrey Berset, Jose Cartagena-Calderon, Sara Cooper, Clémence Jouët-Paré, Caridad Kennedy, Monica Malamud-Makowski, Patrice Marks, Alice Miano, Joan Molitoris, Consuelo Perales, Anthony Prieto, Ana M. Sierra, Maria-Cristina Urruela, Douglas Young
Affiliated Faculty: James Fox (Cultural and Social Anthropology)
Writer-Artist-in-Residence: Cherrie Moraga (Drama)
Spanish Language Coordinator: Alice Miano
Majors and Minors Coordinator: Jose Cartagena-Calderon
Undergraduate Advisers: Michael Predmore, Lucia de Sa
Graduate Adviser: Mary Pratt

The department is committed to four main educational purposes: (1) to provide students with expert training in the Spanish and Portuguese languages at all levels and to enable them to develop their skills in these languages according to their goals and interests; (2) to acquaint students with the literatures and cultures of the Spanish and Portuguese speaking world (Iberia, Latin America, the United States), in terms of both contemporary realities and 1,000 years of written and oral tradition; (3) to prepare undergraduates for advanced study in Iberian, Latin American, and Luso-Brazilian languages, literatures, and cultures and/or in language education, and (4) to provide doctoral students with advanced training as research scholars and teachers, in preparation for careers as university teachers or related roles.

The faculty represent a broad range of interests and approaches. In general, the department’s programs are characterized by: (1) a commitment to undergraduate and graduate teaching at the highest intellectual level, (2) a strong interdisciplinary focus that combines the study of literature with that of other forms of cultural expression, (3) a sociohistorical perspective on language, literature, and culture, (4) an effort to maintain a balance among Latin American, Iberian, and U.S. Latino fields, and (5) language study tailored to a range of educational intellectual goals and native and non-native experience with the Spanish and Portuguese languages.

The department works closely with the Center for Latin American Studies, El Centro Chico, the Overseas Studies programs in Santiago, Chile, and Puebla, Mexico, and selected overseas programs in Spain. It makes extensive use of the resources of the language laboratory and the Language Center. The University library maintains world class collections in Latin American and Iberian Studies and one of the largest research archives in the country in Chicanist history and literature. The Hoover Library is a valuable resource for particular research topics on Spanish and Latin American intellectual history. Department faculty teach in the School of Education. Comparative Literature, Comparative Studies in Race and Ethnicity Drama, Feminist Studies, Film Studies, Introduction to the Humanities Program, and Modern Thought and Literature. The department houses a Brazilian Writer-in-Residence program developed in cooperation with the Brazilian Ministry of Culture, and hosts visiting faculty from Spain and Latin America on a regular basis.

575
UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS

Note—The department redesigned its undergraduate major in Autumn Quarter 1996-97. Students who declared a Spanish major prior to June 1, 1996 may remain under the former requirements or may elect to fulfill the new requirements. The former requirements are found in previous versions of the Stanford Bulletin or in the department’s Undergraduate Handbook. For transition arrangements, see the department’s academic affairs administrator or undergraduate adviser.

The major in Spanish is designed to enable students to develop a concentration in a particular area of interest, accompanied by basic work in two secondary areas. Students are normally expected to declare the major during the sophomore year, but it is possible to declare during the junior year as well, particularly after overseas study at Santiago or Puebla.

The major in Spanish requires 50 units in addition to completion of second-year Spanish (13, 13B or equivalent). Course work for the major is grouped under the following subject areas:

1. Latin American/Caribbean Studies (including Brazil)
2. Iberian Studies (including Portugal)
3. U.S. Latino studies
4. Language in the Spanish-speaking world
5. Luso-Brazilian language and culture

Students are required to take four courses in one of these areas, two courses in a second and one in a third. Course work for the major must include:

One quarter of Portuguese language (counts for area 5 above)

Spanish 101, Structure of Spanish (counts for area 4 above)

Spanish 140, Methods of Literary and Cultural Analysis (counts for area 1, 2, or 3 above)

One writing intensive course

Spanish 278, Senior Seminar (writing intensive optional)

All courses in the department numbered 100 or above count toward the major. With the consent of the student’s adviser, up to 10 units of relevant course work outside the department and up to 10 units of course work done in English may be counted toward the major. With the consent of the adviser, up to 25 units of relevant course work taken abroad may be counted toward the major. Courses taken credit/no credit cannot be counted toward the major.

How to Declare a Major—Students interested in declaring a Spanish major should see the Majors and Minors Coordinator, José Cartagena-Calderón, or one of the undergraduate advisers, Professors Fox and Rosa. General information on the major is available in the department reception area, Building 260, room 214.

Double Majors—The major in Spanish and Portuguese is designed to combine readily with a second major in another field and with study abroad. Students may not count the same course to fulfill requirements in both majors.

Intensive Summer Program—Stanford University offers first-year intensive language and conversation courses in Spanish during the summer. For further information, contact the department or the Summer Session office.

Courses for Heritage Language Speakers—The department offers a series of second- and third-year courses especially designed for students who grew up in homes where Spanish is spoken and who wish to develop their existing linguistic strengths. The suffix B in course numbers below indicates these courses.

Proficiency Notation—Seniors are encouraged to qualify by examination (given every Spring Quarter) for the departmental Language Proficiency Notation on their transcript, which certifies foreign language competence. For further information, contact Alice Miano, Spanish Language Coordinator, or Lyris Wiedemann, Portuguese Language Director.

MINORS

The department offers two minor concentrations. With the consent of the student’s adviser, up to 10 units of relevant course work outside the department, and up to 15 units of relevant course work taken abroad, may be counted toward the following minors:

LANGUAGE AND CULTURE STUDIES

This minor is intended for students who wish to focus on developing advanced linguistic competence in Spanish and/or Portuguese, or who wish to combine acquisition of linguistic competence with the study of the literature, thought, culture, or language systems of the Spanish- or Portuguese-speaking world.

Requirements—Thirty units of course work at the level of Spanish 11 or above, and/or in Portuguese at any level. Students must take at least three courses in one of the following subject areas:

1. Latin American and Iberian Studies: recommended are Spanish 130, 131, 132, 133 and 134; and 150, 151, 160, 161.
3. Advanced Language: any combination of second-year Spanish and/or first- and second-year Portuguese, plus a selection of 100 and 200-level language courses. Recommended: Spanish 203, 204, 205, 206, 207.
4. Luso-Brazilian Language and Culture: recommended are Portuguese 11A, 12A, 133, 134, 170, and 171.

CULTURE AND AREA STUDIES

This minor is intended for students who wish to study the literature, culture, or thought of the Spanish- and Portuguese-speaking world without necessarily acquiring proficiency in Spanish or Portuguese language. Students choosing this minor are strongly encouraged to take courses in Spanish or Portuguese language, including reading courses (such as Spanish 50 or Portuguese 50). Such courses count, but are not required, for this minor.

Requirements—Thirty units of course work in Latin American, Iberian, U.S. Latino, or Luso-Brazilian literature, culture, language, and thought studied in the original or in translation at the level of Spanish 11 or above.

HOW TO DECLARE A MINOR

For minors in the School of Humanities and Sciences, students must complete their declaration of the minor no later than the last day of the quarter two quarters before degree conferment. For example, a student graduating in June (Spring Quarter) must declare the minor no later than the last day of Autumn Quarter of senior year. Students declaring a minor should meet with the majors and minors coordinator. General information about the minor is available in the reception area of the department, Building 260, room 214.

HONORS PROGRAM

Spanish and Portuguese majors in the junior year, with a grade point average (GPA) of 'B+' or better in all major courses, may apply to the honors program. Honors students are eligible to participate in the honors college at the beginning of their senior year. Students should submit an application for the honors program and a proposal outline by the end of Winter Quarter of the junior year. Each honors student must write an honors essay of 20 to 25 pages under the direction of a faculty member who serves as adviser. Work on the essay normally begins in the Spring Quarter of the junior year and must be completed by the end of the third week of March of the senior year. Consult an undergraduate adviser (Professors Fox or Rosa) for additional information on the honors program.

OVERSEAS STUDIES

All majors are strongly encouraged to study abroad. To transfer credit from programs abroad, consult the Office of the Registrar. Depending on course selections, up to 25 units of course work taken abroad may be applied toward the major and 15 units toward the minor in Spanish. Students planning study abroad, or returning from study programs, are encouraged to consult with the majors and minors coordinator or an undergraduate adviser to coordinate the course work from abroad with their degree program.
Both the department and Becktel International Center maintain information banks on study abroad programs. Stanford sponsors the following options:

STANFORD IN SANTIAGO, CHILE

The Stanford Program in Santiago, Chile requires one year of college Spanish, with preference given to students with more advanced language preparation. Course work there is done entirely in Spanish. Detailed information, including curricular offerings, is listed in the “Overseas Studies” section of this bulletin, or at the Overseas Studies Program (OSP) office in Sweet Hall. Internships and research opportunities may be arranged for two-quarter students.

STANFORD IN PUÉBLA, MEXICO

The Stanford Program in Puebla, Mexico requires preparation through the level of Spanish 13 (second year third-quarter Spanish) or the equivalent. The minimum required preparation is completion of Spanish 11 (second year first-quarter Spanish) or its equivalent by the time of enrollment in the Puebla program. Students who have completed Spanish 11 prior to Autumn Quarter but have not yet completed Spanish 13 are required to enroll in Spanish 12 or a higher course at Stanford during the Autumn Quarter prior to participation in the Puebla program. Course work at Puebla is done entirely in Spanish in regular courses at the Universidad de las Americas. Detailed information, including curricular offerings, is found in the “Overseas Studies” section of this bulletin, or at the Overseas Studies Program (OSP) office in Sweet Hall. Research opportunities may be arranged.

BRAZIL AND PORTUGAL

The University maintains a relationship with the Universidade Estatal do Rio de Janeiro in Brazil. Students interested in study in Brazil or Portugal, should contact Professor de Sa or Lyris Wiedemann.

SPAIN

The Department of Spanish and Portuguese recommends study in Spain with the Hamilton College Academic Year in Spain program, administered by the Department of Romance Languages of Hamilton College in cooperation with faculty members of Williams and Swarthmore colleges. Two distinguishing features of this program are: (1) Spanish must be spoken at all times, both in and outside of class; all students are required to sign a pledge to this effect before their arrival in Madrid; (2) the arrangement of independent study projects in lieu of regular courses. The program is based in Madrid, where the cultural, educational, social, and geographical benefits are optimal.

An additional excellent program recommended by the department is the Madrid Campus of St. Louis University. This program has many of the features of the Hamilton College Program. In addition, it has its own buildings and facilities located on the outskirts of the University of Madrid campus. This is the only U.S. overseas study program in Spain which has received full accreditation by the Spanish authorities.

Students interested in study in Spain should consult Professors Haro or Predmore for information.

TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, see the “School of Education” section of this bulletin and the credentials administrator, School of Education.

COTERMINAL A.B. AND A.M.

The requirements for the coterminal A.B. are the same as those outlined below for the A.M. No course can count for both the A.B. and A.M. degrees. Contact Graduate Admissions at the Registrar’s Office for information.

GRADUATE PROGRAMS

University requirements for the A.M. and Ph.D. degrees are discussed in the “Graduate Degrees” section of this bulletin.

MASTER OF ARTS IN SPANISH

This terminal A.M. degree program is for students who do not intend to continue their studies through the Ph.D. degree. Students in this program may not apply concurrently for entrance to the Ph.D. program. Students must complete a minimum of 45 graduate-level units, 36 of which must have a grade point average (GPA) of ‘B’ or above.

Requirements—One linguistics course (203, 204, 205, 206, 207); one course in language pedagogy; one course in literary or cultural theory; two 200- or above courses in Latin American literature and two 200-or above courses in Peninsular literature; and reading knowledge of one foreign language other than Spanish (preferably Portuguese). Independent study courses (299, 399), and cross-listed courses originating outside the department may not be used to fulfill requirements except by permission of the graduate adviser.

In addition, students may take approved courses in related fields such as classics, comparative literature, education, history of art, linguistics, modern thought, and philosophy.

DOCTOR OF PHILOSOPHY

The requirements of the Ph.D. are: (1) 90 units of graduate-level course work with a grade point average (GPA) of ‘B’ or above. Units completed toward the A.M. degree can be counted for the Ph.D.; (2) one course in Spanish linguistics, one course on methods of teaching Spanish, and one course on introduction to literary theory; (3) a reading knowledge of Portuguese and one other foreign language; (4) the qualifying paper, the comprehensive, and the University oral examinations, as described below; (5) teaching of three to five courses in the department; (6) completion of a dissertation. Independent study courses (299, 399) and cross-listed courses originating outside the department may not be used to fulfill requirements except by permission of the graduate adviser. For basic residency and candidacy requirements, see the “Graduate Degrees” section of this bulletin. For further information, consult the department’s Graduate Student Handbook.

Newly admitted students are required to take an oral proficiency examination in Spanish by the third week of Autumn Quarter to determine the level of previous preparation. The student is required to remedy deficiencies indicated by this examination before a teaching assignment is awarded. In preparation for teaching, Ph.D. candidates must take Spanish 301, and/or Spanish 300 in the first year.

In consultation with the adviser, students select one major field of study from the following: (1) Spanish Literature of the Golden Age, (2) Modern Spanish Literature, (3) Spanish-American Literature to Independence, (4) Spanish-American Literature of the 19th and 20th Centuries, (5) Chicano Literature. In addition, candidates select two secondary areas of study outside the major field from the following: (1) Spanish Medieval Literature, (2) Spanish Literature of the Golden Age, (3) Modern Spanish Literature, (4) Spanish-American Literature of the Colonial Period, (5) Spanish-American Literature from Independence, (6) Chicano Literature, (7) Literary Theory, (8) Linguistics, (9) Spanish-American Film, (10) Brazilian Literature.

At least four courses must be taken in the major field of study. At least two courses must be taken in each secondary area. Students whose major field is in Spanish-American or Chicano Literature must choose one secondary area in Peninsular literature and vice versa. One secondary area of concentration may be taken outside the department in consultation with the adviser.

In addition to the department’s course offerings, students may take relevant courses with the approval of their adviser in other departments and programs, such as the graduate programs in Comparative Literature, Feminist Studies, History, Humanities, or Modern Thought and Literature. It is also possible to complete a minor in another department with approval of the adviser. Normally, not more than 25 units are taken outside the department.

After the first year of study, the student’s progress is evaluated by the faculty to determine whether continuation to the Ph.D. is recommended and whether there are particular areas where improvement is needed. For this evaluation, students submit a research paper of approximately 20
STANFORD INTRODUCTORY SEMINARS

110N. Stanford Introductory Seminar: Arts and Archives—Introduction to Research in Chicana/o Cultural Studies—Preference to freshmen. Hands-on introduction to the methods and topics of archival research on the visual and verbal arts and their socio-historical context. Student develop original research projects using the digital archive "Chicana Art," and the Special Collections in Green Library, which house the papers of major Chicana/o artists, writers, activists, and intellectuals. Slide/presentations by invited artists and presentations by students on their research. GER:4b (DR:3)
3 units (Yarbro-Bejarano)

112N. Stanford Introductory Seminar: The U.S.-Mexico Border Region in Film and Literature—Preference to freshmen. Targeted at students who are heritage speakers of Spanish, or who have scored a 4 or 5 on the AP exam in Spanish. Introduces the wide range of cultural production about the border region, highlighting the U.S. and Mexican viewpoints. Topics: free trade, the maquila system, interethnic relations, women's issues, and migration. Readings from novels and essays by Chicana/o, Mexican, and Anglo authors. Weekly screenings of movies and videos, ranging from classic Hollywood and Mexican study productions to independent features produced in the border region. Assignments stress the development of basic skills in literary and visual analysis, and oral production. (In Spanish and English) GER:4b (DR:3)
3-5 units (Fox)

113N. Stanford Introductory Seminar: Latin American Culture is the '60s—Preference to freshmen. Focus is on the Latin American culture of the 1960s (through literature, film, music, politics, fashion, etc.) as a means of understanding Latin America as a whole. Latin America underwent a drastic renovation during this decade: the emergence of the Cuban revolution and the figure of Ernesto Che Guevara as a continental symbol; the boom of the Latin American novel (Novel Prize winner Gabriel García Márquez, Mario Vargas Llosa, and Julio Cortázar); the student revolt; the creation of testimony as a genre; and the emergence of popular music. These and other cultural themes are examined with emphasis on the representation of youth ("la cultura de los jóvenes") through literature and film. GER:3a (DR:7)
3-5 units, Win (Ruffinelli)

114N. Stanford Introductory Seminar: Lyric Poetry—Preference to freshmen. Aimed at students with considerable competence who may be interested in increasing their language skills. Introduction to the basic elements and expressive devices of lyric poetry: multidimensional language, denotation, connotation, image, metaphor, symbol, allegory, paradox, irony, meaning, idea, rhythm, and meter. These primary elements of poetry are studied through representative poems of outstanding poets of Spain and Latin America of the late 19th and early 20th century. G. A. Bécquer, Rosalía de Castro, Rubén Darío, Miguel de Unamuno, Antonio Machado, García Lorca, Pablo Neruda, and Gabriela Mistral. (In English and Spanish) 3-5 units (Fredmore)
115N. Stanford Introductory Seminar: Growing up Bilingual—Introduction to the Study of Bilingualism in the U.S.—Preference to freshmen. For students who have grown up in bilingual communities or bilingual households or who have studied Spanish formally for three or more years at the secondary level. How do people become bilingual? When and how do people use two languages in their everyday lives? What kinds of different bilinguals are there? Field project in a nearby Latin community. GER:3a (DR:7) 3-5 units, Spr (Valdés)

116N. Stanford Introductory Seminar: Letters and Colors of Imperial Spain—Preference to freshmen. The rich and challenging literature and images of Imperial Spain (mostly 16th and 17th centuries). Golden Age letters and paintings are combined to see how citizens of the past arranged their experiences for a better life, and how this relates to the future. Historicity and heterogeneity are examined in relation to authors, e.g., Calderón de la Barca, Saavedra y Pajardo, Gracián and Estebanillo González. Students use cd-rom material on Golden Age paintings and become acquainted with a panorama of Golden Age collections in the Prado Museum (Velázquez, Greco, Zurbarán, etc.). (In English, but some readings in Spanish.) GER:3a (DR:7) 3-5 units, Win (Gómez)

125N. Stanford Introductory Seminar: Latin American Nobel Prize Winners—(Same as Comparative Literature 25N.) Preference to freshmen. An inquiry simultaneously into the powers of the artistic imagination and the dynamics of modern Latin American society and culture. The works of six Nobel Prize writers and intellectuals: Pablo Neruda, Gabriela Mistral, Octavio Paz, Gabriel García Marquez, Miguel Ángel Asturias, and Rigoberta Menchú. All write from deep connections to the tumultuous history of Latin America in this century. GER:3a (DR:7) 5 units, Spr (Pratt)

130N. Stanford Introductory Seminar: Reading the Rain Forest—Visions of the Amazon—Preference to freshmen. Different views of the Amazon, considering travel literature, Brazilian and Spanish-American novels, indigenous narratives, socio-environmentalist texts, and film. Texts: Susanna Hecht’s The Fate of the Forest; passages from travel diaries by fray Gaspar de Carvajal, Richard Schomburgk, Walter Bates, and Lévi-Strauss; Alejo Carpentier’s Los pasos perdidos, José Eustasio Rivera’s La vorágine, Márcio Souza’s Galvez, o Imperador do Acre, Mário de Andrade’s Macunaima, Mario Vargas Llosa’s El habitador, and Betty Mindlin’s Vozes da Origem. Texts in original language or in English translation. (In English, unless all participants agree to have it in Portuguese or Spanish.) GER:3a (DR:7) 3-5 units, Aut (Sd)

142Q. Stanford Introductory Seminar: Space and Representation in Latin-America—Preference to sophomores. How have representations of urban spaces developed in Latin America? How different spaces and places are engineered and transformed in a process of cultural negotiation and the dynamics of modern Latin American society and culture. Students will understand and interpret the written and spoken language on a variety of topics; manifest an awareness of the social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world; and present information, concepts, and ideas to an audience of listeners or readers on a variety of academic topics. Completion of 3 fulfills the University’s language requirement. 5 units, Aut, Win, Spr (Staff)

1A,2A. Accelerated First-Year Spanish—Completes the first-year language sequence in two rather than three quarters. Recommended only for students who have previous knowledge of Spanish or a strong interest in it who wish to dedicate more time to the development of their language proficiency. A full mastery of the language is impossible in one course. Students will understand and interpret written and spoken texts in the Spanish- and English-speaking world; and present information, concepts, and ideas to an audience of listeners or readers on a variety of academic topics. Completion of 9 fulfills the University’s language requirement. 10 units, Sum (Staff)

9A,9B,9C. Intensive First-Year Spanish—Stanford graduate students restricted to 9 units may take two or three courses in the series for a total of 9 units, or one course for 5 units. Upon completion, students are able to engage in interaction with speakers of Spanish for a variety of purposes and in a variety of contexts, using socially and culturally appropriate forms for participating in conversations; establish relationships with others; provide and obtain information; express feelings and emotions, and expressing opinions. Students will understand and interpret written and spoken language on a variety of topics; manifest growing awareness of the social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking worlds; and present information, concepts, and ideas to an audience of listeners on a variety of academic topics. Completion of 9 fulfills the University’s language requirement. See the Summer Session Catalogue, 2000. Enrollment limited to 15. No auditors. 15 units, Sum (Staff)

10. Beginning Oral Communication—For students who have completed or are currently taking Spanish 2 and who wish to devote additional
class time to developing pronunciation, usable vocabulary, and speaking skills. May be repeated once for credit.

2 units, Aut, Win, Spr (Staff)

SECOND YEAR

11C, 12C, 13C. Second-Year Spanish, Cultural Emphasis—Students become aware of and able to use socioculturally appropriate language in a variety of situations, formal and informal, academic and professional. Greater emphasis is placed on the presentational language, giving academic presentations and writing reports on topics of interest to students who develop the ability to comprehend and interpret oral and written language. Can be taken in any quarter.

4 units, Aut, Win, Spr (Staff)

11R, 12R, 13R. Second-Year Spanish, Emphasis on International Relations—Content-based approach, focusing on politics in the Spanish-speaking world and international relations; and the Hispanic world today, geographically, socially, and economically. Develops correct usage in contemporary Spanish through the reinforcement of reading, writing, listening, and speaking abilities. Primary texts from Latin America and Spain. Activity-based methodology. Fieldwork projects for an optional unit.

4-5 units, Aut, Win, Spr (Angelelli, Urreuela)

FOR HERITAGE LANGUAGE STUDENTS

11B, 12B, 13B. A special series designed for students who grew up in homes where Spanish is spoken, and who wish to develop their existing linguistic strengths.

11B. Second-Year Spanish for Heritage Language Students—Emphasis is on developing the ability to successfully communicate orally or in writing with persons with whom students come into personal contact. Intensive and extensive reading of selected texts.

4-5 units, Aut (Staff)

12B. Written and Spoken Language for Heritage Language Students—Emphasis is on developing the ability to understand, interpret, and critically analyze a variety of print and non-print materials such as movies, radio and television broadcasts, short novels, short stories, and newspaper editorials. Extensive reading of texts from a number of fields and disciplines. Writing of summaries and reviews. Prerequisite: 11B or consent of instructor.

3-5 units, Win (Staff)

13B. Multipurpose Communication for Heritage Language Students—Emphasis is on developing the bilingual student's abilities to use the oral and written language appropriately for a variety of purposes, focusing on the development of styles and registers used in more formal settings. Prerequisite: 12B or consent of instructor.

3-5 units, Spr (Staff)

15. Intermediate Oral Communication—For students who have completed or are enrolled in any second-year Spanish course, and for students trained in grammar-oriented courses who wish to improve oral skills. Develops appropriate speech strategies and communicative proficiency in Spanish, creating opportunities to act out everyday life situations encountered in a Spanish-speaking environment. Listening and reading materials are used to develop interpretive abilities and knowledge of cultural context. May be repeated once for credit.

3 units, Aut, Win, Spr (Staff)

18M. Spanish for Heritage Language Pre-Med Students—For premed students who grew up in homes where Spanish is spoken or for premed students who have learned Spanish as a foreign language and possess a considerable command of this language. Emphasis is on oral communication with Spanish-speaking patients on topics related to their health. Students participate in the organization and participation of a workshop on health-related topics prepared for a Spanish-speaking community outside campus.

3-4 units, Win (Sierra)

50. Reading Spanish—For students who have already taken Spanish for at least one full year or have superior reading proficiency in another Romance language. Emphasis is on comprehension of academic texts. Fulfills University reading requirements for advanced degrees if students earn at least a grade of 'B.'

3 units, Spr (Sierra)

99. Language Specials—With consent of department only. See instructor for section number.

1-5 units (Staff)

100. Advanced Oral Communication—For students who have completed second-year Spanish or who have oral skills above the intermediate level. Interactive activities require students to persuade, analyze, support opinions, and gather and interpret others' points of view. Focus is on vocabulary enrichment with emphasis on idiomatic expressions. Cultural, literary, political, and journalistic readings stimulate discussion about issues related to the Spanish-speaking world. May be repeated once for credit. Prerequisite: 13 or equivalent.

3 units, Aut, Win, Spr (Staff)

103B. Advanced Spanish for Heritage Language Students—Enrollment limited to students who grew up in homes where Spanish is spoken or who have had extensive experience (e.g., 3-5 years residence) in Spanish-speaking countries. Develops competence in Spanish for academic and professional purposes, including giving presentations, writing essays, and discussing academic subjects.

4 units, Aut (Cartagena-Calderón)

104B. Special Topics in Advanced Grammar and Composition for Heritage Language Students—A grammar and composition workshop intended for heritage language speakers with advanced oral and written language skills who wish to improve their ability to communicate in Spanish through writing. The mechanics of writing (written accents, spelling, syntax, etc.) and the art of writing itself (from brainstorming, planning, and outlining to drafting, editing, and rewriting), introducing the more complex aspects of Spanish grammar. Provides students with the necessary skills to successfully undertake courses that require strong competence in academic Spanish. Students are encouraged to take such a course during the quarter of instruction.

3-4 units, Win (Cartagena-Calderón)

PORTUGUESE

FIRST YEAR

1, 2, 3. First-Year Portuguese—For students with no prior study of Portuguese or Spanish. By the end of the first-year sequence of the Portuguese language program, students are able to engage in interactions with speakers of Portuguese for a variety of purposes and in a variety of contexts using socially and culturally appropriate forms for participating in conversations, establishing relationships with others, providing and obtaining information, expressing feelings, emotions, and opinions. Students will understand and interpret written and spoken languages in a variety of contexts; manifest growing awareness of the social and cultural influences shaping the production of oral and written texts in the Portuguese-speaking world; and present information, concepts, and ideas to an audience of listeners or readers on a variety of academic topics. Completion of 3 fulfills the University's language requirement.

1. First-Year Portuguese (Part 1)—Normal paced. Follows a proficiency-oriented approach, emphasizing speaking and oral comprehension. Students learn the language as they contrast Brazilian culture with their own. Lab.

5 units, Aut (Staff)

2. First-Year Portuguese (Part 2)—Continuation of 1. Normal-paced. Emphasizes speaking and oral comprehension proficiency and promotes the beginning of development of reading and writing skills. Lab. Prerequisite: 1.

5 units, Win (Staff)
3. Second-Year Portuguese (Part 3)—Continues emphasizing speaking and oral comprehension proficiency and the development of reading and writing skills. Literary and journalistic readings, studying of Brazilian popular music, and viewing short documentaries are the basis for discussions on Brazilian culture and current events. Lab. Prerequisite: 2 or equivalent.

5 units, Spr (Staff)

1A, 2A. Accelerated First-Year Portuguese—Recommended for students with at least two years of formal study of a Romance language. By the end of the first-year sequence of the Portuguese language program, students are able to engage in interactions with speakers of Portuguese for a variety of purposes and in a variety of contexts using socially and culturally appropriate forms for participating in conversations, establishing relationships with others, providing and obtaining information, expressing feelings and emotions, and expressing opinions. Students will understand and interpret written and spoken language on a variety of topics; manifest a growing awareness of the social and cultural influences shaping the production of oral and written texts in the Portuguese-speaking world; and present information, concepts, and ideas to an audience of listeners or readers on a variety of academic topics. Completion of 2A fulfills the University’s language requirement.

1A. Accelerated First-Year Portuguese (Part 1)—Fast-paced. Follows a proficiency-oriented approach, emphasizing speaking and oral comprehension. Students learn the language as they contrast Brazilian culture with their own. Lab.

3-5 units, Aut, Win, Spr (Wiedemann)

2A. Accelerated First-Year Portuguese (Part 2)—Continuation of 1A. Fast-paced. Recommended for students with a background in a Romance language. Emphasizes speaking and oral comprehension proficiency and promotes the beginning of reading and writing skills development. Literary and journalistic readings, Brazilian popular music, and short documentaries are the basis for discussions on Brazilian cultural aspects and current events. Prerequisite: 1A or equivalent.

3-5 units, Aut, Win, Spr (Wiedemann)

SECOND YEAR

11A, 12A. Accelerated Second-Year Portuguese—By the end of the second-year sequence of the Portuguese language program, students are able to engage in interactions with speakers of Portuguese belonging to different sociolinguistic groups, using socially and culturally appropriate forms. Students will understand and interpret written and spoken language on a variety of topics; judge, discuss, and defend points of view; work in increasing depth on academic topics of their own interest in the target language; and present original information, concepts, and ideas to an audience of listeners or readers on a variety of genres and with an array of different purposes.

11A. Accelerated Second-Year Portuguese (Part 1)—Fast-paced. Three of the five cultural-geographical regions of Brazil are studied as a means of developing listening, speaking, reading, and writing proficiency. The regions are contrasted through discussions fostered by viewing movies, plays, short stories, journalistic materials, Brazilian popular music, and by listening to speakers from each region. Prerequisite: first-year sequence, equivalent, or consent of instructor.

3-5 units, Aut, Win, Spr (Wiedemann)

12A. Accelerated Second-Year Portuguese (Part 2)—Continuation of 11A. Fast-paced. Provides further development of listening, speaking, reading, and writing proficiency. Two of the five cultural-geographical regions of Brazil and other Portuguese-speaking areas are studied and contrasted through discussions fostered by viewing movies, reading longer texts of different genres, Brazilian popular music, and listening to speakers from each region. Prerequisite: 11A, or consent of instructor.

3-5 units, Aut, Win, Spr (Wiedemann)

50. Reading Portuguese—For students with superior reading proficiency in Spanish. Reading competence for research and courses in Luso-Brazilian studies. Overview of grammar. Literary, journalistic, and academic readings. Fulfills University reading requirement for advanced degrees.

3 units, Spr (Staff)

100. Advanced Portuguese Conversation—Conversation practice recommended as a supplement to the second-year sequence. Prerequisite: 12A, equivalent, or consent of instructor.

2-3 units, Spr (Staff)

109A. Practicum—Portuguese for Speakers of Spanish (Part 1)—Recommended for graduate students of literature. Accelerated introduction to Portuguese for speakers of Spanish. Follows a proficiency-oriented approach, emphasizing speaking and oral comprehension. Students learn the language as they contrast Brazilian culture with their own. Lab. Prerequisite: advanced reading competence in Spanish.

3-4 units, Aut (Wiedemann)

109B. Practicum—Portuguese for Speakers of Spanish (Part 2)—Continuation of 109A. Emphasizes speaking, oral comprehension, and reading proficiency, and promotes the beginning of the development of writing skills.

2-3 units, Win (Wiedemann)

ADVANCED AND SPECIALIZED LANGUAGE

101. Structure of Spanish—Advanced study, designed to help students understand the grammatical system of Spanish language and how it functions. It offers a description and analysis of the main topics of Spanish grammar: types of clauses, relative pronouns, verb aspect and tenses, review of prepositions, ser and estar, etc. Exercises (prepared in advance) inform class discussion.

3-5 units, Aut (Angelelli)

102. Composition and Writing Workshop—Focuses on individual development of the ability to write in Spanish. Emphasis is on style and diction, and on preparing and writing essays on literary topics. Non-Spanish majors or minors may choose topics more closely related to their studies for their projects. Prerequisite: two years of college Spanish, bilingual Spanish series at Stanford, or equivalent. GER:3a (DR:7) (WIM)

4 units, Spr (Cartagena-Calderón)

110. Introduction to Translation—Designed to familiarize students with basic translation skills and strategies. A variety of text types illustrate different types of translation (general, technical, medical, legal). Service learning component provides an opportunity to put into practice the translation principles discussed. Prerequisites: 101 and 102B; advanced command of Spanish and English.

4 units, Win (Angelelli)

121L, 122L. Spanish for Legal Professions—Open only to law students and designed for lawyers who need to work with Spanish-speaking clients. Legal terminology is combined with a review and practice of grammar for adequate oral and written expression in legal situations. Comparison of the Common Law and Roman Law systems, and some issues where the two legal systems might not correspond. Uses legal documents and materials. Law semester calendar.

3-5 units (Angelelli)

121M, 122M, 123M. Spanish for Medical Students—(Same as Health Research and Policy 280, 281, 282.) Geared to achieve a practical and rapid command of spoken Spanish. Topics: the human body, hospital
procedures, diagnostics, food, and essential phrases for on-the-spot reference when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

3 units, Aut, Win, Spr (Corso)

125. Spanish for the Professions—Third-year level, aimed at students who wish to continue developing their Spanish language skills in relation to their particular discipline of study. Written and oral presentations required. Prerequisite: 13, 13B, or equivalent.

4-5 units (Staff)

LITERATURE, CULTURE, LINGUISTICS, AND THEORY
UNDERGRADUATE

130, 131, 132, 133, 134, 135. Cultural Perspectives—For students interested in the culture of Spanish and Portuguese speakers. Readings and topics for discussion and composition include socio-cultural and historical material from Spain, Portugal, Brazil, Spanish America, and the Mexican-Chicano, Portoriqueño, and Cuban heritage. Art, current events, folklore, history, language, and literature topics are supplemented by slides, movies, tapes, and occasional field trips.

130. Spanish Cultural Perspectives—GER:3a (DR:7)
4 units, Spr (Haro)

131. Spanish American Cultural Perspectives
4 units, Aut (Sroedler)

132. Mexican and Chicano Cultural Perspectives
4 units, Aut (Prieto)

133E. Portuguese Cultural Perspectives
4 units (Staff)

134. Brazilian Cultural Perspectives
4 units (Sá)

135. Caribbean Cultural Perspectives
4 units, Win, Spr (Negron, Johanson)

140. Introduction to Methods of Literary and Cultural Analysis—For students with little or no background in literary analysis. The basic terminology of literary theory and critical approaches to literature through textual analysis. Emphasis varies with instructor. Prerequisite: 13, 13B, or equivalent. GER:3a (DR:7)
3-5 units, Aut (Rosa)

141. Contemporary Spanish Women Writers—The speed of change and unique vitality of contemporary Spain is illustrated by studying women, particularly in the literary arena. Works by prominent women narrators of Franco's era (Matute, Martín Gaite). Novels by the new narrators of Franco's era (Matute, Martín Gaite). Novels by the new generations of women writers (Tusquets, Montero, Mayoral, Ortiz, Etxebarria) who are transforming their experiences, values, and ideologies into a new literature about the complex relationships among gender, creativity, and social mores. The feminist consciousness, how it has developed to this day, and how it is changing to face the challenges of our world. GER:3a, 4c (DR:7)
3-5 units, Win (Haro)

142E. Latino Self-Representation in the Arts: 1980s-1990s—The ways in which configurations of Latino identity are constructed and represented in the arts; how artists choose to participate in the public cultural process of self-representation; and how they have staged a trajectory in the U.S. Latino artistry in which the simplistic “ethnic” tag is transformed. The 1980s renaissance of a politicized arts “movement” inspired by the NEA controversy, censorship, and an increasing awareness of the stereotypical media image” projected of Latinas/os. The 90s as a postmodern culture, and the process of self-definition. Issues of racial and sexual differences, and how a subject is constituted through language and cultural representations.
3-5 units (Staff)

150, 151. Spanish Literature—Basic introduction to Spanish Peninsular literature. Sequence deals with major works from several periods and genres preparing for more specialized 200-level courses. Prerequisite: 13, 13B, or equivalent.

150. Spanish Literature I—The spirit of Spain in its early literature. Medieval and Golden Age masterpieces that establish and reflect Spain’s unique identity (Christians, Jews, Moors) and create its traditions. Close reading of El libro de buen amor, Poema del Cid, La Celestina, Lazarillo de Tormes, El Burlador de Sevilla, Gacilaso, Covantes, Góngora, Lope de Vega, Calderón. GER:3a (DR:7)
3-5 units, Spr (Williamson)

151. Spanish Literature II—Representative works of Spanish literature from the 1830s to the 1930s: Larra, Esproncede, Bécquer, Rosalía de Castro, Galdós, Unamuno, Valle-Inclán, Machado, and Loca. Emphasis is on a close reading of the texts in relation to the “problem of Spain” within the democratic tradition of Spanish liberalism. GER:3a (DR:7)
3-5 units, Win (Pledmore)

160, 161. Spanish American Literature—Introductory survey of major works from several periods and genres. Prerequisite: 13, 13B, or equivalent.

160. Spanish American Literature I—Major themes, writers, and cultural debates from the Colonial Period to independence. Novels, poems, essays, and periodicals from Latin America. GER:3a (DR:7)
3-5 units, Win (Rosa)

161. Spanish American Literature II—Continuation of 160, from independence to the present. Readings from a range of genres including essay, poetry, short story, and the novel. GER:4a (DR:2)
3-5 units, Spr (Staff)

168E. Chilean Studies: Modern Chilean Culture through Music, Film, and Literature 1945-1997—(Same as Latin American Studies 120.) Recommended for students planning to attend the Santiago program and open to all students. Introduction to the history, culture, politics, and literature of Chile, mainly in the 20th century.
3-5 units, Spr (Missana)

169E. Cultural Dimensions of Globalization—Recommended for students working up an honor’s thesis or a research grant proposal. The relationship between national identity and culture. How do different disciplines define “culture” and the “nation?” How do phenomena such as international trade in consumer goods, transitional migration, and global mass media affect the way in which peoples identify themselves? Readings from “case histories” in the humanities and social sciences.
3-5 units (Fox)

170, 171. Brazilian Literature—Introductory survey of major works from several periods and genres.

170. Brazilian Literature I—Survey of Brazilian literature, from the Colonial Period through the 19th century. Authors: Gregório de Matos, Tomás Antonio Gonzaga, Antonio Gonçalves Dias, José de Alencar, Nísia Floresta, Bernardo Guimarães, and Machado de Assis.
3-5 units (Staff) given 2000-01

171. Brazilian Literature II—Survey of 20th-century Brazilian literature, fiction, poetry, and essays. Themes: “the urban gaze” (Mario de Andrade, Oswald de Andrade, Patricia Galvão, Manuel Bandeira, Clarice Lispector, Dalton Trevisan, and Ledusha) and “regional” (Eduídes da Cunha, Gilberto Freyre, Raquel de Queirós, Graciliano Ramos, João Cabral de Melo Neto, João Guimarães Rosa, and Márcio Sousa). (In Portuguese or English, depending on the students’ fluency.) GER:3a (DR:7)
3-5 units, Win (Sá)
190. Fiction and Political Imagination—The ways contemporary Latin American writers explore and debate the realities of their societies and visions for the future. How literary forms and symbolic structures create socio-historical understanding, and how literature itself interacts with social and institutional structures and historical circumstances. Focus is on contemporary literary texts from regions undergoing social, cultural, and political transformations: Mexico, the Andean region, and the Southern Cone (Argentina/Chile). Authors: Carlos Fuentes, Alicia Partnoy, Juan Rulfo, José María Arguedas, Pía Barros, Manuel Puig, Domitila Barrios de Chungara, etc. Audiovisual materials contextualize written texts. GER:3a (DR:7)

3-5 units, Spr (Pratt)

191. Contemporary Spanish Cinema I: From Surrealism to Almodóvar—Spanish cinema from the Franco dictatorship through the transition to democratic Spain. The works of internationally-known directors (Buñuel, Bardem, Ercíce, Saura, Trueba, and Almodóvar), and the new Basque and Catalan filmmakers. The relationship of film to literature and the sociopolitical realities of Spain. GER:3a (DR:7)

3-5 units, Aut (Haro)


3-5 units (Haro)

199. Individual Work—Open only to students in the department, or by consent of professor. (Spanish and Portuguese)

1-12 units (Staff)

ADVANCED UNDERGRADUATES AND GRADUATES

LANGUAGE, LINGUISTICS, AND THEORY

202. Academic Writing Workshop—For entering graduate students who need to improve their academic writing skills in Spanish, and for seniors working on honors theses in Spanish or fulfilling the writing intensive requirement for the major.

5 units (Ruffinelli)

203. History of the Spanish Language—The development of the Spanish language from its earliest days to the present. Focus is on the historical circumstances in which the growth of the Spanish language took place, and on the phonological, morphological, and syntactic changes that took place during of this development.

3-5 units (Valdés)

204. Second Language/Second Dialect Acquisition—Introduction to adult second language/second dialect acquisition in tutored environments. Focus is on questions posed by the nature of Spanish-language teaching and learning. Prerequisite: 101 or equivalent.

3-5 units (Valdés)

205. Dialectology of the Spanish Language—Focuses on the major varieties of Spanish as they are spoken in Spain and in the Americas. Introduction to dialect geography and to the study of social and regional variation from a sociolinguistic perspective.

3-5 units (Valdés)

206. Spanish Use in Chicano Communities—The significance and consequences of language diversity in the culture and society of the U.S. Using Spanish-English Chicano bilingual communities, focuses on the experiences of non-English background individuals in this country. GER:4b (DR:3)

3-5 units (Valdés)

207. Theory and Issues in the Study of Bilingualism—(Same as Education 149/249.) Fulfills linguistics requirement. Key issues in the study of bilingualism from a sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, the description and measurement of bilingualism, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings.

3-4 units (Valdés) not given 1999-2000

PENINSULAR LITERATURE

222. The Problem of Two Spains: Literature and Society in 19th-Century Spain—Representative literary figures of 19th-century Spain: Larra, Espronceda, Zorrilla, Rosalía de Castro, Bécquer, and Galdós. Major directions in modern lyric poetry and in the modern realist novel are studied against the background of Napoleonic invasions, the loss of overseas colonies, two Carlist civil wars, and frustrated attempts to establish the First Spanish Republic. Emphasis is on close textual analysis.

3-5 units, Aut (Predmore)


3-5 units, Win (Predmore)

224. The Literature of the Spanish Republic: Civil War and Aftermath—The significance of the Civil War for Spanish, European, and world history; the International Brigades. The effect of war on the literary and cultural life of the country and the response of writers from Spain (Alberti, Lorca, Machado) and Latin America (Guillén, Neruda, Vallejo). Literary protest during the Franco regime by Aleixandre, Alonso, Cela, and Sender.

3-5 units, Spr (Predmore)

225E. Theater, Society, and Politics in 20th-Century Spain—The two major 20th-century Spanish dramatists: Ramon del Valle-Inclán and Federico García Lorca. The innovative, avant-garde nature of their major plays (symbolism, expressionism, realism) and the dramatists’ engagement with fundamental social and political issues of the times (feudalism, the newly emerging liberal state, women’s protest, class struggle, civil war).

3-5 units (Predmore)

231. Early Modern Subjectivities—Is human nature one or is it (or are we) constantly changing? Inquiries into the notion of subjectivity of subjecthood, reading classic authors of the Golden Age of Spanish Literature (16th and 17th centuries), e.g., Francisco de Vitoria, Fray Luis de León, Calderón de la Barca, Juan de la Cruz, and Teresa de Avila. Changing, historical notions such as literature and textuality, modernity and progress, individuality and authorship, emblems, Jesuit pedagogy and allegorical modes of signification in visual and non-visual formats. (In Spanish)

3-5 units, Spr (Gómez)

233. Modern Hispanic Poetry—Representative poems from 19th- and 20th-century Hispanic poets (Rosalía de Castro, Bécquer, Darío, Unamuno, Machado, Lorca, Neruda, etc.). Introduction to the elements and devices of lyric poetry: figurative language, image, symbol, metaphor, irony, meter, meaning, idea.

3-5 units (Predmore)

LATIN AMERICAN LITERATURE

210E. Anglophone Caribbean Literature—Surveys the major Anglophone Caribbean writers, with emphasis on narrative fiction and literary
241. The Colonization of the Americas—Interdisciplinary. The Early Modern "colonization" of the Americas, examining notions such as colonization or domination in relation to Early Modern American populations. What is the object of domination and in relation to what? Languages, bodies, bodies of knowledge, physical territories, territories of the imagination and the future? What are the historical options and possibilities (if any) to colonization? What would the “negative” notion of decolonization mean for us today? Historical narratives and chronicles, legal texts and repressive performances, ephemeral architectures, glyphs and images from and about the Early Modern Americas are analyzed critically. (In Spanish) 3-5 units (Gómez)

244. Women Writers of the Spanish Speaking World—Social and textual analysis of selected narratives by U.S. Latina, Spanish/Catalan, and Latin-American women writers, focusing on the representation of race, gender, and sexuality. The works are examined in their specific socio-historical context. Theoretical questions of narrativity and the role of memory. 3-5 units (Yarbro-Bejarano)

252. Contemporary Mexican Thought—Writings of theorists of mexicanidad from the post-Revolutionary era to the 1960s (Vasconcelos, Ramos, Zea, Paz). The work of these pensadores in light of recent critiques and refashionings of the concept of national identity, including cultural theory, performance art, plastic arts, popular fiction, and activist movements. 3-5 units (Fox)

254. Latin American Cinema: The Short Story in Film—Focus is on the genre of Latin American short story and those developments by major writers (Borges, García Márquez, Vargas Llosa, Onetti) which encouraged adaptations into film. Short story literary techniques are compared to cinematic techniques. 3-5 units (Ruffinelli)

255. Magical Realism: Gabriel García Márquez—Focus is on one of the most complex and confusing terms in criticism and literature history: Magical Realism. The novels and short stories of Colombian Gabriel García Márquez, and film adaptations of his literature, portray Magical Realism and other familiar concepts: Fantastic, “Real Maravilloso,” “fiction” vs. reality and documentary, etc. 3-5 units (Ruffinelli)

256. Mexico through the Eyes of Buñuel and Ripstein—Focus is on the two masters of film representation, Buñuel and Ripstein offered disturbing and polemic images of Mexico, which constitute the "real" Mexico for many viewers. The representation of family, gender, religion, race, and sex in films such as Los Olvidados, Nazarin, El Santo Oficio, and El Castillo de la Pureza. 3-5 units (Ruffinelli)

258. Dictatorships Aftermath: New Literature/New Cinema—The sociological, political, psychological, and existential scars left by South Cone military dictatorships in the '70s. Testimonial texts, short stories, and films as new expressions of literature and film on the eve of the new millennium. 3-5 units, Spr (Ruffinelli)

261. The Avant Garde in Latin America—Surveys the neglected but increasingly important Avant Garde period of the 1920s and '30s. Readings include novels, short stories, manifestos, and poetry from Mexico, Argentina, Uruguay, Peru, etc. 3-5 units (Ruffinelli)

262. The Origins of the New Latin American Novel—Several works of the 1920s form the foundation of the contemporary novel and provide a powerful image of Latin America: the "novel of the Land" (Don Segundo Sombra, Doña Barbara, La Vidascape), and the "novel of the City" (Los siete locos, Ifigenia). Close readings survey the 20th century. 3-5 units (Ruffinelli)

263. The Latin American Novel of the '60s: Cortázar, Vargas Llosa, García Márquez—Novels of the "Boom" era by this "generation" of internationally-known writers. Focus is on the construction of the modern canon of the Latin American novel. 3-5 units (Ruffinelli)

264. The Latin American Novel of the '70s: Bryce, P. Rossi, Soriano—Focuses on the post-Boom novel and the struggle for identity by a new generation of writers. The continuation/disruption of the aesthetics of the '60s. Readings: Peri Rossi, Skármeta, Soriano, etc. 3-5 units (Ruffinelli)

265. The Latin American Novel of the '80s 3-5 units (Ruffinelli)

266. Power, Resistance and Culture—The ways in which literary texts and cultural performances are related to power. Readings from various moments of Latin America and U.S. Latino history. The extent to which a project of resistance can be articulated through cultural production. Different strategies and the extent to which it can be an effective tool for transforming the ways in which modernity impacted the different time-space of the communities of their authors. Readings by Guzmán Poma, Carpenter, Piri Thomas, Miguel Barnet, etc. 3-5 units (Rosa)

268. A New Literary Genre: Testimony—Latin American literature and politics in light of a new narrative genre in the works of Cabezas, Poniatowska, Walsh, etc. 3-5 units (Ruffinelli)

269. Borges—Short stories, poetry, and essays by the Argentinean Borges. His works as literature and as a paradigm for the subsequent generation. Utilizes film adaptations of the short stories to make comparisons between two different aesthetic expressions. 3-5 units (Ruffinelli)

271. Reading the Rain Forest: Visions of the Amazon—For decades, the Amazon has been one of the most debated regions of the world. Home of a millennial cultural tradition that is expressed in and through various languages and social practices, it has had a decisive impact on the writers, artists, and scholars of Brazil and Spanish America. Views of the Amazon, considering indigenous texts: Umsusin Panlon Kumu’s AnteMundo nao Exista. Brazilian and Spanish American novels: Alejo Carpentier’s Los Pasos Perdidos, Darcy Ribeiro’s Maira, Marcio Souza’s O Boto do Tucuxi, and Mario Vargas Llosa’s El Hablador; plays, films, photography, and sociological essays. 3-5 units (Sá)

272. The Southern Cone Dictatorships—Works from Brazil, Argenti- na, Uruguay, Paraguay, and Chile focusing on the '60s-Southern Cone dictatorships. Writers: Nélida Piñón, Antonio Callado, Márcio Souza, Renato Tapajós, Diamela Eltit, David Viñas, Ricardo Piglia, Manuel Puig, Luisa Valenzuela, Cristina Perri-Rossi, Marta Traba, and Rubén Barioglo Aguiar. (In English, Spanish, or Portuguese, depending on students’ fluency.) 3-5 units (Sá)

275. Market and Culture in the Caribbean—The ways the Caribbean has been imagined and lived through different textual and cultural strategies, reacting and influencing different political and economic scenarios. How the image of the Caribbean is constructed from different spatial and social locations and how the cultural landscape has been
transformed in the last years. Issues: cultural geography; migration; urban problems; and popular cultures, race, and feminism.

3-5 units, Aut (Rosa)

276E. “Race,” Discourse, and the Origin of the Americas: The History that Literature Makes—The major literary and other texts related to the arrival of Columbus and the Spaniards in the Caribbean; the prelude voyage of the Portuguese around Cape Bojador, their landing on the shores of W. Africa; and the subsequent yoking of three separate worlds. The central role played by the literary and correlated juridico-theological texts of the time in the structuring of the post-1492 societies of the New World. Race as a basis of a status-organizing principle replacing the feudal principle of caste, a code that would be inseparable from the Renaissance’s “Invention of Man,” the rise of the modern state, and the global expansion of the West.

3-5 units (Wynter)

278. Senior Seminar: Pan-American Movements—Recommended for students working on honors theses. At various moments in the history of Latin America, intellectuals have proposed the goal of continental unity. How does the Pan-American ideal relate to the project of nation-building? Survey of Pan-American visions ranging from 19th- and early 20th-century leaders and intellectuals (Bolívar, Bello, Martí, and Vasconcelos) to contemporary figures (García Márquez, Galeano, Castillo, Saldívar). GER:4a (DR:2) (WIM)

3-5 units (Fox)

279. Senior Seminar: Heroes or Villains? Transgression in Spanish Art, Film, and Literature—Recommended for students working on honors theses. Transgression has been an element in Spanish Literature since the Middle Ages. In Western culture, transgressive fictional characters such as Celestina, Lazarillo and Don Juan have become the prototypes of the go-between, rogue, and womanizer. In art, Picasso and Miro shattered the aesthetic cannon of painting forever; and Bunuel and Almodóvar brought about surrealism and postmodernism in film. Contemporary fiction and film actively continue this tradition by depicting recurrent types of transgressors of both genders. Artistic and literary works and film represent aesthetic, ideological, criminal, sexual, and other behaviors that sabotage accepted rules and mores, yet exert tremendous magnetism on readers and viewers. (WIM)

3 units, Win (Haro)

CHICANO STUDIES

281. “Flor y Canto” A Poetry Workshop—Intensive poetry reading and writing workshop explores the poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-columbian Aztec poetry known as “flor y canto,” and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlan. Required 20-page poetry manuscript.

3-5 units (Moraga)

282. Sour Grapes: Writing in Resistance

4-5 units, Spr (Moraga)

285E. Chicana Cultural Studies—Analysis of the expressive culture (visual art, film/video, writings, and everyday cultural practice) of Mexican women in the U.S., grounded in an understanding of the culture as fluid and dynamic, not static or unchangeable, and shaped by the historical experience of its practitioners rather than existing beyond and above the people. Historical survey of culture as a site of conflict, contradiction, domination/resistance, and protest. Internship required. (In English) GER:4e (DR:1)

3-5 units, Spr (Yarbo-Bejarano)

286. Chicana/o Muralism—The artistic, political, and social movements that formed the modern tradition of chicana/o mural making in the U.S. and internationally. The social and political movements and their relationships to muralists: the WWII Zoot Suit era, McCarthyism, the bracero era, the birth of the UFW and the chicano student movement/MECHA, the Chicano Moratorium, chicana feminism, and international solidarity movements. Collaborative, hands-on design project.

5 units, Win (Alicia)

299. Individual Work—Open to department undergraduates or graduates by consent of professor. May be repeated for credit. (Spanish and Portuguese)

1-12 units, any quarter (Staff)

GRADUATE SEMINARS

Open to undergraduates with consent of instructor.

300. Issues and Methods in the Teaching of Heritage Languages—Focus is on the teaching of Spanish as a heritage language to students raised in Spanish-speaking homes. The fundamental issues relating to the language abilities of heritage students, including aspects of language variation in the Spanish-speaking world, characteristics of English/Spanish bilingualism in the U.S., and the process of second dialect acquisition. Emphasis is on the methods and techniques for developing the academic Spanish language skills of heritage-background students in a classroom setting.

3-5 units, Aut (Valdés)

302. Historicity and Legality in Colonial Latin America—Examination of tensions between the changing continuum of human life and the formalized rigors of the repressive culture (or law). A possible definition of law: the historical formalization of inclusions and exclusions of social agents from social goods. A critical look at the historical configuration or content of the repressive reality in relation to the Early Modern Americas (16th and 17th centuries). What does it mean to “regulate life” in Colonial Latin America or to “repress” collectivities and how is it done? Who determines the law? The role of the “letrado” culture in collective repression. Texts by Solorzano y Pereira, Ginés de Sepúlveda, Francisco de Vitoria, Bartolomé de las Casas, and Vasco de Quiroga. (In Spanish)

3-5 units, Spr (Gómez)

303. Concepts of Literacy and Cultural Theory—Topics of recent literary and cultural theory. Issues of meaning, agency, gender, and race. Reconceptualizations of the relationship between culture and material practices, and the implications for the study of the literary production of technological changes, the crisis of geographical and spatial distributions, and the emergence of social identities and informationalism. The relationship between literary and critical texts, social theory, economy, and anthropology. Texts by Rama, Castells, Bourdieu, Seyla Benhabib, Fernando Calderon, etc.

3-5 units (Rosa)

306E. Introduction to Literary Criticism and Theory: Sociocriticism—Literary theorists have proposed systematic approaches to literature in relation to the structures of society and of consciousness. “Classic” figures are combined with recent critics theorizing from non-European contexts. Readings: Northrop Frye, Raymond Williams, Jean Franco, Terry Eagleton, Angel Rama, Patricia Hill Collins, Gayatri Spivak, Edward Glaissant, Jean Bernabe, Nestor García Canclini, Pierre Bourdieu, Henry Louis Gates, etc.

3-5 units (Pratt)

307. Latin American Cultural Theory: A Historical Perspective—How has Latin America defined itself over time? How have its intellectuals dealt with questions related to race, class, and culture? Examples from different regions and moments of the Latin American experience offer some answers using concepts developed in the field of “Cultural Studies,” with a more diachronic approach. Readings: the foundational statements by Andres Bello, Jose de Alencar, and Jose Marti; the racial theories of Gilberto Freyre; Oswald de Andrade’s “Manifesto Antropofago”; Carpentier’s definition of “lo real maravilloso;” texts by Ernesto Che Guevara; Augusto Boal’s Teatro do Oprimido; Roberto Fernandez Retamar’s Caliban; Angel Rama’s Transculturation narrativa en Amer-
Trends and developments in 20th-century poetry in the context of Cervantes.

315. Cervantes
3-5 units (Sd)

308E. Scholarly Research and Writing: Workshop and Tutorial—Doctoral students produce a scholarly research: argumentation, questions of audience and expression, use of secondary sources, and other topics. Collaborative projects welcome. Group meetings and individual tutorials. Enrollment limit to 10.
3-5 units, Win (Pratt)

309E. Criticism and Colonialism—Critical approaches to literature and the study of literature and culture in relation to colonialism, neocolonialism, and the postcolonial world. Topics: representations and hegemony, transculturation, cultural dimensions of decolonization and resistance, psychoanalysis and colonial subjects, ideologies of masculinity and the feminine, colonial discourse, nationalism and the first world/third world distinction, popular culture, and syncretism. Readings from Europe, N. America, Latin America, Africa, and the Caribbean.
3-5 units (Pratt)

315. Cervantes
3-5 units, Spr (Williamson)

336. Major Trends in Spanish Poetry: Machado, Jiménez, Lorca—Trends and developments in 20th-century poetry in the context of Restoration Spain (1871-1930) and against the background of the democratic tradition of Spanish liberalism. Emphasis is on close stylistic analysis and such concepts as the Generation of 1898, Modernism, Krausism, pure poetry, and symbolic systems.
3-5 units (Predmore)

337. Ramón del Valle-Inclán—The evolution of the major works of Valle-Inclán from the Sonatas to Tirano Banderas, including the Comedias bárbaras and three of the “esperpentos,” against the background of Restoration Spain. Emphasis is on Valle as a major force in aesthetic innovation and social criticism.
3-5 units (Predmore)

341. Gabriel García Márquez and Magical Realism—Overview/discussion on “Magical Realism” as developed in the literary works of Colombian writer García Márquez and in films based on his short stories and scriptwriting. Magical Realism as the expression of myth, exoticism, and political discourse.
3-5 units, Win (Ruffinelli)

342. Liberalism: Politics and Literature in 19th-Century Latin America—The relationships between poetic works and the creation of the new states in Latin America are formulated by focusing on the connections between the appropriation of the liberal tradition and its transformations by the elite and subaltern intellectuals, and the parallel process of imitating and transforming European literary models. Theoretical readings from recent debates on liberalism and studies on literary romanticism are combined with discussion of the works of Latin American writers.
3-5 units, Win (Rosa)

348E. Contemporary Cuban Narrative and Marxist Aesthetics—Cuban novels since the '60s are a way to question and reflect on Marxist theories of literature. How Cuban writers appropriate and nationalize Marxist theories of representation to reconcile them with a construction of a "Cuban" or "Caribbean" self within the frame of the revolutionary state. Recent cultural debates through the readings of fiction and theory, e.g., the relationship between self and community, organic intellectuals, ideology and the state, popular culture, etc. Readings: Lezama Lima, Carpenter, Reinaldo Arenas, Lisandro Otero, Daena Chaviano, etc.
3-5 units (Rosa)

357. Latin American Fiction of the 1990s—The works of a range of contemporary prose fiction writers: Margo Glantz (Mexico), Sergio Ramírez (Nicaragua), Diamela Eltit (Chile), Mario Bellatin (Peru/Mexico), Silviano Santiago (Brazil), and Carmen Boullosa (Mexico). Intensive reading.
5 units, Aut (Pratt)

358. Latin American Short Story: Theory and Practice—Since Modernismo, the short story has been considered one of the most important "genres" in Latin American literature. Focus is on short story-telling writers such as Darío, Quiroga, Borges, Cortázar, Garro, Arreola, Monterroso. Latin American theories on the short story are compared with other (European, American) theoretical and critical thinking.
3-5 units (Ruffinelli)

359. 19th-Century Latin America: Currents and Cross-Currents—Intensive three weeks of concentrated seminar sessions, followed optionally by preparation of individual research projects.
3-5 units (Pratt)

360. Gender, Race, and Nation in 19th-Century Latin America—Readings of major writers of the 19th century, emphasizing their relation to projects of nation-building and decolonization.
5 units (Pratt)

361. Latin American Writing, 1900-1945: Dialectics of Cosmopolitanism/Localism—Major women poets, novelists, and essayists in dialogue with the major male writers of the same period. Issues of gender and gender symbolism in relation to regionalist, vanguardists, and the feminist movements.
5 units (Pratt)

363. Third Cinema and After—The New Latin American Cinema and Cine Novo movements. The role of the filmmaker as social theorist, the filmmakers' relation to cosmopolitan and other third world intellectuals, and the role of cinema in national liberation struggles. The legacy of these movements in Latin America and elsewhere. Current trends in Latin American cinema, and the revival of the term "Third Cinema" to describe a variety of oppositional film practices worldwide.
3-5 units (Fox)

369. The U.S.-Mexico Border Region—Interdisciplinary seminar, emphasizing recent scholarship in the field of border studies. Topics: the maquiladora industry, cross-border organizing, mass media in the border region, free trade, immigration; and critical theory, arts, and literature about border identities. (Readings in Spanish and English)
3-5 units (Fox)

372E. A Latin American Woman Voice: Clarice Lispector—The major works of Clarice Lispector in the context of Brazilian, Anglo-American, and French feminist and non-feminist criticism. (In English)
3-5 units, Win (Sá)

380. Critical Concepts in Chicana/o Literature—Metacritical interrogation of received notions about Chicana/o creativity, and how its canon and genealogies have been constructed and re-constructed over time. "Foundational" texts (With a Pistol in His Hand, Y No se lo Trago la Tierra), and cultural nationalist/neoinmigrant manifestos. Poetry and theater have been formulated as configuring genealogies that were later disrupted by Chicana feminist/lesbian critiques and writings. This literary history is questioned by highlighting women's essential participation from the beginning in theorizing and writing (which co-existed with sexism), by examining alternative subjects and genealogies, and by studying recently published early women-authored novels.
3-5 units (Yarbro-Bejarano)

389E. Race and Sexuality—Analysis of representations by Latinas and Latinos of race, ethnicity, sexuality, and identity in a variety of media: writing, visual art, performance, film/video, and music. How are the
intersections between race and sexuality represented? How is desire racialized in these representations? How do these representations contest the "ideal body" of American and/or Latina/o national identity? (In English)

5 units, Win (Yarbro-Bejarano)

399. Individual Work—Exclusively for Spanish and Portuguese departmental graduate students engaged in special work, by consent of professor.
1-12 units, any quarter (Staff)

AFFILIATED DEPARTMENT OFFERINGS
See the respective department listings for course descriptions.

COMPARATIVE LITERATURE

271. On Honor
3 units, Spr (Middlebrook)

CULTURAL AND SOCIAL ANTHROPOLOGY

72. Dance and Culture in Latin America
3-4 units, Spr (Cashion)

104. Race and Language in the U.S.
5 units, Spr (Roth, Gordon)

DRAMA

17N. Stanford Introductory Seminar: (Re)Viewing Valdez in the Year 2000
3 units, Win (Moraga)

177. Playwriting: Writing for Performance—The Fundamentals
5 units, Win (Moraga)

179B. Teatro America Workshop: The Theater of Native/Chicano America
5 units, Spr (Moraga)

DANCE

42. Dances of Latin America
1 unit, Aut (Cashion)

43. Afro-Brazilian and Afro-Peruvian Dance
1 unit, Aut (Cashion)

ENGLISH

162G. Writings by 20th-Century Women of Color
5 units, Aut (Moya)

LATIN AMERICAN STUDIES

250. Graduate Core Seminar in Latin American Studies: Discourses of Race and Identity in Latin America
5 units, Aut (Sá)

SPECIAL LANGUAGES PROGRAM

174A, B, C. Beginning Quechua
3 units, Aut, Win, Spr (Fajardo)

OVERSEAS STUDIES

These courses are approved for the Spanish major and taught at the campus indicated. Students should discuss with their major advisers which courses would best meet educational needs. Course descriptions can be found in the "Overseas Studies" section of this bulletin or in the Overseas Studies Program office, 126 Sweet Hall.

SANTIAGO

290Z. Modernization and Culture in Latin America—(Same as Overseas Studies 120X.)
5 units, Aut, Spr (Subercaseaux)

STATISTICS

Chair: David O. Siegmund
Associate Professors: Amir Dembo, Joseph P. Romano
Assistant Professors: Emmanuel Candès, Jun Liu, Guenther Walther
Courtesy Professors: Richard A. Olshen, Neil Risch
Courtesy Associate Professor: David Rogosa
Senior Lecturer: Susan Holmes

The department’s goals are to acquaint students with the role played in science and technology by probabilistic and statistical ideas and methods, to provide instruction in the theory and application of techniques that have been found to be commonly useful, and to train research workers in probability and statistics. There are courses for general students as well as those who plan careers in statistics in government, business, industry, and teaching.

The requirements for a degree in statistics are flexible, depending on the needs and interests of the students. Some students may be interested in the theory of statistics and/or probability, whereas other students may wish to apply statistical and probabilistic methods to a substantive area. The department has long recognized the relation of statistical theory to applications. It has fostered this by encouraging a liaison with other departments in the form of joint and courtesy faculty appointments: Economics (Anderson), Education (Olkin, Rogosa, Suppes), Electrical Engineering (Cover), Geological and Environmental Sciences (Switzer), Genetics (Risch), Health Research and Policy (Brown, Efron, Hastie, Johnstone, Moses, Olshen), Mathematics (Dembo, Diaconis), Stanford Linear Accelerator (Friedman). The research activities of the department reflect an interest in both applied and theoretical statistics, and probability. There are workshops in biology-medicine and in environmental factors in health.

In addition to courses for statistics majors, the department offers a number of service courses designed for students in other departments. These tend to emphasize the application of statistical techniques rather than their theoretical development.

The Department of Statistics is well equipped for statistical applications and research in computational statistics. Computer facilities include SGI Challenge networked to approximately 25 X-terminals and a PC lab for general research and teaching use. The Mathematical Sciences Library serves the department jointly with the departments of Mathematics and Computer Science.

The department has always drawn visitors from other countries and universities. As a consequence, there is usually a wide range of seminars offered by both the visitors and our own faculty.

UNDERGRADUATE PROGRAMS

MAJOR

Students wishing to build a concentration in probability and statistics are encouraged to consider declaring a major in Mathematical and Computational Sciences. This interdepartmental program is administered in the Department of Statistics (Bradley Efron, chair) and provides a core training in mathematics, statistics, computing, and operations research, with opportunities for further elective work and specialization. See the "Mathematical and Computational Science" section of this bulletin.

MINORS

The undergraduate minor in Statistics is designed to complement major degree programs primarily in the social and natural sciences. Students with an undergraduate Statistics minor should find broadened possibilities for employment. Furthermore, the Statistics minor provides
Examples of elective course sequences are:

- Statistics 217, 218 (251), emphasizing probability and its applications
- Statistics 207; Electrical Engineering 264 (279), emphasizing signal processing
- Statistics 206; Psychology 156 (160), emphasizing psychology models and experiments
- Statistics 205; Economics 160 (181), emphasizing economic optimization
- Statistics 202; Mathematics 110, 190.

**GRADUATE PROGRAMS**

**MASTER OF SCIENCE**

The department requires that the student take 40 units of work from offerings in the Department of Statistics or from authorized courses in other departments. If Ph.D. level statistics courses are included in the program, the total number of units may be reduced. Ordinarily, four or five quarters are needed to complete all requirements.

Each student should fulfill the following requirements for the M.S. degree:

1. Statistics 116, 200, 201, and 217. Courses previously taken may be waived by the adviser, in which case they must be replaced by other graduate courses offered by the department.

2. One of Mathematics 103, 113, and 115/117; and one of Computer Science 106X (3 units), 137 (3 units), and 138A. Substitution of other courses in mathematics and computer science may be made with consent of the adviser.

3. At least three additional courses from graduate offerings in the department (202-399). Consent of the adviser is required in order to take more than 6 units of Statistics 260, 390, or 399.

4. Additional units to complete the requirements may be chosen from the list available from the department. Other graduate courses (200 or above) may be authorized by the adviser if they provide skills relevant to statistics or deal primarily with an application of statistics or probability and do not overlap courses in the student’s program. There is sufficient flexibility to accommodate students with interests in applications to business, computing, economics, engineering, health, operations research, and social sciences.

Students with a strong mathematical background who may wish to go on to a Ph.D. in Statistics should consider applying directly to the Ph.D. program.

All statistics courses required for the M.S. degree (116, 200, 201, 217, and three additional statistics graduate courses) must be taken for letter grades, and an overall 2.75 grade point average (GPA) is required.

**DOCTOR OF PHILOSOPHY**

The department looks for motivated students who want to prepare for research careers in statistics or probability, either applied or theoretical. Advanced undergraduate or master’s level work in mathematics and statistics provides a good background for the doctoral program. Quantitatively oriented students with degrees in other scientific fields are also considered for admission. The program normally takes four years.

**Program Summary**—Statistics 300A, B, C, 305, 306A, B, and 310A, B, C (first-year core program); pass two of three parts of the qualifying examination (beginning of second year); breadth requirement (second or third year); University oral examination (end of third year or beginning of fourth year); dissertation (fourth year).

In addition, students are required to take 9 units of advanced topics courses offered by the department (courses numbered above 310, not including literature, research, or consulting), and 3 units of statistical consulting.

**First-Year Core Courses**—Statistics 300 systematically surveys the ideas of estimation and of hypothesis testing for parametric and nonparametric models involving small and large samples. 305 is concerned with linear regression and the analysis of variance. 306 surveys a large number of modeling techniques, related to but going beyond the linear models of 305. 310 is a measure-theoretic probability theory, beginning with the basic concepts of analysis.

**Qualifying Examinations**—These are intended to test the student’s level of knowledge when the first-year program, common to all students, has been completed. There are separate examinations in the three core subjects of statistical methods, mathematical statistics, and probability theory, and all are given at the beginning of the Autumn Quarter of the student’s second year. Students may take two or three of these examinations and are expected to show acceptable performance in two examinations.

**Breadth Requirement**—In order to appreciate scientific problems, students are required to take 9 units of course work at a graduate or advanced undergraduate level in some other department. These units must be in courses higher than 200. Students with a graduate degree in a scientific area that is not essentially mathematics or statistics are exempted from this requirement.

**University Oral Examination**—The University oral examination is taken on the recommendation of the student’s research adviser after the thesis problem has been well defined and some research progress has been made. Usually, this happens early in the student’s fourth year. The oral examination consists of a 40-minute presentation on the thesis topic, followed by two question periods. The first relates directly to the student’s presentation and the second is intended to explore the student’s familiarity with broader statistical topics related to the thesis research.

**Financial Support**—Students accepted to the Ph.D. program are offered financial support. All tuition expenses are paid and there is a fixed monthly stipend determined to be sufficient to pay living expenses. Financial support is continued for four years, department resources permitting, for students in good standing. The resources for student financial support derive from funds made available for student teaching and research assistantships. Students receive both a teaching and research assignment each quarter which, together, do not exceed 20 hours. Students are strongly encouraged to apply for outside scholarships, fellowships, and other forms of financial support.

**Ph.D. MINOR**

The Department of Statistics will devise individual Ph.D. minor programs, but the department urges all graduate students in other fields who wish to have a subspeciality in statistics to study for an M.S. degree instead. The unit requirement for an M.S. degree is 40 units, whereas the number of units required for a minor averages around 30. This difference of 10-12 units can be made up by the student by including in the M.S. program courses from his or her own field which are related to statistics or applications of statistics.
COURSES

INTRODUCTORY

Introductory courses for general students with an interest in the problems of descriptive statistics and statistical inferences are Statistics 40, 50, 60, 61. These courses have no mathematical prerequisites. Statistics 40, 50, and 60 are certified to meet the General Education Requirement in mathematics for undergraduates. Statistics 40 and 50 are Stanford Introductory Seminars offering introductions to particular topics in a small group format with a preference to freshmen. The sequence 60, 61 emphasizes mainly the techniques and methods of statistical inference. Statistics 110, 116, 190, 200, 217-218 are introductory but have a calculus prerequisite. Statistics 110 (which builds on 116) covers the most important techniques used in the analysis of experimental data in engineering and science. Statistics 190 is a post-calculus course in statistics specifically designed for economists, psychologists, sociologists, and other social science majors. Statistics 116 provides a general introduction to the theory of probability. It may be followed by 200, which deals with statistical theory, or by 217 and 218, which deal with stochastic processes. The sequence 116, 200 is a basic two-quarter sequence in mathematical statistics; the sequence 116, 217, 218 is a basic one-year course in probability theory.

40N. Stanford Introductory Seminar: Chance, Experiments, and Interface—Preference to freshmen. The role of probability and statistics in understanding chance phenomena in an uncertain and unpredictable world. Goal: expose students to the range of real-world applications of probability and statistics, to read newspaper and journal articles with critical thinking, and to learn some simple "back of the envelope" calculations to interpret data. Applications: statistics in court cases, randomized clinical trials and assessing the efficacy of new drugs; chance and strategy in sports; paradoxes in probability and statistics; predicting the stock market and the random walk hypothesis; analysis of ESP experiments. GER:2c (DR:4) 3 units, Win (Romano)

41N. Stanford Introductory Seminar: News and Numbers—Interpreting Information—Preference to freshmen. Data reporting in newspaper and magazine accounts often leads to misinterpretations and erroneous conclusions. Goal: introduce the basic statistical tools needed to critically interpret reported data. Applications from medicine, law, sports, parapsychology, business, etc. GER:2c (DR:4) 3 units, not given 1999-2000

42N. Stanford Introductory Seminar: Monte Carlo Methods—From Molecular Structure to Dynamic Systems—Preference to freshmen. Computer simulation techniques, particularly Monte Carlo methods, first appeared in the early days (1945-55) of electronic computing. The technique was named after the gambling resort because its procedures incorporate the element of chance. Statistical physicists introduced the Markov Chain-based, dynamic Monte Carlo method for the simulation of simple fluids and, later, more complex physical systems. 1980s statisticians and computer scientists developed the method for varieties of Bayesian computation tasks (e.g., hierarchical modeling, forecasting, and belief network computation). In the 90s, the method played a role in computational biology and was used to solve problems in sequence motif identification and the analysis of complex pedigrees. Application areas of Monte Carlo methods include biology, chemistry, computer science, economics and finance, engineering, material science, physics, and statistics. The basic principle of the Monte Carlo simulation method and the power of the method: applications from polymer simulations to target tracking. GER:2c (DR:4) 3 units, not given 1999-2000

43N. Stanford Introductory Seminar: Data Analysis and Flow Cytometry—Preference to freshmen. Hands-on research at a flow cytometer in the Medical School. Flow cytometry is a technology for analyzing and sorting cells that is based on laser-induced fluorescence. The technique has become prevalent in the clinical setting and for research, and is an excellent medium to explore important statistical tools used in data analysis. GER:2c (DR:4) 3 units, not given 1999-2000

50N. Stanford Introductory Seminar: Mathematics in Sports—Preference to freshmen. The mathematical and physical foundations of various sports are developed to provide new statistics, interpret old statistics, and suggest new physical and strategic approaches. Extremes are examined to find the optimum. Some game theory and assessment of odds. The extent to which all sports are equally exciting. Skill vs. luck. The mathematics are followed as necessary to reach the desired conclusions. Recommended: mathematical aptitude. GER:2c (DR:4) 3 units, Spr (Cover)

60. Introduction to Statistical Methods: Precalculus—(Graduate students register for 160; same as Psychology 10.) Emphasis is on techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. GER:2c (DR:4) 3 units, Win (Griffin) 5 units, Spr (Thomas)

61. Introduction to Statistical Methods II—(Graduate students register for 161.) Chi-square tests, analysis of variance, regression, correlation, nonparametrics, sample surveys, elementary design of experiments. Prerequisite: 60 or consent of instructor. 3 units, Win (Candes)

105Q. Stanford Introductory Seminar: Statistical Design of Experiments in Extrasensory Perception—Preference to sophomores. The principle of good and bad experimental designs and how experimental data is used to reach conclusions. Randomization, experimental control, efficient design, elementary probability, statistical inference, quantification of uncertainty. 3 units, not given 1999-2000

110. Statistical Methods in Engineering and the Physical Sciences—Introduction to applied statistics for engineers and physical scientists. Topics: descriptive statistics, interval estimation, tests of hypotheses, nonparametric methods, linear regression, analysis of variance, elementary experimental design. Prerequisites: 116 or equivalent, and one year of calculus. GER:2c (DR:4) 4 units, Aut (Switzer) 3-5 units, Aut (Walther) Sum (Staff)

116. Theory of Probability—Probability spaces as models for phenomena with statistical regularity. Discrete spaces (binomial, hypergeometric, Poisson). Continuous spaces (normal, exponential) and densities. Random variables, expectation, independence, conditional probability. Introduction to the Laws of Large Numbers and Central Limit Theorem. Prerequisite: Mathematics 52 and some familiarity with infinite series, or equivalent. GER:2c (DR:4) 3-5 units, Aut (Walther) Sum (Candes) Sum (Staff)

160. Introduction to Statistical Methods: Precalculus—See 60. For graduate students. 5 units, Aut (Griffin) Win (Walther) Spr (Thomas) Sum (Staff)

161. Introduction to Statistical Methods II—See 61. For graduate students. 3 units, Win (Candes)
190. Introduction to Statistical Methods (Postcalculus) for Social Scientists—(Same as Economics 80.) Introduction to statistical methods relevant to the social sciences. Emphasis is on the description and examples of the use of statistical techniques. Probability: basic rules of probability, conditional probability, Bayes' rule, discrete and continuous probability distributions. Statistical inference: point estimation, tests of hypotheses, confidence intervals, large-sample methods. Data analysis: linear regression techniques and diagnostics. Statistical computer packages (e.g., Mintab) are used for inference and data analysis. Autumn, section 2, (Switzer) uses Web based tools; limited enrollment. See www.stat/teaching/Stat190. Prerequisites: Mathematics 41 or equivalent, consent of instructor. GER:2c (DR:4)

3-5 units, Aut (Johnstone)
Win (Amemiya)
Spr (Liu)
Sum (Staff)

199. Independent Study—For undergraduates.
(Staff)

200. Introduction to Statistical Inference—Modern statistical concepts and procedures derived from a mathematical framework. Statistical inference, decision theory; point and interval estimation, tests of hypotheses; Neyman-Pearson theory. Bayesian analysis; maximum likelihood, large-sample theory. Prerequisite: 116. 3 units, Win (Staff)

CONTINUATION

Courses in this category have been designed for particular use in applications. Generally, they have introductory statistics or probability as prerequisites.

201. Statistical Methods—Descriptive statistics, tests of hypotheses, comparison of two samples, the binomial distribution, nonparametric methods, regression correlation, and elements of the analysis of variance. Can be followed by 202 or 203 (or both, in any order). Prerequisite: 116 or equivalent.

3 units, Aut (Walther)

202. Data Analysis—Elements of modern data analysis. Possible topics: bootstrap and jackknife methods for assessing variability, cross-validation, smoothing procedures and density estimation, multiple linear regression and variable selection, data transformation, nonlinear regression. Emphasis is on conceptual rather than theoretical understanding. Prerequisite: 201 or equivalent.

3 units, Spr (Candes)

203. Introduction to Regression Models and the Analysis of Variance—The most widely used statistical techniques; interpretation of observational data and empirical model building. Topics: simple and multiple linear regression, nonlinear regression, analysis of residuals and model selection, design of one-way and two-way factorial experiments, fixed effects and random effects models. Prerequisite: 200 or 201.

3 units, Spr (Owen)

204. Sampling from Finite Populations—The theory of sampling from finite populations. Simple random sampling, stratified sampling, cluster sampling, efficiency of various designs, nonresponse models; emphasis on applications. Prerequisite: a basic course in statistics (61, 110, or 200).

3 units, not given 1999-2000

205. Introduction to Nonparametric Statistics—Nonparametric analogs of the one- and two-sample t tests and analysis of variance; the sign test, median test, Wilcoxon's tests, and the Kruskal-Wallis and Friedman tests, tests of independence. Nonparametric regression and nonparametric density estimation, modern nonparametric techniques, nonparametric confidence interval estimates.

3 units, Win (Candes)

206. Applied Multivariate Analysis—Introduction to the statistical analysis of several quantitative measurements on each observational unit. Emphasis is on concepts, computer-intensive methods. Examples from economics, education, geology, psychology. Topics: multiple regression, multivariate analysis of variance, principal components, factor analysis, canonical correlations, multidimensional scaling, clustering. Prerequisite: 200 or 201; concurrent registration in 200 is permitted.

3 units, not given 1999-2000

207. Introduction to Time Series Analysis—Time series models used in economics, engineering, physics, geology, etc. Trend fitting, autoregressive schemes, moving average models, periodograms, second order stationary processes, spectral analysis. Prerequisites: 116 and a basic course in statistics (200 or 201A).

3 units, not given 1999-2000

208. Introduction to the Bootstrap—The bootstrap is a computer-based method for assigning measures of accuracy to statistical estimates. By substituting computation in place of mathematical formulas, it permits the statistical analysis of complicated estimators. Topics: nonparametric assessment of standard errors, biases, and confidence intervals; related resampling methods including the jackknife, cross-validation, and permutation tests. Theory and applications. Prerequisite: at least one course in statistics or probability.

3 units, not given 1999-2000

211. Statistical Methods for Meta-Analysis—(Same as Education 493B, Health Research and Policy 206.) Meta-analysis is a quantitative method for combining results of independent studies, and enables researchers to synthesize the results of related studies so that the combined weight of evidence can be considered and applied. Examples from the medical, behavioral, and social sciences. Topics: literature search, publication and selection bias, statistical methods (contingency tables, cumulative methods, sensitivity analyses, non-parametric methods). Project. Prerequisites: basic sequence in statistics.

3 units, Win (Olkin)


3 units, Aut (Romano)


3 units, Aut (Staff)
Win (Liu)


3 units, Spr (Cover)


3 units, not given 1999-2000
3 units, Win (Owen)

245. Computation and Simulation in Finance—(Enroll in Mathematics 240.)
3 units, Spr (Papanicolaou)

3 units, Win (Owen)

3 units, Win (Tibshirani, Betts)

3 units, Spr (Olshen)

289. Industrial Research for Statisticians—Masters-level research as in 299, but must be conducted for an off-campus employer. Final report required. Prerequisite: enrollment in M.S. or Ph.D. program (prior to candidacy).
3 units, Aut, Win, Spr (Staff)

PRIMARILY FOR DOCTORAL STUDENTS

Sequences 300A, B, C, 305, 306A, B, and 310A, B, C comprise the fundamental sequence which serves as a general introduction to and prerequisite for further work. Subsequent courses delve more deeply into special topics.

300A, B, C. Workshop in Biostatistics—(Same as Health Research and Policy 260A, B, C.) Primarily for doctoral students in statistics. Applications of statistical techniques to current problems in medical science. Enrollment for more than 2 units of credit involves extra reading or consulting and requires consent of the instructor.

300A. 1-5 units, Aut (Bloch, Brown, Efron, Hastie, Johnstone, Lavori, Olshen, Tibshirani)

300B. 1-5 units, Win (Bloch, Brown, Efron, Hastie, Johnstone, Lavori, Olshen, Tibshirani)

300C. 1-5 units, Spr (Bloch, Brown, Efron, Hastie, Johnstone, Lavori, Olshen, Tibshirani)

300A, B, C. Theory of Statistics—Elementary finite sample theory of point estimation: statistical models; sufficiency; applications to exponential families, group families, and nonparametric families; minimum risk unbiased estimation; minimum risk equivariant estimation; Cramér-Rao inequality. Elementary decision theory: loss and risk functions, Bayes estimation; minimax estimation; shrinkage estimators. Large sample estimation theory: asymptotic efficiency, maximum likelihood estimation, delta method, asymptotic distribution of quantiles and trimmed means, differentiability of statistical functionals robustness and influence. Hypothesis testing and confidence intervals: Neyman-Pearson theory; uniformly most powerful tests and uniformly most accurate confidence intervals for distributions with monotone likelihood ratio; systematic use of sufficient and conditioning to eliminate nuisance parameters in exponential families; use of invariance to eliminate nuisance parameters in group families; asymptotic theory of likelihood ratio test; Pitman asymptotic efficiency; rank, permutation and randomization tests; jackknife, bootstrap, and sample reuse methods. Density estimation: kernel density estimation; bias vs. variance tradeoff; choice of bandwidth and kernel. Time series: first- and second-order autoregressive processes; conditions for stationarity; use of maximum likelihood in time series with asymptotic theory. Possible topics: sequential analysis, optimal experimental design, empirical processes with applications to statistics, Edgeworth expansions with applications to statistics.

300A. 3 units, Aut (Romano)
300B. 3 units, Win (Romano)
300C. 3 units, Spr (Donoho)

3 units, Aut (Hastie)

306A, B. Methods for Applied Statistics—Survey of applied statistical methods, including computational methods. Topics: nonlinear least squares (including robust regression), generalized linear models, time series (autocorrelation, autoregression, periodogram, spectrum), survey sampling (finite populations, stratification, clustering, ratio estimation), nonparametric regression (kernels, splines, projection pursuit, CART, MARS), survival analysis (Kaplan-Meier, Mantel-Haenszel, Cox model), design (factorial experiments, response surfaces), random number generation, numerical linear algebra, numerical optimization, sample reuse (bootstrap, jackknife, cross-validation, other Monte Carlo), matrix based multivariate statistics (canonical correlation, T-squared, factor analysis, principal components), and other topics briefly. Prerequisite: 305 or equivalent.

306A. 3 units, Win (Donoho)
306B. 3 units, Spr (Friedman)

310A. Theory of Probability—Mathematical tools: asymptotics, metric spaces; measure and integration; Lp spaces; some Hilbert spaces theory. Probability: independence, Borel-Cantelli lemmas, almost sure and Lp convergence, weak and strong laws of large numbers. Weak convergence and characteristic functions; central limit theorems; local limit theorems; Poisson convergence. Prerequisites: 116, Mathematics 171.
3 units, Aut (Siegmund)
3 units, Win (Dembo)

3 units, Spr (Siegmund)

314. Matrix Theory and Inequalities
3 units, not given 1999-2000

315A,B,C. Modern Applied Statistics: Learning and Data Mining—
The meteoric rise in computing power has been accompanied by a rapid growth in the areas of statistical modeling and data analysis. New techniques have emerged that were not possible ten years ago, using ideas that bridge the gap between statistics, computer science, and artificial intelligence. The new methods, emphasizing the statistical methodology.
3 units, Aug (Tibshirani)

315B. Data Mining—Data mining is used to discover patterns and relationships in data, with an emphasis on large observational data bases. It sits at the common frontiers of statistics, data base management, machine learning, and data visualization. From a statistical perspective, it is viewed as computer automated exploratory analysis of (usually) large complex data sets. Topics: classification, association rules, decision trees, covering algorithms, example based methods, clustering, and visualization.
3 units, Win (Friedman)

3 units, Spr (Hastie)

3 units, Spr (Dembo)

318. Modern Markov Chains—Examples: the Gibbs sampler, metropolis algorithm and hybrid Monte Carlo. Irreducibility, recurrence periodicity, Doeblins techniques, C-sets, Harris recurrence. Coupling, spectral techniques, bounds on convergence from bounds on the spectrum. Iterated function systems with application to image compression recurrence; Foster’s criteria and applications to statistical decision theory. Introduction to control theory and nonlinear time series analysis. Pre-requisite: graduate probability course.
3 units, not given 1999-2000)

319. Literature of Statistics—Literature study of topics in statistics and probability culminating in oral and written reports.
3 units, Aut (Staff)
Win (Donoho)
Spr (Johnstone)

3 units, not given 1999-2000

323. Wavelets and Beyond, with Applications—New representations have been proposed for signals and images, e.g., wavelets, wavelet packets, and cosine packets. How these representations are constructed, comparing their special features. The range of potential applications (data compression, feature extraction, pattern classification), and newer representation tools, e.g., noiselets, brushlets, ridgelets, etc.
3 units, not given 1999-2000

3 units, not given 1999-2000

326. Sequential Experimentation—Sequential statistical decision problems, dynamic programming and optimal stopping, quality control and changepoint detection, dynamic allocation and bandit problems, repeated significance tests, and boundary crossing probabilities.
3 units, not given 1999-2000

332. Asymptotic Methods in Statistics—Concepts of efficiency, the asymptotic efficiency of maximum likelihood estimators, best asymptotically normal (BAN) estimators, asymptotic behavior of likelihood ratio tests, optimal designs, empirical Bayes methods.
3 units, not given 1999-2000

3 units, not given 1999-2000

340. Experimental Design—For graduate students in science, engineering, and statistics. Emphasis is on how and why do experiments, and analyzing and presenting the results. Topics: control groups, anova, blocking and balance, factorial experiments, fractional factorials, screening designs, response surfaces, binary outcomes, Taguchi methods, computer experiments. Pre-requisite: 116. Recommended: experience with experimentation or data analysis.
3 units, not given 1999-2000

3 units, not given 1999-2000
344A. Genetic Epidemiology—(Same as Genetics 344A.) Methods for the design and analysis of studies in human genetics, focusing on the epidemiology of Mendelian disorders and the genetic and environmental contributions to common, complex familial traits. Topics: study designs for assessing the importance of genetic factors (family, twin, and adoption studies); methods for determining modes of inheritance (segregation analysis); identification and mapping of major genes through linkage analysis and disease-marker associations. Applications to birth defects, coronary heart disease, psychiatry, neurology, cancer, and immunology. 3 units (Risch) alternate years, not given 2000-01

344B. Topics in Statistical Genetics—(Same as Genetics 344B.) In-depth discussion of statistical methods currently used in human genetic analysis. Topics depend on interests of the students and instructors: concepts of likelihood as used in the genetic context; measures of familial aggregation, including issues of censoring and age-dependent data; genetic modeling of quantitative traits; mode of inheritance analysis, including segregation analysis; analysis of extended pedigrees; parametric and nonparametric approaches to linkage analysis and gene mapping, including family studies, radiation hybrid data, sperm typing, and DNA contig mapping; linkage disequilibrium; analysis of DNA profiles for individual identification; DNA sequence analysis. 3 units (Risch)

350. Advanced Topics in Probability Theory—Each year concentrates on a different topic(s) of current research in probability theory, chosen to reflect the interests of the students and instructor. Possible topics: Brownian motion, course graining, concentration inequalities, discrete probability, Gibbs measures, interacting particle systems, large deviations, percolation, random matrices, Stein’s method. 3 units, not given 1999-2000

352. Spatial Statistics—Summary statistics, probability models, smoothing and interpolation, classification, sampling design, applications to remote sensing, and environmental monitoring. 3 units, Spr (Switzer)

353. Monte Carlo Methods—Recent advances in iterative and noniterative Monte Carlo sampling methods involved in scientific and statistical computations. Basic iterative methods: the Metropolis-Hastings algorithm and the Gibbs sampler; noniterative methods mainly cover variations of importance and sampling. Topics: molecular dynamics, hybrid Monte Carlo (and other Hamiltonian-based methods), Langevin diffusion, simulated and parallel tempering, adaptive directional sampling, multigrid Monte Carlo and generalized Gibbs sampling, multiple-try Metropolis, conjugate-gradient MC, growth Monte Carlo, and Monte Carlo filtering methods. Applications to Bayesian computations, computational biology, computer chip design, digital signal processing, polymer simulation, statistical physics, and target tracking. 3 units, Win (Liu)


371. Bayesian Modeling and Computations—Bayesian methods treat unknowns as random variables and are coherent and flexible. Basic Bayesian models, whose answers often appear similar to classical answers. Complicated hierarchical and mixture models with nonstandard solutions. Methods for model checking, sensitivity analysis, and predictions. Emphasis is on drawing inferences via computer simulation. Mathematical analysis discussion. 3 units, not given 1999-2000

372. Graphical Models and Bayesian Network—Using graphs to represent statistical models (the associational and casual relations between random variables under study) enables concise representations, easy interpretation, and computationally feasible incorporation of new information. Emphasis is on Bayesian inference using these graphical models, e.g., Bayesian networks. Topics: basic graph theory, graphical Gaussian models, log linear models, expert systems, missing data problems, and genetic modeling. Computational issues and their applications to artificial intelligence. 3 units, not given 1999-2000

376A. Information Theory—(Same as Electrical Engineering 376A.) Information theory and statistics. The extreme points of communication theory: data compression to the entropy limit, and communication at the channel capacity limit, Kolmogorov complexity, Shannon entropy. Rate distortion theory. Huffman coding and random coding. Unified treatment based on the asymptotic equipartition theorem. Prerequisite: 116 or Electrical Engineering 278, or equivalent. 3 units, Win (Cover, Gill)

376B. Information Theory—(Enroll in Electrical Engineering 376B.) 3 units, alternate years, given 2000-01

390. Consulting Workshop—Provides skills required of practicing statistical consultants and exposure to wide range of statistical applications. Students participate as consultants in the department’s drop-in consulting service, analyze client’s data, and prepare formal written reports. Seminar provides supervised experience in short term consulting. Prerequisites: coursework in applied statistics or data analysis, and consent of the instructor. 3 units, Aut, Win (Owen) Spr (Donoho)

398. Industrial Research for Statisticians—Doctoral research as in 199, but must be conducted for an off-campus employer. Final report required. Prerequisite: Statistics Ph.D. candidate. 1-9 units, Aut, Win, Spr, Sum (Staff)

399. Research—Research work as distinguished from independent study of nonresearch character listed in 199. (Staff)

PROGRAM IN STRUCTURED LIBERAL EDUCATION

Director and Professor: Mark Mancall (History)
Lecturer and Coordinator: Suzanne Greenberg

The Program in Structured Liberal Education (SLE) is designed specifically for freshmen interested in an interdisciplinary approach to the liberal arts and sciences. The program emphasizes intellectual rigor and individualized contact between faculty and students. SLE has three basic purposes: to present a coherent program of instruction; to develop the student’s ability to ask effective questions of texts, teachers, the culture, and themselves; and to develop intellectual skills in logical reasoning, critical reading, expository writing, and group discussions.

SLE stresses inquiry, criticism, and a tolerance for ambiguity. Neither the faculty nor the curriculum provides “ready-to-serve” answers to the questions being dealt with; rather, SLE encourages a sense of intellectual challenge, student initiative, and originality.

APPLICATION

Freshmen should apply during the summer preceding the academic year in which they will enroll.

SLE is designed as a three-quarter sequence and students applying should be willing to make a commitment for the entire year.
Correspondence regarding the program should be addressed to Program in Structured Liberal Education, Florence Moore Hall, Stanford University, Stanford, California 94305.

COURSES
91, 92, 93. SLE is a demanding program which consumes approximately 60 percent of the average academic workload first-year students usually carry. Autumn Quarter concentrates on ancient Greece, Israel, and India. Winter Quarter examines the religious, ideological, and aesthetic transformations that occurred in Europe, Asia, and the New World as a result of the Middle Ages, Renaissance, Scientific Revolution, and Enlightenment. Spring Quarter focuses on the social, political, and artistic forces that shape the modern world. Completion of the SLE program satisfies the Area One Requirement, the University Writing Requirement, and one General Education Requirement in the humanities.

91. 9 units, Aut (Staff)
92. 9 units, Win (Staff)
93. 9 units, Spr (Staff)

PROGRAM IN SYMBOLIC SYSTEMS

Director: Thomas Wasow (Linguistics, Philosophy)
Program Coordinator: Lera Boroditsky
Program Committee: James Greeno (Education), Daphne Koller (Computer Science), Paul Skokowski, Kenneth Taylor (Philosophy)
Program Faculty: David Beaver (Linguistics), Michael Bratman (Philosophy), Joan Bresnan (Linguistics), Christopher Chafe (Music), Eve Clark (Linguistics), Herbert H. Clark (Psychology), John Etchemendy (Philosophy), Solomon Feferman (Mathematics, Philosophy), Anne Fernald (Psychology), John Gabrieli (Psychology), Peter Godfrey-Smith (Philosophy), Zenzir Griffin (Psychology), David Heeger (Psychology), Martin Kay (Linguistics), Christopher Manning (Computer Science, Linguistics), Ellen Markman (Psychology), John McCarthy (Computer Science), Raymond McDermott (Education), Grigorii Mints (Philosophy), Clifford Nass (Communication), Nils Nilsson (Computer Science), John Perry (Philosophy), Stanley Peters (Linguistics), Vaughn Pratt (Computer Science), Byron Reeves (Communication), Eric Roberts (Computer Science), Ivan Sag (Linguistics), Peter Sells (Linguistics), Michael Strevens (Philosophy), Joshua Tenenbaum (Psychology), Johan van Benthem (Philosophy), Decker Walker (Education), Brian Wandell (Psychology), Terry Winograd (Computer Science)
Lecturer: Todd Davies
Consulting Faculty: Bernardo Huberman (Applied Physics), John R. Koza (Medicine, Electrical Engineering)
Other Faculty: Margaret Johnson (Computer Science), Keith Stenning (Philosophy)

Computer systems, robots, and people are all examples of symbolic systems, agents that use language to represent the world around them so as to communicate and generally act intelligently. The notions of symbol, representation, information, and action are at the heart of the study of symbolic systems. This common core of notions arises in a variety of fields including artificial intelligence, computer science, cognitive psychology, linguistics, philosophy, and symbolic logic. In recent years, though, a new discipline has begun to emerge from research collaborations across these traditional disciplines, addressing questions such as:

In what ways are computers and computer languages like humans and their languages? How can the interaction between humans and computers be made easier and more productive? What would it take to build a computer that thinks?

The Symbolic Systems Program (SSP) offers an opportunity to focus on these issues. Majors take courses in the departments of Computer Science, Linguistics, Philosophy, and Psychology, as well as courses designed specifically for the program. The goal is to prepare students with the vocabulary, theoretical background, and technical skills to understand and participate in contemporary interdisciplinary research into questions about language, information, and intelligence, both human and machine. The curriculum offers traditional humanistic approaches to these questions as well as a training in, and familiarity with, contemporary developments in the science and technology of computation.

A degree in Symbolic Systems prepares students for advanced training in the interdisciplinary study of language and information, or for postgraduate study in any of the contributing disciplines. It is also excellent preparation for employment immediately after graduation.

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE

The program leads to a B.S. in Symbolic Systems. The curriculum provides students with a core of concepts and techniques from computer science, linguistics, logic, philosophy, and cognitive psychology, drawing on faculty and courses from various departments.

Symbolic Systems majors must complete a core of required courses plus a concentration consisting of five additional courses. All major courses are to be taken for letter grades unless an approved course is offered satisfactory/no credit only. The core requirements are:

1. Cognition:
   a) Psychology 40, Introduction to Cognitive Psychology
   b) One Psychology course from: 30, Introduction to Perception; 50, Introduction to Human Neuropsychology; 131, Language and Thought; 152, Language Processing; 141, Cognitive Development

2. Computation and Artificial Intelligence:
   a) Computer Science 106B, Programming Abstractions, or 106X, Programming Methodology and Abstractions
   b) Computer Science 103X, Discrete Structures, or 109, Introduction to Computer Science
   c) Computer Science 121, Introduction to Artificial Intelligence, or 221 Artificial Intelligence: Principles and Techniques

3. Philosophical Foundations:
   a) Philosophy 80, Mind, Matter, and Meaning
   b) One Philosophy course from: 181, Philosophy of Language; 184, Theory of Knowledge; 186, Philosophy of Mind; 189 Philosophical Applications of Cognitive Science

4. Language:
   a) Linguistics 120, Introduction to Syntax
   b) Linguistics 130, Introduction to Semantics and Pragmatics, or 230A, Semantics and Pragmatics

5. Logic:
   a) Philosophy 160A, First Order Logic
   b) Philosophy 160B, Computability and Logic; or Computer Science 154, Introduction to Automata and Complexity Theory

6. Mathematics: one approved course on a mathematical topic other than calculus.

7. Senior Seminar: Symbolic Systems 201 or an approved interdisciplinary seminar.

Students select concentrations from the list below or design others in consultation with their advisers.

Applied Logic
Artificial Intelligence
Cognition
Computation
Computer Music
Education and Learning
Human-Computer Interaction
Natural Language
Neural Systems
Philosophical Foundations
Rationality
MINORS

Students may minor in Symbolic Systems by completing either item '1' or '2' below.

1. One course in each of the specified core areas:
   a) Artificial Intelligence: Computer Science 121 or 221
   b) Computer Science: Comp. Sci. 103X or 109
   c) Linguistics: Ling. 120 or 130
   d) Logic: Philosophy 159 or 160A, or Computer Science 154
   e) Philosophy: Phil. 80, 181, 184, 186, or 189
   f) Psychology: Psych. 30, 40, 50, 131, 132, or 141

2. Psychology 200, plus an interdisciplinary SSP concentration listed in the program booklet (available from the program office, or on the SSP Web page, http://www-leland.stanford.edu/dept/symbol/). To qualify, the selection of courses used for the minor must be interdisciplinary, that is, it must either include courses from at least three departments, or include more than one course from each of two departments.

DIRECTED RESEARCH AND SENIOR HONORS

The program strongly encourages all SSP majors to gain experience in directed research by participating in faculty research or by pursuing independent study. Several avenues are offered.

1. Summer Internships: students work on SSP-related faculty research projects.
2. Independent Study: under faculty supervision, students work on independent projects. For course credit they may enroll in Symbolic Systems 196.
3. Senior Honors: under faculty supervision, students pursue extended research projects and complete a senior honors dissertation.

Contact SSP for more information on any of these options. In addition, the Undergraduate Research Opportunities office at campus offers numerous grants and scholarships supporting student research projects at all levels.

COURSES

CORE

30. Introduction to Perception—(Enroll in Psychology 30.)
   3 units, Spr (Heeger)

40. Introduction to Cognitive Psychology—(Enroll in Psychology 40.)
   4 units, Win (Spieler)

50. Introduction to Human Neuropsychology—(Enroll in Psychology 50.)
   4 units, Win (Gabrieli)

80. Mind, Matter, and Meaning—(Enroll in Philosophy 80.) (WIM)
   5 units, Aut (Braitman)
   Spr (Taylor)

103X. Discrete Structures (Accelerated)—(Enroll in Computer Science 103X.)
   4 units, Spr (Mitchell, Dill, Staff)

106B. Programming Abstractions—(Enroll in Computer Science 106B.)
   5 units, Aut (Staff)
   Win (Plummer)
   Spr (Zelenski)

106X. Programming Methodology and Abstractions (Accelerated)—(Enroll in Computer Science 106X.)
   5 units, Aut (Plummer)
   Win (Young)
   Spr (Zelenski)

109. Introduction to Computer Science—(Enroll in Computer Science 109.)
   4 units, Aut (Staff)
   Win (Johnson)

120. Introduction to Syntax—(Enroll in Linguistics 120.)
   4 units, Aut (Sag, Wasow)

121. Introduction to Artificial Intelligence—(Enroll in Computer Science 121.)
   3 units, Aut (Nilsson)

130. Introduction to Linguistic Meaning—(Enroll in Linguistics 130.)
   4 units, Win (Beaver)

131. Language and Thought—(Enroll in Psychology 131.)
   4 units, Aut (H. Clark)

132. Language Processing—(Enroll in Psychology 132.)
   4 units, Spr (Griffin)

141. Cognitive Development—(Enroll in Psychology 141.)
   3 units, Aut (O"Donnell, Henderlong)

150. Computers and Democracy—The existence of computer networks creates new options for participative decision making in societies, communities, and organizations. The issues involved in the design of systems for democratic decision making from several perspectives: formal theories of social choice and voting; psychological evidence concerning group decision making, persuasion, and presentation effects; previous uses of computers and the internet as aids to democracy and group involvement; and theories of deliberative discourse. Content flexibility depending on student interests. Student projects on the issues. 3 units, Win (Davies)

154. Introduction to Automata and Complexity Theory—(Enroll in Computer Science 154.)
   4 units, Win (Ullman)
   Spr (Motwani)

157. Seeing Reason: An Interdisciplinary Approach—How can we combine diagrams and language in reasoning, and what are their internal mental forms? A satisfactory answer requires at least: a semantic analysis of diagrams and languages; an experimental analysis of student learning, based on the semantic theory; and an account of the different learning styles that lead to contrasting effects of presentations on different students. These ingredients yield a new theory of human reasoning focused on the creation and selection of representations. 3 units, Spr (Stenning)

160A. First-Order Logic—(Enroll in Philosophy 160A.)
   4 units, Win (Mints)

160B. Computability and Logic—(Enroll in Philosophy 160B.)
   4 units, Spr (Mints)

181. Philosophy of Language—(Enroll in Philosophy 181.)
   4 units, Win (Taylor)

184. Theory of Knowledge—(Enroll in Philosophy 184.)
   4 units, Win (Lawlor)

189. Philosophical Applications of Cognitive Science—(Enroll in Philosophy 189.)
   4 units, Aut (Stevens)

200. Symbolic Systems Seminar: Problems in Intelligence, Information, and Learning—(Same as Education 120, Linguistics 137, Philosophy 200.) Interdisciplinary topics in cognitive science, (e.g., modular-
ity, representation, reasoning, situated action, or creativity). Prerequisites: Computer Science 109, Linguistics 120 or 130, Philosophy 80, Psychology 40, or consent of instructors.

201. Senior Seminar—Core seminar for program majors. Integrates themes from core course work with contemporary cross-disciplinary research in learning, computation, and formal systems.
2 units, Win (Greeno, Wasow)

221. Artificial Intelligence: Principles and Techniques—(Enroll in Computer Science 221.)
4 units, Aut (Koller)

230A. Introduction to Semantics and Pragmatics—(Enroll in Linguistics 230A.)
4 units, Win (Peters)

RESEARCH
190. Senior Honors Tutorial—Under the supervision of the honors faculty adviser, students work on their senior honors project.
1-5 units, any quarter (Staff)

191. Senior Honors Seminar—Under the leadership of the Symbolic Systems program coordinator, students meet, discuss, and present their honors project.
2 units, Win, Spr (Boroditsky)

196. Independent Study—Independent work under the supervision of a faculty member.
1-15 units, any quarter (Staff)

AFFILIATED DEPARTMENT OFFERINGS
Listed below are a sample of other courses, some of which can be used as part of the student’s concentration (see SSP booklet), or may be of special interest to SSP majors. The list is not exhaustive. Students should consult course listings in the related departments for additional courses and information.

COMMUNICATION
169/269. Computers and Interfaces: Psychological and Social Issues
4 units, Spr (Nass)

172/272. Psychological Processing
5 units, Win (Reeves)

COMPUTER SCIENCE
9. Undergraduate Journal Club
1 unit, Aut (Caspi)

99L. Stanford Introductory Seminar: How are We to Know?
3 units, Win (Nilsson)

99P. Stanford Introductory Seminar: Smart Computers and other Technological Opportunities
3 units, Spr (McCarthy)

147. Introduction to Human-Computer Interaction Design
3-4 units, Aut (Winograd)

150. Introduction to Computer Theory for Non-CS Majors
4 units, Spr (Cain)

193D. C++ and Object-Oriented Programming
3 units, Win (Cain)

193I. Internet Technologies
3 units, Spr (Parlante)

193J. Programming in Java
3 units, Aut (Zelenski)

193U. Software Engineering in C
3 units, Win (Staff)

193W. Microsoft Windows Programming
3 units, Spr (Young)

201. Computers, Ethics, and Social Responsibility
4 units, Spr (Johnson)

202. Law for Computer Science Professionals
1 unit, Win (Heckman)

221. Artificial Intelligence: Principles and Techniques
4 units, Aut (Koller)

223A. Introduction to Robotics
3 units, Win (Khatib)

228. Reasoning Under Uncertainty
3 units, Win (Koller)

229. Machine Learning
3 units, Spr (Bregler)

247A. Human-Computer Interaction: Interaction Design Studio
3-4 units, Win (Winograd)

247B. Contextual and Organizational Issues in Human-Computer Interaction
3-4 units, Spr (Hinds)

377. Topics in Human-Computer Interaction
3-4 units

3-4 units, Win (Winograd)

547. Human-Computer Interaction Seminar
1 unit, Aut, Win, Spr (Winograd)

EDUCATION
224. Information Technology in the Classroom
3 units, Win (Walker)

LINGUISTICS
17Q. Stanford Introductory Seminar: Slips of the Tongue
3 units, Win (Zwicky)

35Q. Stanford Introductory Seminar: Computers and Human Language
3 units, Win (Hubbard, Kay)

44N. Stanford Introductory Seminar: Living with Two Languages
3 units, Spr (E. Clark)

105. Phonetics
4 units, Aut (Flemming)

110. Introduction to Phonetics and Phonology
4 units, Spr (Flemming)

120. Introduction to Syntax
4 units, Aut (Sag, Wasow)
124. Lexical Functional Grammar  
   4-6 units, Aut (Bresnan)

138. Introduction to Computational Linguistics  
   4 units, Aut (Kay)

235. Mathematical Linguistics  
   1-4 units, Aut (Peters)

237. Natural Language Processing  
   4 units, Spr (Manning)

240. Language Acquisition I  
   4 units, Aut (E. Clark)

PHILOSOPHY

14N. Stanford Introductory Seminar: Consciousness  
   3 units, Aut (Perry)

15N. Stanford Introductory Seminar: Mind and World  
   3 units, Spr (Strevens)

60. Introduction to the History and Philosophy of Science  
   (Same as History and Philosophy of Science 60.)  
   5 units, Aut (Godfrey-Smith)

159. Basic Concepts in Mathematical Logic  
   4 units, Aut (Baker-Plummer)

164. Central Topics in the Philosophy of Science: Scientific Explanation  
   4 units, Win (Strevens)

167B. Philosophy, Biology, and Behavior  
   4 units, Spr (Godfrey-Smith)

169. Intensional Logic  
   4 units, Spr (van Benthem)

187. Philosophy of Action  
   4 units, Win (Bratman)

298. Logical Dynamics  
   3 units, Spr (van Benthem)

PSYCHOLOGY

20. Introduction to Brain and Behavior  
   3 units, Aut (R. Fernald)

112. Research Methods in Cognitive Psychology  
   5 units, Aut (Spieler)

134. Seminar on Language and Deception  
   3 units, Win (H. Clark)

205. Foundations of Cognition  
   1-3 units, Aut (Tenenbaum)

221. Applied Vision and Image Systems  
   1-3 units, Win (Wandell)

PROGRAM ON URBAN STUDIES

Director: Leonard Ortolano (Professor of Civil and Environmental Engineering)

The Committee on Urban Studies: (Chair) Paul Seaver (Professor, History); Samuel Chiu (Associate Professor, Engineering-Economic Systems and Operations Research), Richard Ford (Professor, Law), Luis Fraga (Associate Professor, Political Science, on leave-Autumn), Steven Gurelick (Professor, Geological and Environmental Sciences), Shirley Heath (Professor, English, Linguistics), Keith Loague (Associate Professor, Geological and Environmental Sciences), Milbrey McLaughlin (Professor, Education), Nancy Tuma (Professor, Sociology), Paul Turner (Professor, Art and Art History)

Visiting Professor: Michael Douglas

Visiting Associate Professor: Gerald Gast

Lecturers: John Barton, Patricia Cross Collins, Nadinne Cruz, Radford Hall, David Neuman, Beverly Purrington, Jackie Schmidt-Posner, Michael Smiley, Frederic Stout, Patti Walters, Douglas Webster

Urban Studies brings together students, faculty, and outside specialists who are concerned with the people and problems of cities. The program stresses two basic themes: developing a critical understanding of how cities evolve and gaining knowledge of the practical and analytical tools which can help improve the quality of urban life. Urban Studies enables undergraduates to examine urban problems through a number of disciplinary lenses and to address these problems in a practical way.

The Urban Studies major examines the city within the broad context of a liberal arts education. It treats urbanism as an interdisciplinary field and encourages students to inquire critically into both the nature of the urban environment and techniques used to modify that environment.

The major prepares students for a variety of careers and advanced academic pursuits. Graduates from the Program on Urban Studies have established careers in architecture, community service, environmental planning, real estate development, urban design, and urban planning. Many have obtained graduate degrees in architecture, urban design, or urban planning from major universities across the country including UC-Berkeley, Harvard, and MIT. A substantial number have opted to take graduate degrees in business, law, and public policy.

Information on graduate programs in urban planning, community organization, and architecture and urban design is available from the program office. This information also details prerequisites for these graduate programs.

UNDERGRADUATE PROGRAMS

All students majoring in Urban Studies must complete the Urban Studies core. Those who specialize in community organization, urban planning, or architecture and urban design must complete their majors by meeting the appropriate Option Requirements. Students who wish to concentrate in a different area (for example, health care) must complete the Urban Studies core and design the remaining units with an academic adviser who is a member of the Academic Council.

In all cases, Urban Studies majors must satisfy requirements for an option, and complete a minimum of 70 units (not counting prerequisites). Courses used to satisfy requirements for the major must be taken for a letter grade.

Students interested in declaring Urban Studies as a major should do so using Axess. However, students are required to meet with the program director before declaring Urban Studies as a major.

URBAN STUDIES CORE

Urban Studies (Urbs) majors should take 110, Introduction to Urban Studies, before the end of the Autumn Quarter of their junior year.

Each of the following is required:

Urbs. 110. Introduction to Urban Studies
Economics 1. Elementary Economics.

Select one of the following*:

Art and Art Hist. 280. Utopia and Reality in Modern Urban Planning

or Urban Studies 120. Building Community

* Students in the Urban Planning Option and the Architecture and Urban Design Option are encouraged to select Art and Art History 280, whereas students in the Community Organization Option are encouraged to select Urban Studies 120.

Select at least one course from each of the following categories:

Social Science Research Methods:
Comm. 106. Communications Research Methods
Cult. & Social Anthro. 93. Prefield Research Seminar
Ed. 179X. Urban Youth and their Institutions: Research and Practice
There are no formal prerequisites. Students who want to pursue a graduate degree in business or city planning are encouraged to take Economics 50, Economic Analysis I. Information on graduate programs suitable for urban studies graduates who wish to pursue advanced studies in community organization is available in the Urban Studies office.

**REQUIRED TO COMPLETE THE MAJOR**

All students complete the Urban Studies Core and Economics 1, which are prerequisites to a required course in this option (Urban Studies 192).

- Comp. Sci. 105, or a more advanced course in computing
- Poli. Sci. 59R, Issues in Public Service*
- Public Policy 191, Business Skills for the Social Sector†
- Urbs 191A, Introduction to Community Service Organizations
- Urbs 191B, Community Organizing
- Urbs 191C, Community Organizing
- Urbs 192, Social Entrepreneurship

Select one of the following courses on organization theory:

- Soc. 160, Formal Organizations
- or Indust. Engr. 100, Organizations: Theory and Management

* Pol. Sci. 159R should be taken before or at the same time as Urban Studies 191C.
† Public Policy 191 must be taken before Urbs. 192.

**RESTRICTED ELECTIVES**

The total number of units taken to satisfy the major add up to at least 70; restricted electives are used for this purpose.

- Ed. 95S, Issues in Leadership
- Ed. 100X, The State of Public Education in Urban Communities
- Ed. 105, American Education and Public Policy
- Ed. 141, Children, Civil Rights, and Public Policy in the U.S.
- Ed. 177X, Education of Immigrants in Cities
- Ed. 193, Peer Counseling
- Geol. & Envir. Sci 196, Introduction to GIS
- Hist. 264S, Undergraduate Research Seminar: The Papers of Martin Luther King, Jr.
- Hist. 269, Undergraduate Colloquium: The African American Community Organizing Tradition
- Law. 564, Housing Law and Policy
- Soc. 118, Collective Action
- Soc. 145, Race and Ethnic Relations
- Soc. 266, Organization and Public Policy

**URBAN PLANNING OPTION**

Courses required for the Urban Planning option introduce the techniques and approaches of city and regional planners. A course applying economics to the solution of urban problems is a key element of this option. Students are also required to study land use planning and the methods used to control the use of land. Because urban planners rely heavily on computers, the major requires an introduction to computer science. The Urban Planning option provides excellent preparation for graduate programs in urban and regional planning and in public policy analysis.

Students interested in these graduate programs are encouraged to consult with the program director and to review information describing graduate programs available in the Urban Studies office.

**PREREQUISITES**

- Math. 41, or 19 and 20, Calculus
- Econ. 50, Economic Analysis I
- Econ. 50M, Economic Analysis IA or pass math placement exam

**REQUIRED TO COMPLETE THE MAJOR**

- Comp. Sci. 105, or a more advanced course in computing
- Geol. and Envir. Sci. 130, Environmental Earth Sciences I
- Geol. and Envir. Sci. 131, Environmental Earth Sciences II
- Geol. and Envir. Sci. 132, Environmental Earth Sciences III
- Geol. and Envir. Sci. 196, Introduction to GIS: ARC/Info and ARC-View

Select one of the following economics courses:

- Econ. 118, Economics of Development
- Econ. 148, Urban Economics
- Econ. 150, Economics and Public Policy
- Econ. 154, Economics of Legal Rules and Institutions
- Econ. 155, Environmental and Natural Resources Economics
RESTRICTED ELECTIVES

These elective courses include any from the Urban Studies core; any 100-level course offered by the Program on Urban Studies; any course listed elsewhere in this section of the Stanford Bulletin under Affiliated Department Offerings, or courses listed below. Restricted electives are used to bring the total number of units to 70 (not including prerequisites).

Civil & Environmental Engr. 171. Air Quality Management
Industrial Engr. 100. Organizations: Theory and Management
Public Pol. 185. American Public Administration
Soc. 160. Formal Organizations

ARCHITECTURE AND URBAN DESIGN OPTION

The Architecture and Urban Design option allows the student to explore the design in the context of architectural and urban history and in response to human needs, social concerns, and cultural values. Required courses focus on drawing and design and on the history of architecture. Two of the design courses are sequenced (Art and Art History 60 and 160). This option provides strong preparation for graduate study in architecture and urban design. Students considering professional study in architecture are strongly advised to take, in addition to the required courses, Mathematics 19, 20, and 21; Physics 21; and an introductory course in computers.

PREREQUISITES
Course No. and Subject
Art & Art Hist. 60. Basic Design

REQUIRED TO COMPLETE THE MAJOR

Art & Art Hist. 140. Drawing I
Art & Art Hist. 160K or 160L. Design I: Intermediate Design

Select one of the following computer courses:
Civil & Environmental Engr. 111. 3D Modeling of Civil Engineering Projects
Computer Sci. 105. Introduction to Computers
Computer Sci. 106A. Programming Methodology

Students who are planning to become architects are strongly encouraged to take Civil and Environmental Engineering 111. It is recommended that Mech. Engr. 101 be taken before Art and Art History 60.

At least two courses on the history of architecture (or architecture and art) offered by the Department of Art and Art History. Urban Studies 175 and Mechanical Engineering 120 may also be used to meet this requirement.

RESTRICTED ELECTIVES

These elective courses include: any from the Urban Studies core; any 100-level course offered by the Program on Urban Studies; any 100-level course offered by the Department of Art and Art History in drawing, painting, sculpture, printmaking or design; or courses listed below. Restricted electives are used to bring the total number of units to 70 (not including prerequisites).

Art & Art Hist. 130B. Transatlantic Modernism: Paris and New York in the Early 20th Century
Art & Art Hist. 174. Digital Art in Public Areas
Civil & Environmental Engr. 100. Managing Civil Engineering Projects
Civil & Environmental Engr. 101A. Structural Systems
Civil & Environmental Engr. 122A/222B. Computer Integrated Architectural/Engineering Construction
Civil & Environmental Engr. 174. Ethical Issues in Civil Engineering
Civil & Environmental Engr. 176A. Energy Efficient Buildings
Mech. Engr. 103. Manufacturing and Design
Mech. Engr. 103D. Engineering Drawing
Mech. Engr. 120. History and Philosophy of Design

RECOMMENDED ADDITIONAL STUDY

Architecture graduate schools typically require applicants to submit a portfolio of work in the visual arts or design as part of the admissions process. The Urban Studies library contains samples of portfolios from alumni who have successfully gained entrance to graduate programs in architecture and urban design. In addition, many graduate schools of architecture require calculus, physics, and basic computer skills as conditions for admission.

Students seeking exposure to orthographic projection, sectioning, and other aspects of technical drawing should take Mechanical Engineering 103D, Engineering Drawing. Students interested in graduate programs in architecture are encouraged to consult with the program director to review information describing graduate programs available in the Urban Studies office. The program office also contains information on portfolio preparation. Courses in drafting are available at local community colleges including West Valley College and Foothill College.

SELF-DESIGNED OPTION

Students who wish to concentrate on an area other than Community Organization, Urban Planning, or Architecture and Urban Design must complete the Urban Studies core and design the remaining units (to bring the total to 70 units) with an academic adviser who is a member of the Academic Council. The self-designed portion of the major should concentrate on a particular area of analysis such as health care, education, or urban policy.

Proposals should include only courses at the 100 level or above and must be approved by a subcommittee of the Committee on Urban Studies. Proposals for the self-designed portion of the major should include a course list and a description of how the courses meet the student's educational objectives. The proposal must be accompanied by a letter from the student's academic adviser indicating that he or she has examined the final version of the proposal and finds it acceptable.

Students pursuing a self-designed option must submit proposals for approval by the Urban Studies Committee by the middle of the second quarter of the student's junior year. Applications received after that deadline are not considered. Students interested in designing their own option are strongly encouraged to meet with the program director before the end of the first quarter of their junior year.

MINORS

The minor in Urban Studies is designed to accomplish two things. First, it introduces students to how specialists from each of several different disciplines approach the study of cities. Second, it provides students with an opportunity to explore their interests in one of three specialized fields: (1) Architecture and Urban Design, (2) Urban Planning, or (3) Community Organization. Students must declare the minor no later than the last day of the quarter four quarters before degree conferral.

Requirements—Students must complete seven courses (for a letter grade) including Urbs 110. Introduction to Urban Studies.

Three courses must be completed from the following categories as listed above in the Urban Studies core: Urban History, and Urban Anthropology and Sociology. At least one course must be from each category.

All three courses in one of the following groups must be completed:

1. Architecture and Urban Design
   b) One course from those included in the Urban Studies Core course listings for Architecture and Urban Design
   c) One (100 level) course on the history of architecture offered by the Department of Art and Art History.

2. Urban Planning
   a) Geol. and Envir. Sci. 130. Environmental Earth Sciences I
   b) Geol. and Envir. Sci. 132. Environmental Earth Sciences II
   c) One course from those included in the Urban Studies Core course listings above for Urban Politics or one of the courses listed as meeting the "economics course" requirement for Urban Studies majors in the Urban Planning Option.

3. Community Organization
   a) Urbs. 191C. Community Organization (requires Urban Studies 191B as prerequisite)
   b) Urbs. 192. Social Entrepreneurship
   c) One of the following courses in Organization Theory:
      1) Soc. 160. Formal Organizations
      2) or Indust. Engr. 100. Organizations Theory and Management
HONORS PROGRAM

The honors program offers qualified students an opportunity to conduct independent research and to write a thesis summarizing the results. The program grants honors at graduation to those students who have successfully completed a thesis of honors quality, attained a 3.5 grade point average (GPA) in their major, and successfully completed all course requirements. Honors students must register for a minimum of 10 units and a maximum of 15 units of Urban Studies 199 spread over their senior year. The program encourages students writing theses linked to community service to apply to the Public Service Scholars Program administered by the Haas Center for Public Service and register in Urban Studies 198 concurrently with 199. Students can obtain details regarding honors procedures from the Urban Studies Program office located in Building 60.

COTERMINAL PROGRAMS

Undergraduates in Urban Studies may enter coterminal master's degree programs in a number of departments in the University. In recent years, Urban Studies majors have developed coterminal programs within the departments of Cultural and Social Anthropology, Sociology, and the School of Education. Information and applications for the coterminal degree programs are available at the Undergraduate Advising office. Students should discuss the coterminal program with the program director during their junior year.

COURSES

Further descriptions and details of current courses offered by lecturers in the Program on Urban Studies are available prior to each quarter from the program office.

110. Introduction to Urban Studies—Interdisciplinary introduction to the study of cities and urban civilization. The history of urbanization through Lewis Mumford's *The City in History* and various disciplinary methodologists comprising the unified field of urban studies (sociology, economics, politics, architecture, urban design, and urban public policy formation).

4 units, Aut (Stout)

120. Building Community—Capstone course for Urban Studies majors in the Community Organization track explores the literature and philosophical underpinnings of community theory developed by urban professionals committed to advocacy, activism, and community service, building on students' previous experience, including fieldwork placements. Close reading of classic texts by Louis Wirth, Clarence Perry, Paul Davidoff, Jane Jacobs, Sherry Arnstein, Saul Alinsky, and others.

4 units, Win (Stout, Staff)

135. Cities and Urban Systems in East Asia—Focus is on the urban transition in East Asia, with emphasis on the rapidly growing megaregional urban systems and emerging world cities. Policy issues: urban social, economic, and environmental conditions; transnational capital and intercity competition for investment; and democratization, the rise of civil society and the new urban politics of governance in a global age. Limited enrollment.

5 units, Spr (Douglas)

170. Introduction to Urban Design—Urban design theory and contemporary practice. Critical issues in urban development and conservation. Neighborhood livability, central city revitalization, historic preservation, and regional growth are examined through comparative case studies from N. America and abroad. Projects focus on neighborhood, downtown, and regional issues in San Francisco and the Bay Area. Two Sat. field workshops in San Francisco.

5 units, Win (Gust)

171. Suburbia: New Downtowns of the 21st Century—The evolution of the American suburb, emphasizing the post-WW II suburban centers that emerged as competitors, in terms of size and economy, with traditional urban centers. Historical development of the suburbs from 1820 to the present. Current problems (if any) and issues of concern. Elements of urban design (circulation, land use, building design, etc.) and their application in the suburban context. Students analyze a case study non-downtown suburban area near the Stanford campus and recommend improvements.

4 units, Aut (Smiley)

174. Architectural Design Process—Lecture/studio. Introduction to the basics of the building design process through case studies, including studio sessions. Visits and discussions with practicing architects/landscape architects. Student work is prepared as an architectural program statement and as a conceptual massing model, along with simplified site and building-related graphics. Result: demystification of the initial phase of the design process and a better understanding of the professional's role within it. Architectural office visit. Enrollment limited to 16.

4 units, Spr (Neuman)

175. Contemporary Architecture: Theory and Design—Brief overview of architecture after modernism, a discussion of themes commonly used in architectural criticism, and a typological analysis of form provide a basis for an examination of architecture. Design exercise allows students to personally experiment with the architectural design process. Examines the work of guest speakers in Stanford's spring lecture series in architecture. Class sessions with each guest architect provide further insights into their work. Attendance required in all sessions of the spring lecture series in architecture. Enrollment is limited to 20.

4 units, Spr (Walters)

176. Architecture, Urban Planning, and the First Amendment—Seminar on the relationship and balance between the right and value of free expression in architecture and the need for communities to guide their development and visual appeal. Themes and topics: how architecture is similar and different from other arts, the underlying philosophical basis of first amendment traditions, the rise of powerful city planning departments, and the politicization of architectural design.

3 units, Win (Baron)

182. Urban Environmental Policy—Overview/analysis of urban environmental issues through the study of current policy, organizations, and case examples, with an emphasis on California and the San Francisco Bay area. Guest lectures from experts working directly on urban environmental issues. Prerequisite: 110, or Human Biology 125, or consent of the instructor.

4 units, Win (Hall, Kibel)

183. Land Use Control—Survey of current and emerging methods of land use control related to the pattern and scale of development and the protection of land and water resources. Emphasis is on the relationship between the geographical landscape, physical externalities, land use law, and desired land use goals. Topics: the historical roots of modern land use controls; urban reforms of the 19th century; private ownership of land zoning; innovations in local, state, and federal land use control; and regulations and management programs. Current issues of growth management, park and recreation services, transportation, urban housing, wetlands, environmental mediation/conflict management, and special purpose agencies.

4 units, Spr (Hall)

184. Managing the Urban Environment in East Asia—Focus is on identification of effective actions to address urban environmental issues in rapidly changing Asian regions. Urban systems are analyzed as human habitat, natural resource consumption systems, polluters, and drivers of development. The role of public and corporate policies in improving urban environments in E. Asia. Selective instruments to improve environmental quality. Innovative options for financing/delivering environmental infrastructure, hardware, and software. Case studies from Bangkok, Shanghai, Seoul, and Jakarta.

4 units, Win (Webster)
185. Environmental Justice: Abandoned Uranium Mines on Navajo Lands—For juniors and seniors and first-year graduate students. Workshop investigating technical and social issues arising from uranium mines on Navajo lands in the Four Corners area. Introduction to mining activities, conducted under the auspices of the Atomic Energy Commission, that have disrupted the way of life of the Navajo. An ongoing project of the U.S. Environmental Protection Agency, the "Navajo Abandoned Uranium Mines Project," is used by students to perform their own assessments of the problems and examine alternative solutions, encompassing land use planning, cultural issues, law, environmental and mining geology, environmental engineering, toxicology, and epidemiology. Limited enrollment.

1 unit, Win (Cruz)

186. High-Tech Industrial Complexes and Urban Form—The forces that shape the design and development of high-tech industrial complexes: analysis of the parameters related to regional policy, strategic planning, urban design, and real-estate economics. Silicon Valley and Pacific Rim case studies provide a basis for analyzing how high-tech complexes are influenced by the spatial, social, political, cultural, and economic contexts in which they are placed. How the convergence of computers, communications, and consumer electronics influence urban form and global competition. Field visits to nearby regional high-tech industrial parks. Enrollment limited to 12.

4 units, Spr (Collins)

187. Business Skills for the Social Sector—(Enroll in Public Policy 191.) Students organize an internship in an office of a government agency, a community organization, or a private firm directly relevant to the major. Minimum total of 40 hours of internship work must be completed. Prerequisite preparatory work for the internship requirement in 191C, including preparation of an internship proposal describing learning goals, individual and group meetings on internship selection and placement, orientation, placement interviews, completion of written learning agreements approved by the internship site, and at least 10 hours of beginning internship work during the quarter. Credit is earned contingent on completion of 191C.

1 unit, Aut (Cruz)

189. Urban Design and Planning Professions Seminar—The contemporary practice of urban design and planning, community development, and related fields. Bay Area professionals lecture and respond to questions concerning the nature of their day-to-day work, impressions of their field in general, and academic background recommended for their line of work. One session on graduate schools and degrees relevant to these fields. 1 unit (Staff) alternate years, given 2000-01

190. Directed Reading—For Urban Studies majors only. Students organize an internship in an office of a government agency, a community organization, or a private firm directly relevant to the major. Reading supplements internship. Paper summarizes internship experience and related readings. Prerequisite: Public Policy 179B.

2-4 units, Ortolano

191. Business Skills for the Social Sector—(Enroll in Public Policy 191.)

4 units, Win (Dees)

191A. Introduction to Community Service Organizations—Project-based, providing an overview and introduction to community service organizations. Focus is on urban-based non-profit groups organized to address: housing and homelessness, youth outreach, families in transition, gang intervention, drug prevention, arts and education, etc. Readings, discussions with leaders and staff of community service organization, and a philanthropic class project, resulting in a class recommendation for a disbursement by a philanthropic public funding agency to community service organization. Small groups select a community service organization for study and recommendation for funding, involving research, site visits, written reports, and a presentation to the class and to guests from community service organizations, who provide feedback on presentations. Promotes familiarity with existing types of urban-based community service organizations and critical awareness of issues in evaluating their quality and effectiveness.

1-3 units, Aut (Cruz)

191B. Community Organizing—Prerequisite preparatory work for the internship requirement in 191C, including preparation of an internship proposal describing learning goals, individual and group meetings on internship selection and placement, orientation, placement interviews, completion of written learning agreements approved by the internship site, and at least 10 hours of beginning internship work during the quarter. Credit is earned contingent on completion of 191C.

1 unit, Aut (Cruz)

191C. Community Organizing—Focus is on community organizing by urban-based groups seeking to improve their neighborhoods or groups through organizing processes. Guest presenters provide varying perspectives on what organizing is, who does it, where, how, and with what results. Readings provide basic information and historical and theoretical background. A required internship provides direct experience with organizing processes. Minimum total of 40 hours of internship work during the combined Autumn (191B) and Winter (191C) Quarters, and to be completed no later than Winter Quarter finals. Corequisite: Political Science 159R.

4 units, Win (Cruz)

191D. Introduction to Community Organizations in Asian Pacific Islander (API) Communities—Introduction to the community organizations developed by and for Asian Pacific Islander (API) communities in the greater Peninsula/Bay Area. Focus is on organizations attempting to improve conditions of life in API communities they work with. Representatives of API community organizations provide perspectives on what they do, who participates in them, where, how, and with what results. Readings provide basic information on the API organizations and the socio-economic and political contexts in which they arise, struggle, and thrive, e.g., the Chinese Progressive Association (Chinatown, SF); Asian American Immigrant Women (AIWA in Oakland and San Jose); and Asian Pacific Islander Outreach Center, Palo Alto.

1 unit, Spr (Cruz)

192. Social Entrepreneurship—(Same as Public Policy 192.) Innovative private initiatives address social needs, including non-profit, for-profit, and hybrid ventures. Emphasizes the challenges facing social entrepreneurs and the practical knowledge needed to do this work effectively. Recent trends in using business-like methods to serve social mission. Readings in business school cases, and theoretical and practical articles. Prerequisites: Economics 1, junior or senior standing. Recommended: Public Policy 191.

5 units, Spr (Dees, Heath)

193. Preparation for Internship Learning

1 unit (Ramirez) not given 1999-2000

194. Internship in Urban Studies—For Urban Studies majors only. Students organize an internship in an office of a government agency, a community organization, or a private firm directly relevant to the major. Reading supplements internship. Paper summarizes internship experience and related readings. Prerequisite: Public Policy 179B.

2-4 units, Ortolano

195. Special Projects

1-5 units (Staff)

197. Directed Reading

1-5 units (Staff)

198. Senior Honors Research in Public Service—Limited to seniors who have registered for and have been approved by their departments for honors thesis, and who have been admitted to the year-round Public Service Scholars Program sponsored by the Haas Center for Public Service. If research is to be conducted as a form of public service, what standards for rigor and excellence would apply in addition to those expected by the academy? How can communities benefit from research? Seminar introduces the theory and practice of research as a form of public service, and provides a forum for discussions and presentations of senior honors theses. Readings in research theory and methods, methods of participatory action research; quarterly presentations on research as service; workshops on each individual participant's thesis-work-in-progress; public presentation on completed research; and evaluation (by a community-based reader) of the thesis as a form of public/community service. Corequisites: 199A, B, C.

3 units, Aut, Win, Spr (Cruz, Schmidt-Posner)

199. Senior Honors Thesis

1-15 units (Staff)
Academic Programs and Centers

CENTER FOR TEACHING AND LEARNING (CTL)

Director: Michele Marincovich

The Center for Teaching and Learning is a University-wide resource on effective teaching and public speaking.

SERVICES TO FACULTY, LECTURERS, AND TEACHING ASSISTANTS

CTL provides the Stanford community with services and resources on effective teaching. Its aims are to: identify and involve successful teachers who are willing to share their talents with others, provide those who are seeking to improve their teaching with the means to do so, acquaint the Stanford community with important innovations and new technologies for teaching, prepare inexperienced teachers for their responsibilities, expand awareness of the role of teaching at research universities, and increase the rewards for superior teaching. CTL also has responsibility for helping teaching assistants (TAs) with their teaching and departments with designing effective TA training programs.

Goals are realized through continuing programs such as: videotaping and consultation; small group evaluation; workshops and lectures; a handbook on teaching and a library of teaching materials; quarterly teaching orientations; and work with individuals, groups, and departments on their specific needs. CTL offices are on the first floor of Sweet Hall. For further details, see CTL’s teaching handbook or the CTL brochure, both available by calling (650) 723-1326. You can also consult the Web page at http://www-ctl.stanford.edu.

ORAL COMMUNICATION PROGRAM

The Oral Communication Program at CTL provides opportunities for undergraduate and graduate students to develop or improve their oral communication skills. Courses and workshops offer a comprehensive approach to speech communication, including training in the fundamental principles of public speaking and the effective delivery of oral presentations. The goal is to enhance the students’ general facility and confidence in oral expression. The program also provides innovative, discipline-based instruction to help students refine their personal speaking styles in small groups and classroom settings.

Those interested in individualized instruction or independent study are invited to visit the program’s Oral Communication Lab on the first floor of Sweet Hall, where trained student consultants, audio/video technology, and a variety of instructional resource materials are available on an ongoing basis. For further details, call (650) 723-4149 or 723-1326, or consult the Web page listed above.

COURSES

Learning skills and tutor training classes formerly taught by CTL are now being offered by the Undergraduate Advising Center through the School of Education. See the “School of Education” section of this bulletin.

117. The Art of Effective Speaking—Introduction to the principles and practice of effective oral communication. Through formal and informal speaking activities, students develop skills at framing and articulating ideas through speech. Strategies are presented for speaking extemporaneously, preparing and delivering presentations, formulating persuasive arguments, refining critical clarity of thought, and enhancing general facility and confidence at oral self-expression.

3 units, Aut, Win (Allen)

118. PublicSpeaking—A practical approach to the art of public speaking. Emphasis is on developing skills in various speech types: exposition, argumentation, and persuasion. Students sharpen their skills with the aid of textbooks, videotapes, texts of famous speeches, and participation in a final program of talks. Students also evaluate presentations by others.

3 units, Spr, Sum (Wagstaffe)

119. Teaching Oral Communication—Seminar for students with a strong background in public speaking who wish to train as public speaking consultants for CTL’s Oral Communication Program. Readings, exercises, and supervised teaching refine the students’ speaking skills and prepare them to serve as a peer consultant in a variety of academic disciplines. Admission by consent of instructor.

3 units, Spr (Allen)

219. Oral Communication Workshop for Graduate Students—Addresses a range of graduate student speaking activities such as teaching (delivering lectures, guiding discussion, and facilitating small groups), giving professional presentations and conference papers, and preparing for orals or theses defenses. In-class projects, discussion, and individual evaluation assist students in developing effective techniques for improving oral communication skills.

2 units, Spr, Sum (Allen)

CHICANO RESEARCH, STANFORD CENTER FOR

Faculty Executive Committee: Al Camarillo (History and CSRE), Kenji Hakuta (Education), Jim Leckie (Engineering), and Yvonne Maldonado (Medicine)

The Stanford Center for Chicano Research (SCCR) is an affiliated research unit of the Center for Comparative Studies in Race and Ethnicity (CSRE) and one of the founding member institutions of the InterUniversity Program for Latino Research (IUPLR). The objective of the SCCR is to facilitate basic and policy-oriented research on the nation’s second largest ethnic minority group, Mexican Americans. As part of the IUPLR consortium, the SCCR also serves as one of the sites to support research projects involving faculty and graduate students and is currently supported through various grants from government agencies.

The participating faculty of SCCR include professors from several departments in the School of Humanities and Sciences, as well as faculty from Business, Education, Engineering, Law, and Medicine. The SCCR was founded in 1980 and remains the only research center of its kind at a major private university.

PROGRAM FOR INDIVIDUALLY DESIGNED MAJORS

Individually Designed Majors (IDM) is coordinated by the Undergraduate Advising Center, located in Sweet Hall, first floor. See also the “School of Earth Sciences” and the “School of Engineering” sections of this bulletin for IDMs in these curriculum areas.

This program is intended for currently registered undergraduates in good academic standing interested in pursuing an area of scholarly inquiry that falls outside the purview of an established academic department or program of the University. Students submit proposals for consideration by the IDM Program Dean’s Advisory Committee. These should be intellectually coherent majors designed by the students themselves, with the assistance of faculty members of their choice. While the Individually Designed Major (IDM) program is not an honors program.
the governing committee encourages each participating student to consider an honors project as a culminating experience of the major. Information about proposal procedures, and the procedure for an honors project, is available at the Undergraduate Advising Center, Sweet Hall, first floor.

In designing a major, the student consults with three faculty members (at least two of whom must be members of the Academic Council) from at least two separate departments or programs of the University; one of the faculty members is selected as the student’s “primary” adviser. In helping the student design the major and in signing the proposal requesting approval from the Dean’s Advisory Committee on Individually Designed Majors, the faculty members are committing themselves to act as a regular academic advisory group for the student until graduation. The committee does not consider proposals without the approval of the faculty advisory group.

DEAN’S ADVISORY COMMITTEE

The program is administered by the Dean’s Advisory Committee on Individually Designed Majors and the Undergraduate Advising Center.

The committee acts in lieu of a regular department of the University. This role involves certifying the scholarly merit of the program and includes the obligation to consider, approve, and recommend changes in each proposed major.

In carrying out its role, the committee reserves the right to reject proposals that in its opinion lack scholarly merit or are not clearly interdisciplinary. Occasionally, the committee must reject a proposal that, though of considerable academic merit, requires resources not available at Stanford. The committee also reserves the right to recommend additions to a student’s faculty advisory group.

THE PROPOSAL

Detailed written procedures and advice about the preparation of the proposal are available from the Undergraduate Advising Center (Sweet Hall, first floor; telephone (650) 723-2426), where an academic adviser is available to discuss your proposal with you.

The proposal should begin with a statement that describes the major, articulates the motivation for and the justification and ultimate goal of the major, and shows how the courses listed relate to and fulfill the major’s goal. This statement should be followed by a list of the proposed core courses to be counted toward the major and, as far as possible, the sequence in which they are to be taken. The proposal must be signed by the selected faculty advisory group; their signatures certify that they endorse the major as described in the proposal and agree to serve as the student’s permanent advisory group. The proposal must be accompanied by a letter of recommendation from each of the three advisers giving separate appraisals of the academic viability of the proposed major. The proposal must also include a current copy of the student’s unofficial transcript.

These specific requirements are in addition to the general guidelines discussed under “The Major” section of this bulletin.

THE GUIDELINES

To establish the IDM program as being fully equivalent to a Stanford A.B. or B.S. degree in an established department or program, the Senate of the Academic Council has approved specific requirements. The criteria for approval of proposals submitted include:

1. Each major shall consist of at least 60 units, all in courses at or above the 100 level (or their equivalent).
2. A maximum of 15 units of these 60 units may be taken on a credit/no credit basis.
3. A maximum of 8 units of these 60 units may be taken in individual study or directed reading.
4. The proposed major must constitute a coherent academic program that fulfills the student’s objectives and achieves a clear academic goal.
5. The proposed major must be comparable in quality and in academic rigor to degrees obtained by students in other degree-granting programs offered at Stanford.
6. The proposed major must achieve both breadth and depth within the academic discipline(s), involve interdisciplinary study, and be compatible with a liberal arts education.
7. The proposed major must not duplicate or be achievable through a major already offered by another degree-granting program or department.
8. Students must present evidence that demonstrates their ability to do independent work.
9. Students proposing individually designed majors must have at least three full quarters of undergraduate work remaining at Stanford after the date on which the proposal is approved by the committee.
10. Two of the three advisers must be on the Academic Council. No more than two advisers may be from the same department.

SOCIAL SCIENCE HISTORY INSTITUTE

The goal of Social Science History Institute is to re-engineer the manner in which students in social science departments learn about historical institutions and data, and the manner in which students in history and related disciplines are trained in social science methods. Historians and social scientists share many of the same substantive interests (the development of economies, political systems, and social structures, for example), but they approach them with different and complimentary methods and bodies of evidence. There is, however, a great deal of potential for historians and social scientists to draw on the strengths of each other’s methods to improve their own work and to foster increased interaction among the various disciplines that employ history as a laboratory to operationalize social science theories. The Social Science History Institute seeks to realized this potential by transplanting state of the art research methods from classics, economics, history, political science, and sociology across the boundaries of each discipline.

An A.B. degree with an emphasis in History and Social Science is offered through the Department of History. The History degree is an HMIE (History Majors with Interdisciplinary Emphasis) program designed to acquaint students with the application of the analytic and quantitative tools of the social sciences to issues in historical causality and explanation. See the “History” section of this bulletin.

Ph.D. MINOR

The first element of the Ph.D. minor in Social Science History is a gateway course, The Logic of History (History 206/306). This course is taught in the Department of History and is designed to introduce students to questions of epistemology and methodology in history and the social sciences. It focuses on standards of evidence and argumentation across the various approaches to history, with a strong emphasis on social science approaches to the discipline.

The second element is a quantitative methods requirement. This requirement may be fulfilled by taking any one of the three two-course sequences:

1. Political Science 200A (Introduction to Political Data Analysis) and Political Science 200B (Statistical Modeling for Political Science).
2. Economics 270 (Intermediate Econometrics I) and Economics 271 (Intermediate Econometrics II).
3. Two of the following three courses in Sociological Methods:
   a) Sociology 382 (Sociological Methodology II: The General Linear Model)
   b) Sociology 383 (Sociological Methodology III: Advanced Models for Discrete Outcomes)
   c) Sociology 384 (Sociological Methodology IV: Advanced Models for Continuous Outcomes)

The third element is a requirement that students focus on a substantive area of social science history. Students must take a group of three courses outside their major department with a strong social science history component. These three courses are selected by students with the
advice and approval of a Ph.D. minor adviser, who also must be from outside the student’s major department. The courses should be chosen with an eye toward providing a coherent curriculum in a substantive issue that is useful in the development of a dissertation topic. For example, a student might focus on economic history by taking Problems in American Economic History (Economics 226), European Economic History (Economics 227), and Institutions in Economic History (Economics 228).

The final requirement is a capstone course, History 482 (Historical Social Science). This is a workshop for students working on or planning dissertations on topics related to social science history. Its purpose is to create a venue for the presentation of dissertation chapters or dissertation prospectuses in a multidisciplinary setting, and it is open to all students and faculty in the institute. Students may take this for 1 unit (and for a satisfactory/no credit grade if they so choose), or for 5 units and a grade.

**STANFORD INTRODUCTORY SEMINARS**

**Participating Faculty:** Over 230 faculty from 63 departments take part in the Introductory Seminars Program. See the faculty listings internal to each department’s listing in this bulletin for pertinent information.

The Stanford Introductory Seminars Program provides opportunities for first- and second-year students to work closely with faculty as they explore a potential major. These courses aim to intensify the intellectual experience of the freshman and sophomore years by allowing students to work with faculty members in a small-group setting; to introduce students to the variety and richness of the academic topics, methods, and issues which lie at the core of particular disciplines; and to foster a spirit of mentorship between faculty and students. The courses are given department credit and most count towards an eventual major in the field.

There are three types of classes offered in the program. Freshmen preference seminars are for 3-5 units to a maximum of 16 students, and generally meet twice weekly. Although preference for enrollment is given to freshmen, sophomores may participate on a space-available basis with the consent of the instructor. Sophomore preference seminars and dialogues, similarly, give preference to sophomores, but freshmen may participate on a space-available basis and with the consent of the instructor. Sophomore preference seminars are given for 3-5 units to a maximum of ten to twelve students, while sophomore preference dialogues take the form of a directed reading, and are given for 1-2 units to a maximum of four to five students. In addition, some sophomore preference dialogues and seminars offered during Autumn Quarter have a special advising component. Students who enroll in these classes, which are called advising dialogues and advising seminars, have the option of choosing the instructor as their advisor for the remainder of the academic year.

Because space is limited, students may enroll in only one of these courses each quarter. All Stanford Introductory Seminars require a brief application. Check the Time Schedule or with the Introductory Seminars office, 124 Sweet Hall, phone (650) 723-4388 for more information. Due dates for applications for the 1999-2000 courses are: Autumn Quarter—5 p.m., September 20 for freshmen preference courses, and 5 p.m., September 21 for sophomore preference courses; Winter Quarter—5 p.m., December 3 for freshmen preference courses, and 5 p.m., December 10 for sophomore preference courses; Spring Quarter—5 p.m., March 10 for freshmen preference courses, and 5 p.m., March 17 for sophomore preference courses.

**COURSES**

F=preference to freshmen; S=preference to sophomores; A=advising component; Dial=dialogue; Sem=seminar.

**AMERICAN STUDIES**
114. Visions of the 1960s—(S,Sem) 3 units, Aut (Gillam)

**ANESTHESIA**
75Q. Literature and Medical Interventions—(S,Dial) 1 unit, Spr (Shafer, Barr)

**APPLIED PHYSICS**
79Q. Science-Based Energy Technologies—The Pros and Cons—(S,Dial) 2 units, Aut (Geballe)

**ASIAN LANGUAGES**
71N. Language and Gender in Japan: Myths and Reality—(F,Sem) 3 units, Spr (Matsumoto)

81N. Writing and Writing Systems—(F,Sem) 3 units, Spr (Hare)

**BIOLOGICAL SCIENCES**
11N. Biotechnology in Everyday Life—(F,Sem) 3 units, Aut (Walbot)

12N. The Origin of Species—(F,Sem) 3 units, Spr (Ackerly) alternate years, not given 2000-01

14N. Plants and Civilization—(F,Sem) 3 units, Spr (Mooney)

15N. Environmental Literacy—(F,Sem) 3 units, Win (Schneider) alternate years, not given 2000-01

16N. Island Ecology—(F,Sem) 3 units, Win (Vitousek)

17N. Assessment of Chronic, Low-level Environmental Risks—(F,Sem) 3 units, Aut (Kennedy)

19N. Natural Sex and Gender—An Evolutionary Perspective—(F,Sem) 3 units, Win (Roughgarden)

21N. Readings in Molecular Biology and Genetics—(F,Sem) 3 units, Win (Baker)

22Q. Infection and Immunity—(S,Sem) 3 units, Spr (Jones)

23N. Experimental Strategy in Microbiology—(F,Sem) 3 units (Long)

25Q. Cystic Fibrosis—(S,Sem) 3 units, Spr (Kopito)

26N. Maintenance of the Genome—(F,Sem) 3 units, Spr (Hanawalt)

27N. Nature and Nurture in Brain Development—(F,Sem) 3 units, Spr (McConnell)

28Q. Nobel Prize Winning Research in Cell Biology—(S,Sem) 3 units, Spr (Rexach)

29N. The Outer Limits of Life—(F,Sem) 3 units, Win (Bohannan)
37Q. Evolution in Action—(S,Sem)
3 units, Aut (Gordon)

CHEMICAL ENGINEERING
50Q. Drug Delivery in the 21st Century—(S,Sem)
3 units, Aut (Robertson)

CHEMISTRY
22N. The Frontiers of Science—(F,Sem)
2 units, Win (Collman)

23N. Chemistry and Biology—(F,Sem)
2 units, Spr (Khosla)

24N. Nutrition and History—(F,Sem)
3 units, Spr (Huesis)

26N. Macromolecules: Is Bigger Better?—(F,Sem)
3 units, Spr (Waymouth)

CIVIL AND ENVIRONMENTAL ENGINEERING
45Q. Issues in Affordable Housing—(S,Sem)
3 units, Spr (Paulson, Behrmna)

46Q. Fail Your Way to Success—(S,Sem)
3 units, Spr (Clough)

47Q. Discovering Micro-Organization Theory for Fast-Paced Project Teams—(S,Sem)
4 units, Win (Levitt)

60Q. Waves of Northern California—(S,Sem)
3 units, Win (Monismith)

61Q. Big Dams, the City Hall, and the Sierra Club—(S,Dial)
2 units, Aut (Kitanidis)

76N. Hydrogen: Fuel of the Future—(F,Sem)
3 units, Win (Krug)

CLASSICS
16N. Bimillennium: High and Low Life in Rome 2000 Years Ago—(F,Sem)
3-4 units, Aut (Treggiari)

17N. Decoding Ancient Egypt—(F,Sem)
3-4 units, Spr (Manning)

18N. All is Number—(F,Sem)
3-4 units, Win (Netz)

20N. Love and Death in Epic Poetry—(F,Sem)
3-4 units, Win (Nightingale)

21N. Love as an Art Form in Latin Poetry and the European Novel—(F,Sem)
3-4 units, Aut (Syed)

COMMUNICATION
113Q. Online Media, The Future of News in a Democracy—(S,Sem)
1-3 units, Win (Lewenstein)

COMPARATIVE LITERATURE
24Q. Ethnicity and Literature—(S,Sem)
3-5 units, Aut (Palumbo-Liu)

25N. Latin American Nobel Prize Winners—(F,Sem)
5 units, Spr (Pratt)

30N. Opera and Literature—(F,Sem)
3-5 units, Aut (Lindenberger)

70N. The Bible and World Culture—(F,Sem)
3 units, Spr (Parker)

80N. The Science Wars: Does Physics get Closer to Reality than Poetry?—(F,Sem)
5 units, Aut (Rorty)

84Q. Shakespeare, Playing, Gender—(S,Sem)
3 units, Win (Parker)

115Q. Thinking in the Present: 20th-Century European Philosophy—(S,Sem)
3 units, Win (Gumbrecht)

COMPARATIVE MEDICINE
81Q. Comparative Anatomy and Physiology of Mammals—(S,Sem)
3 units, Spr (Bouley)

82Q. Animal Models in Biomedical Research—(S,Sem)
3 units, Aut (Tolwani)

83Q. Horse Medicine—(S,Sem)
5 units, Win (Green)

84Q. Animals and Medicine—(S,Sem)
3 units, Win (Daunt)

COMPUTER SCIENCE
99A. The Downside of Computing Systems—(F,Sem)
3 units, Aut (Baker)

99D. The Science of Art—(F,Sem)
3 units, Win (Levoy)

99E. Great Ideas in Computer Science—(F,Sem)
3 units, Win (Motwani, Raghavan)

99H. Programming and Problem Solving Seminar—(F,Sem)
3 units (Ullman) not given 1999-2000

99I. Business on the Information Highway—(F,Sem)
3 units, Win (Wiederhold) alternate years, not given 2000-01

3 units, Win (Mitchell)

99K. Digital Actors—(S,Dial)
2 units, Spr (Latombe)

99L. How Are We to Know?—(S,Sem)
3 units, Win (Nilsson)

99M. Computer and Information Security—(F,Sem)
3 units, Aut (Boneh)

99N. Ruler, Compass, and Computer—Computational Representations of Geometry—(S,Dial)
2 units, Spr (Guibas)

99P. Smart Computers and other Technological Opportunities—(F,Sem)
3 units, Spr (McCarthy)

CULTURAL AND SOCIAL ANTHROPOLOGY
8N. Narratives of Self and Society—(F,Sem)
5 units, Win (Rosaldo)
DRAMA
12N. Antigone—From Ancient Democracy to Contemporary Dissent—(F,Sem)
4 units, Win (Rehm)
14N. Contemporary German Drama from Brecht to Heiner Mueller—(F,Sem)
4 units, Win (Weber)
15N. The Shakespearean Era—(F,Sem)
4 units, Aut (Eddelman)
17N. (Re)Viewing Valdez in the Year 2000—(F,Sem)
3 units, Win (Moraga)
19N. The Arts and Civic Dialogue—(F,Sem)
4 units, Aut (Smith)
180Q. Noam Chomsky: The Drama of Resistance—(S,Sem)
3 units, Spr (Rehm)
189Q. Mapping and Wrapping the Body—(S,Sem)
3 units, Spr (Eddelman)

ECONOMICS
99Q. State, Market, and Development—(S,Sem)
5 units, Aut (Meier)

EDUCATION
137Q. Conceptualizing Human Motivation: East and West—(S,Sem)
3 units, Win (Roeser)
138Q. Educational Testing in American Society—(S,Sem)
3 units, Win (Haertel)

ELECTRICAL ENGINEERING
17Q. From Chips to Genes: Engineering the MicroWorld—(S,Sem)
1-3 units, Win (Pease, Quate)
33Q. Fun Electrical Engineering Stuff (and how it works)—(S,Sem)
3 units, Aut (Dutton, Ahrens)
44Q. Physics, History, and Mystique of Lightning—(S,Sem)
3 units, Win (Inan)
47Q. Telecommunications and Networking: From Telegraphy to the Internet—(S,Sem)
3 units, Aut (Harris)
60Q. Viewing Hazards on Earth from Space—(S,Sem)
3 units, Win (Zebker)
93Q. Energy Processes—(S,Sem)
3 units, Aut (da Rosa)

ENGLISH
61N. The Films of Woody Allen—(F,Sem)
3 units, Win (Polhemus)
62N. Eros and other Problems in Modern American Poetry—(F,Sem)
3 units, Win (Fields)
63N. Literature of California—(F,Sem)
3 units, Win (Jenkins)
64N. Growing Up in America—(F,Sem)
3 units, Win (Moya)
65N. Contemporary Short Story—(F,Sem)
3 units, Aut (Tallent)
66N. Landscape and Modern Literature—(F,Sem)
3 units, Spr (Harkin)
67N. The Reciprocal Vision—Our Europe, their America—(F,Sem)
3 units, Win (Evans)
80Q. Gothic Terror—(S,Sem)
3 units, Aut (Bender)
81Q. Authority and Women in the Early Middle Ages—(S,Sem)
3 units, Aut (Brown)
82Q. Shakespeare's Plays—(S,Sem)
5 units, Win (Rebholz)

FRENCH AND ITALIAN
108N. Female Saints—The Rhetoric of Religious Perfection—(F,Sem)
4 units, Aut (Gazelles)
189Q. Romance: Texts and Movies—(S,Sem)
4 units, Win (Gazelles)
190Q. Parisian Cultures of the 19th and Early 20th Centuries—(S,Sem)
4 units, Win (Bertrand)

FUNCTIONAL RESTORATION
70Q. Tissue Engineering: Ethics, Genes, and Cells—(S,Dial)
2 units, Aut (Smith)

GEOLOGICAL AND ENVIRONMENTAL SCIENCES
41N. El Niño—History and Predictability of a Global Climate Pacemaker—(F,Sem)
3 units, Spr (Dunbar) alternate years, not given 2000-01
44N. Emerging Issues in Global Environmental Change—(F,Sem)
3 units, Spr (Matson) alternate years, not given 2000-01
46N. The Beach—(F,Sem)
3 units, Win (Ingle)
49N. Field Trip to Death Valley—(F,Sem)
3 units, Win (Stebbins, Miller)
50Q. The Coastal Zone Environment—(S,Sem)
3 units, Aut (Ingle)
52Q. Geologic Development of California—(S,Sem)
4 units, Spr (Ernst)
53Q. In the Beginning: Theories of the Origin of the Earth, Solar System, and Universe—(S,Sem)
3 units, Win (McWilliams)
54Q. California Landforms and Plate Tectonics—(S,Sem)
3 units, Aut (Miller)
55Q. The California Gold Rush—Geologic Background and Environmental Impact—(S,Dial)
2 units, Spr (Bird)
56Q. Change in the Coastal Ocean—The View from Monterey Bay—(S,Dial)
1 unit, Spr (Dunbar)
GEOPHYSICS
5Q. Earthquakes of the Americas—(S,Dial)
1 unit, Aut (Kovach)

30Q. Earthquake Prediction—(S,Dial)
2 units, Spr (Beroza)

50Q. Earthquakes and Archaeology in the Eastern Mediterranean:
Lectures and Field Trip—(S,Dial)
2 units, Win (Nur)

GERMAN STUDIES
1N. German Studies—(F,Sem)
5 units, Aut (Bernhardt)

120N. Virtue and Terror: Kant, Rousseau, and the French Revolution—(F,Sem)
4 units, Spr (Strum)

123N. The Brothers Grimm and their Fairy Tales—(F,Sem)
4 units, Spr (Robinson)

126Q. Reading German Literature: An Introduction—(S,Sem)
4 units, Aut (Berman)

GRADUATE SCHOOL OF BUSINESS
Upside Potential and Downside Protection—(S,Sem)
2 units, Spr (Sharpe)

GYNECOLOGY AND OBSTETRICS
99Q. Ovarian Kaleidoscope: A Genomic Approach to Ovarian Physiology—(S,Sem)
3 units, Aut (Hsueh)

HEALTH RESEARCH AND POLICY
85Q. Current Issues in Women's Health—(S,Sem)
3 units, Win (Kelsey)

89Q. Cross-Cultural Issues in Medicine—(S,Sem)
3 units, Win (Corso)

HISTORY
12Q. "The Mind has No Sex?"—(S,Sem)
3 units, Win (Findlen)

19N. Peter the Great: The Individual Shaping History, History Shaping the Individual—(F,Sem)
4 units, Win (Kollmann)

22N. Ethnic Cleansing in 20th-Century Europe—(F,Sem)
4 units, Aut (Naimark)

36N. Gay Autobiography—(F,Sem)
4 units, Spr (Robison)

41N. Fictions of Empire—(F,Sem)
5 units, Win (Stansky)

42N. The Invention of Liberty and the English Revolution—(F,Sem)
4 units, Spr (Seaver)

47Q. The Language of African American Names—A History of Naming Traditions—(S,Sem)
5 units, Spr (Jackson)

48Q. South Africa: Contested Transitions—(S,Sem)
3 units, Win (Samoff)

53N. Reflections on the American Condition: American History through Literature—(F,Sem)
5 units, Aut (Kennedy)

85Q. Jews and Muslims—(S,Sem)
5 units, Win (Rodrigue)

99Q. Buddhist Biography and Autobiography—(S,Sem)
5 units, Spr (Mancall)

HUMAN BIOLOGY
90Q. Contemporary Issues in Human Experimentation—(S,A,Sem)
3 units, Aut (Constantinou)

91Q. Studies of Animal Behavior—(S,Sem)
3 units, Aut (Fernald)

97Q. Sports Medicine: Critical Insights—(S,Sem)
3 units, Win (Matheson)

LANGUAGE CENTER
199Q. Literature and Culture of Modern Greece—(S,Sem)
3-5 units, Aut (Prionas)

LINGUISTICS
11N. Accents of English—(F,Sem)
3 units, Spr (Flemming)

17Q. Slips of the Tongue—(S,Sem)
3 units, Win (Zwicky)

30Q. Legal Language—(S,Dial)
2 units, Aut (Traugott)

35Q. Computers and Human Language—(S,Sem)
3 units, Win (Hubbard, Kay)

44N. Living with Two Languages—(F,Sem)
3 units, Spr (Clark)

MATERIALS SCIENCE AND ENGINEERING
159Q. Research in Japanese Companies—(S,Sem)
3 units, Spr (Sinclair)

169Q. Issues in Science and Christianity—(S,Sem)
3 units, Win (Bube)

179Q. Materials in Sports—(S,Sem)
3 units, Spr (Clemens)

MATHEMATICS
80Q. Capillary Surface Interfaces—(S,Sem)
3 units, Win (Finn)

81Q. Fourier Series—(S,Sem)
3 units, Spr (Mazzeo)

82Q. Surfing Wavelets at Stanford—(S,A,Sem)
3 units, Aut (Staffilani)

83N. Paradoxes—(F,Sem)
3 units, Win (Feferman)

84Q. Finite Mathematics, Codes, and Cryptography—(S,Sem)
3 units, Win (Carlsson)
86Q. Problem Seminar—(S, Sem)
3 units, Spr (Katznelson)

87Q. Introduction to Differential Topology—(S, Sem)
3 units, Spr (Cohen)

MECHANICAL ENGINEERING
70N. The Aerodynamics of Sports Balls—(F, Sem)
3 units, Spr (Mungal)

72N. The Jet Engine—(F, Sem)
3 units, Aut (Eaton)

121N. Problem Solving and Creativity—(F, Sem)
3 units, Aut (Adams)

122N. Designing the Human Experience: An Exploration into the Theory and Practice of Design Thinking—(F, Sem)
3 units, Win (Leifer)

123N. Stuff—(F, Sem)
3 units, Aut (Prinz)

MEDECINE
70Q. Cancer and the Immune System—(S, Sem)
3 units, Aut (Croke, Jones)
Win (Negrin)

89Q. Biomedical Ethics—(S, Sem)
3 units, Aut (Young)

88Q. Current Dilemmas in Medical Practice—(S, Sem)

90Q. A Dangerous Profession—(S, A, Sem)
3 units, Aut (Ford)

91Q. The Patient-Physician Relationship—(S, Dial)
1 unit, Win (Thom)

93Q. The AIDS Epidemic—Biology, Behavior, and Global Responses—(S, Sem)
3 units, Aut (Katzenstein)

94Q. Hormones, Health, and Disease—(S, Sem)
3 units, Win (Feldman)

96Q. Blood Diseases: From Hemophilia to Leukemia—(S, Dial)
2 units, Aut (Leung)

MICROBIOLOGY AND IMMUNOLOGY
25N. Modern Plagues—(F, Sem)
2 units, Win, Spr (Boothroyd, Falkow, Kirkegaard)

26Q. The Threat of Emerging Antibiotic Resistance and What We can do About It—(S, Sem)
3-5 units, Spr (Matin)

MUSIC
11N. French Music—(F, Sem)
3 units, Aut (Cohen)

14N. Women Making Music—(F, Sem)
3 units, Win (Hadlock)

14Q. Singing Gregorian Chant—(S, Dial)
2 units, Win (Mahri)

15N. Richard Wagner and the Ring of the Nibelung—(F, Sem)
3 units, Spr (Grey)

15Q. The Music of J. S. Bach and His Time—(S, Sem)
3 units, Win (Cohen)

16N. Contemporary Music—(F, Sem)
3 units, Spr (Hui)

3 units, Aut (Sano)

17N. The Operas of Mozart—(F, Sem)
3 units, Win (Berger)

NEUROLOGY AND NEUROLOGICAL SCIENCES
1Q. Multiple Sclerosis—(S, Sem)
3 units, Win (Dorfman)

NEUROSURGERY
380Q. Computer Technology in Modern Medicine—(S, Sem)
4 units, Aut (Shahidi)

PEDIATRICS
82Q. Impact of Molecular Biology and Genetics on the Practice of Medicine—(S, A, Sem)
3 units, Aut (Fechner)

66Q. Development of Pediatric Cardiology as a Microcosm of the History of Medicine—(S, Dial)
3 units, Spr (Pitlick)

80Q. Growth: A Measure of Health and Disease in Individuals and Societies—(S, Sem)
4 units, Aut (Wilson)

PHILOSOPHY
11N. Autonomy—(F, Sem)
3 units, Spr (Jaworska)

12N. Identity and the Self—(F, Sem)
3 units, Win (Lawlor)

13N. Free Will and Moral Responsibility—(F, Sem)
3 units, Spr (Bratman)

14N. Consciousness—(F, Sem)
3 units, Aut (Perry)

15N. Mind and World—(F, Sem)
3 units, Spr (Streven)

74Q. Ethical Aspects of Risk—(S, Sem)
3-5 units, Aut (Follesdal)

PHYSICS
11N. Symmetries of Nature from Inner Space to Outer Space—(F, Sem)
2 units, Aut (Michelson)

12Q. Science, Society, and Politics—(S, Sem)
4 units, Spr (Walker, Willick)

18N. Revolutions in Concepts of the Cosmos—(F, Sem)
4 units, Spr (Walker)

41N/61N. Mechanics: Insights, Applications, and Advances—(F, Sem)
1 unit, Aut (Romani)

45N. Special Topics in Electromagnetism—(F, Sem)
1 unit, Spr (Thomas)
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Timeframe</th>
<th>Instructor(s)</th>
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<td>Applications of Electromagnetism</td>
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<td>65N</td>
<td>Statistical Mechanics—Principles and Applications</td>
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<td>The Technical Aspects of Photography</td>
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<td>Lookback Time in Cosmology</td>
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<td>Expanding Cosmic Horizons</td>
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<td>The Politics of Labor in Advanced Industrial Democracy</td>
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<td>The Evolution of Voting Rights in the U.S.</td>
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<td>Politics of Bureaucracy</td>
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<td>Psychosis and Society</td>
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<td>Cultural Factors in Family Adaptation to Chronic Stress</td>
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<td>72Q</td>
<td>Traumatic Stress: Antecedents, Consequences, and Intervention</td>
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<td>73Q</td>
<td>From Victim to Perpetrator—the Cycle of Violence and Delinquency</td>
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<td>80Q</td>
<td>Borderline Personality: Artistic Representations and Treatment</td>
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<td>5N</td>
<td>The Psychology of Shyness</td>
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<td>10N</td>
<td>Collective Violence</td>
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<td>Gender and Interaction in the U.S.</td>
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<td>111N</td>
<td>Contemporary Spain: The Challenge of Spain, from Fascism to Democracy (1935 to Present)</td>
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<td>Latin American Culture in the ‘60s</td>
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<td>Growing up Bilingual: Introduction to the Study of Bilingualism in the U.S.</td>
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<td>Chance, Experiments, and Inference</td>
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UNDERGRADUATE RESEARCH OPPORTUNITIES (URO)

Director: Laura S. Selznick

The Undergraduate Research Opportunities (URO) program seeks to combine two of Stanford's greatest strengths: the eminence of its research faculty and excellence in undergraduate education. URO encourages students to work independently on projects with faculty and thus to participate directly in Stanford's research community.

The collaboration takes place in two principal formats. Faculty members may list ongoing research projects in which undergraduates can become involved. Or, undergraduates may design their own individual projects and pursue them under the sponsorship of an individual faculty member. The URO staff directs students to departments with established research programs, advertises opportunities submitted by individual faculty, and helps to develop resources.

Faculty who have participated in this program have found enthusiastic and energetic assistants, made better progress in research, and freed up time for more specialized work. Students have appreciated the direct contact with faculty, immersion in a topic of mutual interest, and the unique learning opportunity that research provides.

LISTING RESEARCH

Faculty members with ongoing research programs are encouraged to identify a piece of their project appropriate to undergraduate competencies and to list it through URO. (Purely menial or mechanical projects are not appropriate.) The researcher should clearly state the nature of the position, requisite background and qualifications, and the expected time commitment. Determination of credit appropriate to each project is left to the researcher and the student. The formula generally used is three hours of intellectual work per week per academic unit. (On average, students have received 3 units of credit per quarter in exchange for a commitment of ten hours per week.)

RESEARCH OPPORTUNITIES (URO)

Major grants differ from small grants in the scope of the project proposed rather than the level of reimbursement requested. Small and major grants are restricted to supplies and expenses associated with research. Major grants are awarded once a year, during Spring Quarter, to as many as 150 students whose projects reflect the highest level of creativity and independence and the greatest promise for exciting results. Students on financial aid may sometimes receive funds to replace summer earnings.

RESOURCE FILES

Students can obtain free access to two data bases designed to facilitate undergraduate research projects. The Odyssey and Faculty Interests files are available through Stanford's Portfolio home page on the World Wide Web. Odyssey lists openings for student research assistance on faculty research projects. The Faculty Interests file contains information about the research interests of individual Stanford faculty across the University. Students can use faculty interest information in identifying potential sponsors for projects of their own design or in seeking advice about a particular discipline.

FUNDING AVAILABLE

The Fund for Undergraduate Research is administered by URO and is available exclusively to Stanford undergraduates. All applicants must file a cover sheet on the World Wide Web (http://www.uro.stanford.edu). Faculty recommendation forms and samples of previous successful grant applications are available at 122 Sweet Hall. Grant advice is available both in person and on the home page. The deadlines for major grants (up to $2,500) for 1999-2000 are Friday, March 31 for projects in social sciences, natural sciences, and engineering and Friday, April 14 for projects in humanities and creative arts. Students with interdisciplinary projects are encouraged to apply by the earlier deadline.

Small grants ($500 maximum per project) are awarded each quarter. The deadlines are October 29, February 4, and April 14.

Major grants differ from small grants in the scope of the project proposed rather than the level of reimbursement requested. Small and major grants are restricted to supplies and expenses associated with research. Major grants are awarded once a year, during Spring Quarter, to as many as 150 students whose projects reflect the highest level of creativity and independence and the greatest promise for exciting results. Students on financial aid may sometimes receive funds to replace summer earnings.

The Chappell-Lougee Scholars program is a special opportunity for sophomores in the humanities and social sciences to be involved in research under faculty mentorship. Faculty may nominate students or students may nominate themselves. Financial need is considered, as well as the academic goals of the proposed project. Applications and nominations are due to the URO office by Friday, December 3, 1999. The URO office has information on applications and criteria.

The Future Faculty Incentives Program encourages URO grant recipients from all categories to consider a career in college or university teaching. The award provides undergraduate loan repayment up to $10,000 for graduate work toward a Ph.D. Preference is given to students from disadvantaged backgrounds who would add diversity to the professoriate in their field of study. Financial need and evidence of disadvantaged background are also considered in the selection process. The application deadline is May 15 of the year in which the student plans to matriculate in a graduate program.

Stanford Fund Research Assistantships and Research Awards enable undergraduates in the humanities and social sciences with financial need to gain research experience in lieu of a campus job. Assistantships are for students who have not yet declared a major, but wish to explore a particular field under faculty supervision. Research Awards are for declared students with subject-matter expertise who wish to pursue the interest further. Recipients may have from 10 to 15 weeks of term-time earnings replaced. High financial need is a criterion for acceptance. A maximum of 25 weeks of work in undergraduate employment may be replaced.

Mellon Minority Undergraduate Fellowships promote diversity by encouraging the pursuit of honors at Stanford and enrollment in a Ph.D. program in the humanities after graduation from Stanford. Benefits include earnings replacement, scholarship expenses, and undergraduate loan repayment totaling a maximum of $20,000. The deadline is Friday, June 9, 2000.

STANFORD IN WASHINGTON

Director: Adrienne Jamieson

Stanford in Washington provides highly-qualified undergraduates with an opportunity to work and study in the nation's capital. In addition to providing students with an understanding of public policymaking, the program offers an opportunity to take advantage of the city's unique cultural resources.

Central in the student's educational experience is an internship. Students serve as interns at such institutions and agencies as the Senate, the House of Representatives, the Office of Management and Budget, the Securities and Exchange Commission, the Smithsonian Institution, the National Gallery, and the departments of Commerce, Education, Health and Human Services, Justice, and State.

In addition to the internship, students must also complete an academic course of study consisting of small tutorials taught by policy experts (5 units), and weekly policy seminars taught by Stanford faculty members (5 units). Frequently, speakers from the Washington policy community join students and faculty for discussions. Students usually write a major paper related to their internship for 3-5 units of credit. Course and seminar topics vary according to student and faculty interest.

Stanford in Washington offers "stretch quarters" in the Autumn and Spring (mid-September to mid-December, and late March to the end of June) and a regular quarter in Winter, which focuses on environmental and health policy. The program is designed for students in their junior year or the first quarter of their senior year. Applications must be completed two quarters in advance. For Autumn Quarter, apply early Winter Quarter of the previous year. For Winter Quarter, apply early Spring Quarter of previous year. For Spring Quarter, apply early Autumn Quarter. Students interested in the program may obtain a brochure at the Haas Center for Public Service or call for information, (650) 723-0992.
School of Law


Dean: Kathleen M. Sullivan

Associate Deans: Frank F. Brucato, Richard Craswell, Mitchell W. Davis.

Dean: Kathleen M. Sullivan


Assistant Professors: Janet Cooper Alexander, Barbara Allen Babcock, Joseph Bankman, John H. Barton, Bernard S. Black, Paul Brest (on leave).


Assistant Professors: R. Richard Banks, G. Marcus Cole

Professor (Teaching): William C. Lazier


Consulting Assistant Professors: Lama Abu-Odeh, Michael Stein

Courtesy Professors: Charles McClure Jr., Abraham Sofaer.


Visiting Associate Professor: Amy Chua.

Visiting Assistant Professor: Seung Wha Chang.

The School of Law was established as a department of the University in 1893. Its purpose is to provide a thorough legal education for students who are fitted by their maturity and their previous academic training to pursue professional study under university methods of instruction. The curriculum leading to the first professional degree in law (J.D.) constitutes an adequate preparation for the practice of law in any English-speaking jurisdiction. Graduate work leading to the degrees of Master of the Science of Law and Doctor of the Science of Law are also offered. (For the full curriculum, see the Stanford University bulletin School of Law.) The school is on a two-term academic calendar. Autumn term classes begin on September 9, 1999. Spring term classes begin on January 24, 2000, and the term ends on May 12, 2000.

COURSES

GRADUATE

The following courses are open to qualified graduate students in other departments of the University upon consent of the instructor:

236. Art and the Law—The range of problems that arise at the intersection of law and the visual arts (painting, sculpture, and graphic art): the protection of works of art in time of war, occupation, and civil strife; international traffic in stolen and smuggled cultural treasures; censorship, criticism, selection, and artistic freedom; copyright, moral right, and the proceeds right; art forgery, fakes, and consumer protection in the visual arts; legal relations between artists, dealers, museums, collectors, and auction houses; tax and estate problems of artists and collectors; legal services for artists; artnapping and insurance; legal problems of art museums, etc.

3 term units, Spr semester (Merryman)

287. Urban Policy Design and Implementation—Open to graduate students. Examination of the interaction between urban redevelopment policies and environmental laws as applied to local land use decisions. The opportunities and obstacles to promoting “smart growth” in existing communities and discouraging sprawl in undeveloped areas. Paper. Enrollment limited. Recommended prior course work on environmental law.

2 term units, Aut semester (Hernandez, Hingerty)

307. Gender, Law, and Public Policy—Open to second- and third-year law students and other qualified students with consent of instructor. Topics: equal protection standards, employment, reproductive rights, sexual harassment, rape, domestic violence, pornography, sexual orientation, feminist legal theory, and the family.

3 term units (Rhode)

313. Health Law and Policy—(Same as Health Research and Policy 210.) Open to all law or medical students and, by consent of instructor, to qualified undergraduates. Introductory survey of the American healthcare system and its legal and policy problems. Topics: the special characteristics of medical care as compared with other goods and services, the difficulties of assuring quality care, the complex patchwork of the financing system, and the ethical problems the system raises.

3 term units, Aut semester (Greely)

440. Biotechnology Law and Policy—Open to graduate and professional students and, by consent of the instructors, to qualified undergraduates. Interdisciplinary exploration of the legal and policy issues raised by the biotechnology industry. Patenting, corporate organization and financing, conflicts of interest, regulatory approvals, health care financing issues, and tort liability. The prospects for and implications of the biotechnology revolution. Interdisciplinary student groups present and discuss a solution to a series of hypothetical problems.

2 term units (Barton, Botstein, Greely) not given 1999-2000

611. Interdisciplinary Seminar on Conflict Resolution—(Same as Economics 386, Engineering Economic Systems and Operations Research 489, Psychology 283.) Addresses problems of conflict resolution and negotiation from an interdisciplinary perspective. Presentations by faculty and scholars from other universities.

1 term unit, Win (Alexander, Arrow, Ross, Wilson)

649. Advanced Issues in Health Law and Policy: Genetics and Law—(Same as Health Research and Policy 211.) Open to 20 students from any Stanford graduate or professional program. Writing seminar on the ethical, legal, and social issues raised by the revolution in human genetics. Topics: DNA fingerprinting, genetic privacy, property rights in genes, genetic testing, genetic discrimination, transgenics, and eugenics.

2 term units (Greely, Cox) not given 1999-2000
NONPROFESSIONAL

The following course is open to undergraduates and graduate students in other departments, and may be counted toward the A.B. degree but not toward professional degrees in law.

106. Introduction to American Law—(Same as American Studies 179, Political Science 182F.) American law for undergraduates. The structure of the American legal system, including the courts, American legal culture, the legal profession and its social role, the scope and reach of the legal system, the background and impact of legal regulation, the relationship between the American legal system and American society in general. GER:3b (DR:9)

5 units, Aut (Friedman)
School of Medicine

Dean: Eugene Bauer
Senior Associate Dean for Education and Student Affairs: Charlotte D. Jacobs

The School of Medicine offers courses of study leading to the M.S., Ph.D., and M.D. degrees.

UNDERGRADUATE PROGRAMS

At the undergraduate level, a number of the school’s courses are open to any registered Stanford student who has fulfilled the prerequisites, subject to the usual limits of course enrollment and faculty approval. Details on admission into undergraduate programs are described in the "Undergraduate Degrees" section of this bulletin.

GRADUATE PROGRAMS

M.S. AND Ph.D. PROGRAMS

Departments offer programs leading to the Ph.D. degree. Applications and information for all graduate programs may be obtained from Graduate Admissions, Registrar's Office, Stanford University, Stanford, California 94305-3005.

M.D. PROGRAMS

The School of Medicine provides an educational environment that encourages intellectual diversity and offers stimulation and opportunity for self-motivated students who are interested in developing a scholarly, investigative approach to problems in medicine. Accordingly, Stanford has designed its medical curriculum with a two-fold purpose: to develop in all students the capacity for leadership in the clinical practice of scientific medicine and to provide them opportunities to prepare themselves for careers in research and teaching in the various branches of basic, clinical, and social medicine. The flexible curriculum allows for individual needs in scheduling course work. Students develop study plans that take into consideration their academic background, particular strengths, and career objectives.

All medical students must complete a formal curriculum in the basic medical sciences and have formal clinical experience in medicine, surgery, pediatrics, gynecology-obstetrics, family medicine, and psychiatry. Following completion of 13 quarters of academic work, additional quarters may be taken at a special student rate. Involvement in research and outside course work may extend the time spent in medical school. Completion of the M.D. degree must be achieved within six years, unless a petition is granted to extend this time frame.

There are a variety of opportunities for in-depth study of subject areas in the basic sciences. Students with strong interests in medical research as a career are urged to investigate opportunities available under the auspices of the Medical Scientist Training Program (MSTP). This program provides a limited number of students the opportunity to pursue an individualized program of research and course work leading to both the M.D. and Ph.D. degrees. The estimated time for completion of the program is seven years. Students interested in participating in the MSTP are asked to provide supplemental information relevant to their research background and are considered for entry into the MSTP at the time of their application to the School of Medicine.

The admissions process recognizes that some minorities and women are under-represented in the medical profession, and especially in academic medicine; the school has a strong commitment to identify, recruit, and educate such students.

Provided an applicant to the school has completed the basic courses in physics, chemistry, and biology, the choice of an undergraduate major may reflect other interests, including the arts and humanities. Course work in mathematics and the behavioral sciences is highly recommended because of its importance in understanding medicine. Extracurricular activities and breadth of interests and experiences play an important role in the selection of students from among those applicants having superior records.

Further details on the M.D. degree, including admission requirements, are in the Stanford University School of Medicine Catalog, available on the World Wide Web at http://www-med.stanford.edu/school/catalog. For application materials write: Committee on Admissions, Stanford University, School of Medicine, 851 Welch Road, Room 154, Palo Alto, CA 94304-1677.

BIOCHEMISTRY

Emeriti: (Professors) Robert L. Baldwin, Paul Berg, Arthur Kornberg
Chair: Suzanne R. Pfeffer
Associate Professors: Patrick O. Brown, Gilbert Chu, Daniel Herschlag, Mark A. Krasnow
Assistant Professors: Pehr A. B. Harbury, Julie A. Theriot

Biochemistry is a department within the School of Medicine, with offices and labs located in the Beckman Center for Molecular and Genetic Medicine at the Stanford Medical Center. Courses offered by the department may be taken by undergraduate, graduate, and medical school students. A basic series in biochemistry (200, 203) is taught by the entire staff and requires a good background in organic chemistry and cell biology.

Advanced courses are offered in more specialized areas and they emphasize the most recent developments in biochemistry, cell biology, and molecular biology. These courses include the physical and chemical principles of biochemistry, enzyme reaction mechanisms, membrane trafficking and biochemistry, molecular motors and the cytoskeleton, mechanisms and regulation of nucleic acid replication and recombination, the biochemistry of bacterial and animal viruses, the molecular basis of morphogenesis, the molecular and cell biology of yeasts, and the structure and function of both eukaryotic and prokaryotic chromosomes.

Opportunities exist for directed reading and research in biochemistry and molecular biology, utilizing a small but excellent departmental library as well as the most advanced research facilities, including those for light and electron microscopy, chromatography and electrophoresis, protein and nucleic acid purification, synthesis and analysis, single molecule analyses using laser light traps, and computer graphic workstation facilities for protein and nucleic acid structural analysis. Ongoing research utilizes a variety of organisms, ranging from bacteria to animal cells.

GRADUATE PROGRAM

DOCTOR OF PHILOSOPHY

Requirements for the M.S. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin. The department does not offer undergraduate degrees.

The Department of Biochemistry offers a Ph.D. program which begins in the Autumn Quarter of each year. The program of study is designed to prepare students for productive careers in biochemistry; its emphasis is training in research, and each student works closely with members of the staff. In addition to the requirement for a Ph.D. dissertation based on original research, students are required to complete six advanced courses in biochemistry and related areas, and at least three of these courses must be taken in the Department of Biochemistry. Selection of these courses is tailored to fit the background and interests of each student. A second requirement involves the submission of three research proposals which are presented by the student to a small advisory committee of departmental faculty members, who are also responsible for monitoring the progress of student curricular and research programs. All Ph.D. students are expected to participate actively in the department's seminar
program and journal club, and students are encouraged to attend and to present papers at regional and national meetings in cellular biochemistry and molecular biology. Teaching experience is an integral part of the Ph.D. curriculum and is required for the degree.

The Department of Biochemistry offers a M.S. degree only to students already enrolled in the Ph.D. program. Students should contact the Graduate Studies adviser for more details.

Those applying for graduate study should have at least a baccalaureate degree and should have completed work in cell and developmental biology, basic biochemistry and molecular biology, and genetics. Also required are: at least one year of university physics; differential and integral calculus; and analytical, organic, inorganic, and physical chemistry. The department is especially interested in those applicants who have research experience in biology or chemistry. Students must submit an application, including transcripts and letters of recommendation, by December 15.

Beginning September 1, applications are available and can be requested by mail from Graduate Admissions, Registrar's Office, Old Union, Stanford University, Stanford CA 94304-3005, by phone (650) 723-4291, or email at ckt.gaa@forysthe.stanford.edu. Applicants are notified by April 1 of decisions on their applications. Stanford University requires scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical), and applicants must submit scores from the GRE Subject Test in either biochemistry, biology, or chemistry. Applicants should take the October GRE exam.

All applicants are urged to compete for non-Stanford fellowships or scholarships, and U.S. citizens should complete an application for a National Science Foundation and a Howard Hughes Medical Institute Predoctoral Training. Students are provided with financial support to cover normal living expenses; Stanford tuition costs are paid.

All applicants for admission to the department are considered without regard to race, color, creed, religion, sex, age, national origin, or marital status.

Postdoctoral research training is available to graduates who hold a Ph.D. or an M.D. degree. Qualified individuals may write to individual faculty members for further information.

At present, the primary research interests of the department are the structure and function of proteins and nucleic acids, the biochemistry and control of development processes, molecular motors and the cytoskeleton, the trafficking of proteins between membrane-bound organelles, and the control and regulation of gene expression. COURSES

200. Biochemical Structure, Metabolism, and Energetics—The structure and function of biological molecules, enzyme kinetics and mechanisms, bioenergetics, pathways of intermediary metabolism and their control, and membrane structure and function. Lectures on special topics. Prerequisites: organic chemistry, cell biology.

5 units, Win (Harbury, Pfeffer, Spudich, Theriot)

201. Advanced Molecular Biology—Lectures on rapidly developing frontiers in DNA structure and metabolism, chromosome structure and function, gene expression and its control, regulation of transcription, protein structure and function, RNA processing, and translation. Prerequisites: course in basic molecular biology.

5 units, Aut (Brutlag, Davis)

203. Molecular Biology—Enrollment limited to medical students or by consent of instructors. DNA structure and metabolism, chromosome structure and function, gene expression and its control, regulation of transcription, protein structure and function, RNA processing, and translation. Minicourses provide in-depth treatment of material in the core lectures, topics with medical relevance, and reviews of original literature. Prerequisite: 200 or equivalent.

4 units, Spr (Brown, Chu, Krasnow, Lehman)

210. Advanced Topics in Membrane Biochemistry—The structure, function, and biosynthesis of cellular membranes and organelles. Based on current literature, with extensive student participation. Prerequisite: 200, 203, or equivalents, or consent of instructor.

4 units (Pfeffer)

211. Development in Microorganisms—Cell differentiation and multicellular development in microorganisms. Microbes are attractive subjects for molecular studies of the regulation of development because they can be manipulated easily by genetic and biochemical techniques, handled in large numbers, and because their genomes are relatively small. Topics: temporal and spatial regulation of cell division; sporulation; flagella and pili morphogenesis; positional information; cell-cell communication and multicellular development; signal transduction pathways. Lectures/readings in current literature.

2 units (Kaiser, Shapiro) not given 1999-2000

213. Biological Signaling during Development—The biochemical and genetic analysis of the developmental response of cells, or cell clusters, to specific molecular signals. Signals vary from complex molecules to simple molecules (steroid hormones), and the responding cells vary from those in close proximity to signal-generating cells to all cells in the organism. Focus is on the signaling mechanisms and on the evolutionary conservation of these systems. Prerequisites: knowledge of basic biochemistry and genetics.

3 units (Hogness) not given 1999-2000

214. Physical and Chemical Principles of Biochemistry—The physical chemistry of proteins, nucleic acids and their complexes, and the chemistry underlying biological reactions; principles of enzymatic catalysis. The physical and chemical concepts that are fundamental to biological processes. Appraisal of experimental and conceptual approaches and analysis of classic and current papers in the literature. Areas: interactions involved in protein and nucleic acid structure and folding; energetic, chemical, and structural principles of enzymatic catalysis and control. Prerequisites: 200, 203 or equivalent, a course in physical chemistry, and a course in organic chemistry.

4 units, Spr (Herschlag)

215. Frontiers in Biological Research—(Same as Developmental Biology 215.) Literature/discussion on how to critically evaluate current biological research, held in conjunction with a Wed. seminar series, hosted in alternate weeks by Biochemistry and Developmental Biology. Invited speakers present works in a particular system. Students and faculty read and critically discuss one or more papers from the primary research literature on a related topic before the seminar, and then, meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, the set of techniques most commonly used to study problems in biology, and a comparison between genetic and biochemical approaches in biological research.

1 unit, Aut, Win (Harbury, Kingsley, Villeneuve)

217. Advanced Tutorial in Special Topics—Readings and tutorial in membrane biochemistry, enzyme mechanisms, chromosome structure, biochemical genetics, bacterial and animal viruses, and nucleic acid enzymology. Conducted under the guidance of advanced graduate students and postdoctoral fellows.

1-3 units, any quarter (Staff)

218. Computational Molecular Biology—(Same as Medical Information Sciences 231.) For molecular biologists and computer scientists desiring a practical, hands-on approach to computational molecular biology; recommended for molecular biologists and computer scientists desiring to understand the major issues concerning representation and analysis of biological sequences and structure. Existing methods critically described with the strengths and limitations of each. Future direction for development of new methods. Practical assignments utilizing the tools described. Topics: accessing molecular databases, pattern search, classification of sequence and structure, alignment of sequences, rapid similarity searching, phylogenies, automated pattern learning, represent-
ing protein structure, modeling protein structure by homology, protein-protein docking and protein-ligand docking. Final project utilizes or analyzes the methods presented. Lecture/lab. Enrollment limited to 40. Prerequisite: introductory molecular biology at the level of Biological Sciences 52 or consent of instructor. Recommended: 210.
3 units, Aut (Brutlag)

221. The Teaching of Biochemistry—To be taken by all teaching assistants in 200, 203, or 217. Emphasizes practical experience in teaching on a one-to-one basis, and problem set design and analysis. Familiarization with current lecture and text materials is expected, along with evaluations of class papers and examinations. Prerequisite: enrollment in the Biochemistry Ph.D. program or consent of instructor. 3 units, any quarter (Staff)

225. Molecular Motor Proteins and the Cytoskeleton—(Same as Developmental Biology 225.) The molecular basis of energy transduction leading to movements generated by microfilament-based and microtubule-based motors. Analysis of forms of myosin, dynein, and kinesin and their roles in the cell, as a model for understanding the structural, biochemical, and functional properties of biological machines in general. Topics: structure of the molecular motors and their accessory proteins; regulation of the function of motile assemblers; functions of molecular motors in cells; spatial and temporal controls on the formation of motile assemblies in cells. Experimental approaches: genetic analysis, DNA cloning and expression, reconstitution of functional assemblies from purified proteins, x-ray diffraction, three-dimensional reconstruction of electron microscope images, spectroscopic methods, and high-resolution light microscopy. Focuses on how a complex cellular process is analyzed at the molecular level by a multifaceted approach using biochemical, biophysical, and genetic techniques. Prerequisites: knowledge of basic biochemistry and cell biology. 3 units (Spudich)

237. Introduction to Biotechnology—(Same as Chemical Engineering 450, Civil and Environmental Engineering 237, Developmental Biology 237, Structural Biology 237.) Faculty from the departments of Biochemistry, Biological Sciences, Chemical Engineering, Civil Engineering, Developmental Biology, Structural Biology, and invited industrial speakers review the interrelated elements of modern biotechnology. Topics: protein structure and dynamics, protein engineering, biocatalysis, gene expression, cellular metabolism and metabolic engineering, fermentation technology, and purification of biomolecules. Prerequisite: graduate student or upper-division undergraduate in the sciences or engineering. 3 units, Spr (Robertson)

294. DNA Repair, Recombination, and Replication—Enzymes and molecular mechanisms and how some physiological aspects of DNA transactions may be explained at the molecular level. Prerequisites: 200, 203.
2 units (Lehman)

299. Directed Reading—Prerequisite: consent of instructor.
1-18 units, any quarter (Staff)

399. Research and Special Advanced Work—Register by section numbers by arrangement with faculty. Prerequisite: consent of instructor.
1-18 units, any quarter

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.
1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

CENTER FOR BIOMEDICAL ETHICS

Co-Directors: Thomas A. Raffin, Ernè W. D. Young
Executive Director: Barbara A. Koenig
Steering Committee: Kenneth Arrow (Economics, emeritus), Paul Berg (Biochemistry), David Cox (Stanford Human Genome Mapping Center), Ronald Davis (Biochemistry), Victor Fuchs (Economics, Health Research and Policy, emeritus), Linda Giudice (In Vitro Fertilization and Reproductive Endocrinology Laboratories), Mary Goldstein (General Internal Medicine, V. A. Palo Alto Medical Care System), Henry Greely (Law), Peter Gregory (Senior Associate Dean of Clinical Affairs), Susan Okin (Ethics in Society Program, Political Science), Debra Satz (Ethics in Society Program, Philosophy), Lucille Shapiro (Developmental Biology), David Stevenson (Pediatrics)

The Stanford University Center for Biomedical Ethics is an interdisciplinary center devoted to teaching and research in scientific and biomedical ethics. Its mission is to: apply ethical reasoning to actual moral problems in the practice of medicine and science; contribute to the national and international discussion of biomedical and scientific issues through research, public symposia, and published papers and monographs; convene scholars, professionals, and policy-makers to debated and propose policy solutions regarding biomedical and scientific ethical issues; serve as a scholarly resource for the University, the Medical Center, and the community at large on emerging ethical issues in medicine and science; and build a community of individuals dedicated to formulating fresh responses to contemporary ethical issues.

The Program in Genomics, Ethics, and Society is multidisciplinary, and is housed within the Center for Biomedical Ethics. It addresses the compelling social, ethical, legal, and political implications of advances in human genetics.

COURSES

For further information, see the Stanford University School of Medicine Catalog.

CULTURAL AND SOCIAL ANTHROPOLOGY

143. The Anthropology of Death and Dying
5 units, Spr (Koenig)

MASTER OF LIBERAL ARTS PROGRAM

57. Bioethics at the Dawn of the New Millennium—Seminar introduces ethical issues in medicine and the life sciences that are controversial at present and in the future: the genetic revolution, the debate about when human personhood begins and ends (and the implications of this debate for clinical decision-making and public policy), and related ethical issues at the beginning and ending of life. Objectives: encourage students to think through morally problematic topics, in small groups and using case studies, and be prepared to defend one's positions publicly.
3 units, Aut (Young)

MEDICINE

214. Literature and Medicine—Reading/discussion on the uses of literary arts as a companion to medical studies. Essays, stories, and poems
on topics relevant to the basic and clinical sciences such as immunology, cardiology, AIDS, end of life, ethics, etc.
1 unit, Win (Crawley, Shafer, Koenig)

250A. Medical Ethics I—Seminar. The major Western theories of ethical decision-making are applied to moral issues in medicine and the life sciences. Daily quandaries confronting clinicians are discussed as a whole or in small groups. Objectives: develop and apply a methodology for clinical decision-making; delineate core issues in biomedical ethics (the nature of the physician/patient, informed consent, quality of life vs. sanctity of life, and the just distribution of finite medical resources); and to enable students to formulate their own positions with respect to contemporary issues and topics in biomedical ethics.
3 units, Win (Young)

250B. Medical Ethics II—Advanced examination of a narrower range of topics at greater depth. Topics vary each year. Students have an informed discussion with an invited expert on the topic under discussion. Objectives: examine the fundamental ethical principles informing the practice of medicine and the life sciences and the relationships between them; identify "non-rational" factors that enter decisively into ethical decision-making; struggle with emerging ethical issues in medicine and the life sciences; and suggest areas where greater conceptual clarity and methodological fitness is required. Recommended: some acquaintance with the field of biomedical ethics.
3 units, Spr (Young)

89. Stanford Introductory Seminar: Biomedical Ethics—Preference to sophomores. In-depth exposure to ethical theory, moral reasoning, and important texts, dealing with different themes in biomedical ethics that apply to clinical ethical issues. Students assume significant responsibility for leading the sessions, along with the instructor. Objective: help students construct reasoned points of view on a variety of topics that can be defended publicly.
3 units, Aut (Young)

RELATED OFFERINGS

BUSINESS

399. Special Topics in Business Research: Biotechnology Business Ethics Case Development Project
4 units, Aut (Eaton)

HEALTH RESEARCH AND POLICY

209. Medicine and the Law
3 units, Win (Eaton)

210. Health Law and Policy—(Same as Law 313.)
3 units, Aut (Greely)

HUMAN BIOLOGY

2S,3S,4S. Bioethical Issues in Human Biology
1-2 units, Aut, Win, Spr (Hurlbut)

90Q. Contemporary Issues in Human Experimentation
3 units, Aut (Constantinou)

121. Ethical Issues in the Neurosciences
4-5 units, Spr (Hurlbut)

PHILOSOPHY

78. Medical Ethics
4 units, Aut (Jaworska)
research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

COURSES

Course work and lab instruction in the Cancer Biology Program conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.


3 units (Staff) alternate years, not given 2000-01

251,252,253. Special Topics in Cancer Biology—Full-quarter courses or half-quarter minicourses given by different lecturers on topics of major importance in cancer research.

251. 1-3 units, Aut (Staff)
252. 1-3 units, Win (Staff)
253. 1-3 units, Spr (Staff)

263: Apoptosis in Normal Development and Cancer—The importance of apoptosis (programmed cell death) in normal development and in formational progression. Apoptotic paradigms in hemopoetic, neurological, and cardiovascular tissues, contrasted with those in malignant transformation and progression. Organized/coordinate by Assistant Professor Giaccia.

4 units (Staff)

299. Research—Students registered for the Ph.D. must register as soon as they begin dissertation-related research work.

COMPARATIVE MEDICINE

Chair: Linda C. Cork
Professor: Linda C. Cork
Assistant Professors: Donna Bouley, Paul Buckmaster, David Daunt, Sherril Green, Glen Otto, Ravi Tolwani

The Department of Comparative Medicine is a relatively new basic science department and does not offer degrees, but its faculty offers courses and participate in teaching in other departments at the undergraduate and graduate level. Faculty members, most of whom are specialists in some veterinary medical specialty, also accept students to participate in ongoing research projects within the department and assist students with special research projects.

The discipline of Comparative Medicine utilizes the differences and similarities among species to understand basic biologic and disease mechanisms. Comparative Medicine incorporates the use of spontaneous or induced disease models as one of several approaches to research. Faculty members have expertise in anesthesiology, infectious diseases, molecular genetics, neuropathology, neuroscience, rodent biology, and so on.

COURSES

Course work and lab instruction in the Department of Comparative Medicine conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

82Q. Stanford Introductory Seminar: Animal Models in Biomedical Research—Preference to sophomores. Overview of the usefulness of animal models in biomedical research (both naturally occurring animal models that mimic human disease and induced models developed by transgenic techniques) as tools to study mechanisms of disease and develop new therapeutic approaches. Examples of animal models in medical disciplines. The techniques utilized to develop animal models, including transgenic technology.

3 units, Aut (Tolwani)

83Q. Stanford Introductory Seminar: Horse Medicine—Preference to sophomores. Introductory to animals, medicine, and biomedical research. Comparative physiology and disease processes between various mammalian species. Recent technological advances in veterinary medicine of companion animals and livestock. Examples of spontaneous and induced animal models of disease. The ethical considerations of using animals for biomedical research and the future directions of animal use in biomedical research and animal health care.

3 units, Win (Daunt)

105/206. Principles of Animal Research—Graduate students register for 206.) Overview of the methodology and principles of animal models in biomedical research: the comparative biology, anatomy, and physiology of a variety of animal models, and an introduction to animal genetics and the current methodology of producing transgenic animals. Examples of spontaneous and induced animal models of disease. The effects on research of underlying factors, e.g., disease, environment, and genetic background. The principles and methods of animal handling, anesthesia, surgery, analgesia, and necropsy. Wet labs provide a basis for proper animal procedures in biomedical research.

5 units, Win (Cork, Otto, Green, Tolwani, Bouley, Daunt, Buckmaster, Coleman)

UNDERGRADUATE INDIVIDUAL WORK

198. Directed Instruction/Reading—May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research.

1-3 units, any quarter

199. Undergraduate Research—Individual research taken by arrangement with department faculty.

FOR GRADUATE STUDENTS

299. Directed Reading—Prerequisite: consent of instructor.

1-18 units, any quarter

399. Research—Opportunities are available in comparative medicine and pathology, immuno-histochemistry, electron microscopy, molecular genetics, quantitative morphometry, neuroanatomy and neurophysiology of the hippocampus, pathogenesis of intestinal infections, immunopathology, biology of laboratory rodents, anesthesiology of laboratory animals, gene therapy of animal models of neurodegenerative diseases, and development and characterization of transgenic animal models. Enrollment limited to six. Prerequisite: consent of instructor.

1-18 units, any quarter
459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is offered in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

I unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

DEVELOPMENTAL BIOLOGY

Co-Chairs: Roeland Nusse, Matthew Scott
Professors: Gerald Crabtree, David Hogness, A. Dale Kaiser, Roeland Nusse, Matthew Scott, Lucy Shapiro, James Spudich, Irving Weissman
Associate Professors: Ben Barres, Margaret Fuller, Stuart Kim, David Kingsley, Ellen Porzig
Assistant Professors: Seung Kim, William Talbot, Anne Villeneuve

A fundamental problem in biology is how the complex set of multicellular structures that characterize the adult animal is generated from the fertilized egg. Advances at the molecular level, particularly with respect to the genetic control of development, have been explosive. These advances represent the beginning of a major movement in the biological sciences toward the understanding of the molecular mechanisms underlying developmental decisions and the resulting morphogenetic processes. This new thrust in developmental biology derives from the extraordinary methodological advances of the past decade in molecular genetics, immunology, and biochemistry. However, it also derives from groundwork laid by the classical developmental studies, the rapid advances in cell biology and animal virology, and from models borrowed from prokaryotic systems. Increasingly, the work is directly related to human diseases, including oncogene function and inherited genetic disease.

The Department of Developmental Biology includes a critical mass of researchers who are leading the thrust in developmental biology and who can train new leaders in the attack on the fundamental problems of development. Department labs work on a wide variety of organisms from microbes to worms, flies, and mice. The dramatic evolutionary conservation of genes that regulate development makes the comparative approach of the research particularly effective. Scientists in the department labs have a very high level of interaction and collaboration. The discipline of developmental biology draws on biochemistry, cell biology, genetics, and molecular biology.

The department is located in the Beckman Center for Molecular and Genetic Medicine within the Stanford University Medical Center.

GRADUATE PROGRAM

MASTER OF SCIENCE

Students in the Ph.D. program in Developmental Biology may apply for an M.S. degree, assuming completion of their course requirements and preparation of a written proposal. The master's degree awarded by the Department of Developmental Biology does not include the possibility of minors for graduate students enrolled in other departments or programs.

Students are required to take, and satisfactorily complete, at least three lecture courses offered by the department, including 210, Developmental Biology. In addition, students are required to take three courses outside the department. Students are also expected to attend Developmental Biology seminars and journal clubs. In addition, the candidate must complete a research paper proposing a specific experimental approach and background in an area of science relative to developmental biology.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

The graduate program in Developmental Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program in which individuals are candidates for both the M.D. and Ph.D. degrees.

Students are required to take, and satisfactorily complete, at least six courses, including Developmental Biology (210); Advanced Genetics (203); Frontiers in Biological Sciences (215); and an advanced molecular biology, biochemistry, or biophysics course. Students are also expected to attend Developmental Biology seminars and journal clubs.

Successful completion of a qualifying examination is required for admission to Ph.D. candidacy. The examination consists of two parts. One proposal is on a subject different from the dissertation research and the other proposal is on the planned subject of the thesis. The final requirements of the program include the presentation of a Ph.D. dissertation as the result of independent investigation and constituting a contribution to knowledge in the area of developmental biology. The thesis must then successfully pass the University oral examination which is taken only after the student has substantially completed his or her research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

COURSES

Course work and lab instruction in the Department of Developmental Biology conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

203. Advanced Genetics—(Same as Genetics 203, Biological Sciences 203.) The underlying genetic logic used to dissect diverse biological phenomena. The genetic toolbox through studies of analytic methods and modern synthetic genetic manipulation, including original papers. Emphasis is on the use of gene knockout tools to dissect complex biological pathways, developmental processes, and regulatory systems. Classical genetic approaches and newer approaches developed in the post-genome era (in which the entire genomic sequence of an organism is known). Graduates students with minimal experience in genetics should work through problems in Hartl and Jones.

4 units, Aut (Botstein, Kim, Stearns, Villeneuve)

204. More Advanced Genetics—Offered upon request of students. Continuation of 203; basic concepts and experimental design in modern genetics. Emphasis is on studying genetic systems in detail from original papers, and the impact of genomics on experimental design and practice. Prerequisite: 203.

3 units, Win (Botstein, Kim, Stearns, Villeneuve)

210. Developmental Biology—Acquaints graduate students and upper-level undergraduates with advances in current developmental biology. Goal: to discover unifying themes in how organismic complexity is generated during embryonic and post-embryonic development. The roles of genetic hierarchies, induction events, cell lineage, maternal inheritance, cell-cell communication, and hormonal control in developmental processes in well-studied organisms (mammals, insects, and nematodes). Small groups of students and faculty discuss current papers in depth. Team taught by department faculty. Undergraduate prerequisite: consent of instructor. Recommended: familiarity with the basic techniques and experimental rationales of molecular biology, biochemistry, and genetics.

5 units, Spr (Fuller, Crabtree, Stuart Kim, Kingsley Nusse, Scott, Seung Kim, Talbot)
215. Frontiers in Biological Research—(Same as Biochemistry 215.)
Literature/discussion on how to critically evaluate current biological research, held in conjunction with a Wed. seminar series hosted in alternate weeks by Biochemistry and Developmental Biology. Invited speakers present works in a particular system. Students and faculty read and critically discuss one or more papers from the primary research literature on a related topic before the seminar and then meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, the set of techniques most commonly used to study problems in biology, and a comparison between genetic and biochemical approaches in biological research.

1 unit, Aut, Win (Krasnow, Kingsley)

217. Mammalian Developmental Genetics—(Same as Genetics 217.)
Topics: imprinting; early development and implantation; germ cell allotment; phenotypic consequences of targeted knockouts of developmental, hox, and other developmental genes in mammals; tumorgenesis; coat color mutations; classical mutations and positional cloning; mutation and insertional and gene traps; growth controls and Igs; muscle and limb development; sex determination; classical genetics and gene mapping and inbred strains; segregation and T locus; and germ and embryonic stem cells and teratocarcinomas. Weekly lecture, plus guest lecture or a literature discussion.

2 units (Barsh, Nusse) given 2000-01 and every 3rd year

225. Molecular Motor Proteins and the Cytoskeleton—(Same as Biochemistry 225.)
The molecular basis of energy transduction that leads to movements generated by microfilament-based and microtubule-based motors. In-depth analysis of forms of myosin, dynen, and kinesin and their roles in the cell as a model for understanding the structural, biochemical, and functional properties of biological machines in general. Topics: structure of the molecular motors and their accessory proteins, regulation of the function of motile assemblies in cells; spatial and temporal controls on the formation of motile assemblies in cells. Experimental approaches: genetic analysis, DNA cloning and expression, reconstitution of functional assemblies from purified proteins, x-ray diffraction, three-dimensional reconstruction of electron microscope images, spectroscopic methods, and high-resolution light microscopy. How a complex cellular process is analyzed at the molecular level by a multifaceted approach using biochemical, biological, and genetic techniques. Prerequisites: knowledge of basic biochemistry and cell biology.

3 units (Fuller, Spudich)

237. Introduction to Biotechnology—(Same as Biological Sciences 237, Biochemistry 237, Chemical Engineering 450, Civil Engineering 237, Structural Biology 237.) Faculty from the departments of Biochemistry, Biological Sciences, Chemical Engineering, Civil Engineering, Developmental Biology, Structural Biology, and invited industrial speakers review the interrelated elements of modern biotechnology. Topics: protein structure and dynamics, protein engineering, biocatalysis, gene expression, cellular metabolism and metabolic engineering, fermentation technology, and purification of biomolecules. Prerequisite: graduate student or upper-division undergraduate in the sciences or engineering.

3 units, Spr (Robertson)

399. Research—Must register by section numbers.
1-18 units, any quarter (Staff)

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. The interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

Epidemiology Program

Director: Jennifer L. Kelsey (Professor of Health Research and Policy)
Steering Committee: (Professors) J. Martin Brown (Radiation Oncology), Byron W. Brown, Jr. (Health Research and Policy, Division of Biostatistics), Jennifer L. Kelsey (Health Research and Policy, Division of Epidemiology), Helena Kraemer (Psychiatry, and Medicine), Robert Marcus (Medicine; Division of Endocrinology, Gerontology, and Metabolism), Alice S. Whittemore (Health Research and Policy, Division of Epidemiology)
Cancer Biology: J. Martin Brown (Professor)
Genetics: Neil Risch (Professor)
Gynecology and Obstetrics: Emmet Lamb (Professor), Mary L. Polan (Professor)
Health Research and Policy: Paul Basch (emeritus), Rodney Beard (emeritus), Byron W. Brown, Jr. (emeritus), John Farquhar (Professor), Jennifer Kelsey (Professor), Abby King (Associate Professor), Lorene Nelson (Assistant Professor), Ralph Paffenbarger, Jr. (emeritus), Julie Parsonnet (Associate Professor), Atsuko Shibata (Assistant Professor), David Thom (Courtesy Assistant Professor), Alice Whittemore (Professor)
Medicine: John Farquhar (Professor), Stephen Fortmann (Associate Professor), James Fries (Professor), William Haskell (Professor, Research), Halstead Holman (Professor), Helen Hubert (Senior Research Scientist), Helena Kraemer (Professor), Robert Marcus (Professor), Gordon Matheson (Associate Professor), Julie Parsonnet (Associate Professor). Charles Prober (Professor), Gary Schoolnik (Professor), Peter Small (Assistant Professor), Marcia Stefanick (Research Associate), David Thom (Assistant Professor), Lucy Tompkins (Professor).
Microbiology and Immunology: Ann Arvin (Professor), Charles Prober (Professor), Gary Schoolnik (Professor), Lucy Tompkins (Professor)
Neurology and Neurological Sciences: Leslie Dorfman (Professor)
Neurobiology: Denis Baylor (Professor)
Pediatrics: Ann Arvin (Professor), Laura Bachrach (Associate Professor), Yvonne Maldonado (Associate Professor), Charles Prober (Professor)
Stanford Center for Research in Disease Prevention: John Farquhar (Professor), Stephen Fortmann (Associate Professor), William Haskell (Professor), Abby King (Associate Professor), Helena Kraemer (Professor), Marcia Stefanick (Research Associate), Marilyn Winkley (Lecturer)

GRADUATE PROGRAMS

The Epidemiology Program offers interdisciplinary instruction and research opportunities leading to the M.S. and Ph.D. degrees in Epidemiology. The program has strengths in the following areas of epidemiology: cancer, cardiovascular, infectious, musculoskeletal and neurological diseases; genetics; some aspects of epidemiologic methods; and reproductive, environmental, and occupational epidemiology.

MASTER OF SCIENCE

The M.S. program is designed to provide training in epidemiologic methods to professionals in a variety of related fields and to serve as an introduction to those with bachelor's degrees who are considering careers in epidemiology. Applicants to the M.S. program should have previous coursework in biology and statistics or mathematics.
To receive the degree, students are expected to obtain a thorough grounding in epidemiologic methods and applied biostatistics and to demonstrate research skills through the completion of a master's thesis. A total of 45 units of course work, including a 12-credit master's thesis, must be successfully completed. Required courses are Health Research Policy 224 (Statistical Issues in Epidemiology), Genetics 344A (Genetic Epidemiology), and an additional course in epidemiology. A student must select a specialty area (for example, cardiovascular diseases, cancer, genetics, infectious diseases, musculoskeletal diseases, neurological diseases, reproductive disorders). Additional courses are required in each specialty area. Requirements for the specific specialty areas may be obtained from the office of the Program Coordinator, and depending on the specialty area, include one or more of the following courses: Pathology 230A (General and Special Pathology), Cancer Biology 241 (Molecular and Cellular Biology of Cancer), Genetics 344A (Genetic Epidemiology), Human Biology 166 (Cardiovascular Disease Prevention and Epidemiology), Health Research Policy 201 (Infectious Basis of Disease), Neuroscience 200 (The Nervous System), and Human Biology 156 (Human Development).

Successful completion of three written qualifying examinations is required for admission to Ph.D. candidacy. The qualifying examinations cover: (1) epidemiologic methods, (2) biostatistics, and (3) a specialty area (for example, epidemiology and pathobiology of cancer, or cardiovascular diseases). Requirements also include the presentation of a Ph.D. dissertation as the result of independent investigation and constituting a contribution to knowledge in epidemiology. The candidate must then successfully pass the University oral examination, which is taken only after the student has substantially completed his or her research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

**COURSES**

The course listings of individual departments participating in the Program in Epidemiology should be consulted for complete descriptions.

**GENETICS**

**Emeritus:** (Professor) L. L. Cavalli-Sforza

**Chair:** David Botstein

**Professors:** David Botstein, Stanley N. Cohen, David R. Cox, Ronald W. Davis, Uta Francke, Leonard A. Herzenberg, Richard M. Myers, Neil J. Risch, Matthew P. Scott, Lucille Shapiro

**Associate Professors:** Gregory S. Barsh, Michele P. Calos, Margaret T. Fuller, Mark A. Kay, Stuart K. Kim

**Assistant Professors:** James M. Ford, Joanna L. Mountain, Arend Sidow, Tim Stearns, Anne M. Villenuve, Douglas E. Volrath

**Assistant Professors (Research):** Laura Lazzeroni, Zijie Sun

**Researchers:** Leonore A. Herzenberg

**Visiting Professors:** Thomas Breithaupt, Alberto Piazza

**Visiting Associate Professor:** Ian C. Hsu

**GRADUATE PROGRAMS**

University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. program in the Department of Genetics offers graduate students the opportunity to study in all the major areas of modern genetics research, including many aspects of human genetics (linkage mapping, physical mapping, cytogenetics, genetic epidemiology and population genetics), bacterial and yeast genetics, Drosophila developmental genetics, mouse genetics, immunogenetics, and mathematical biology. The department also includes two Genome Centers, the Stanford Human Genome Mapping Center, and the Stanford DNA Sequence and Technology Center which are engaged in state-of-the-art mapping and sequencing of human and model organism genomes.

The department believes genetics should be viewed as a discipline that encompasses not just a set of tools but a coherent and fruitful way of thinking about biology and medicine. It emphasizes, in the teaching of doctoral students and physician-scientists, the broad scope of genetic thinking, including not just molecular genetics, but also classical, medical, and population genetics. The department provides training through laboratory rotations, dissertation research, a series of advanced courses in genetics and other areas of biomedical science, several seminar series and colloquia, journal clubs, and an annual three-day retreat that includes faculty, students, postdoctoral fellows, and staff scientists. A strong emphasis is placed on interactions among students, postdoctoral students, and faculty within the department and throughout the campus.

The Department of Genetics is located in the School of Medicine and includes modern, well-equipped laboratories. Extensive computer support and advanced instrumentation are available for research projects. The department has 25 to 30 graduate students and 30 to 35 postdoctoral fellows. In addition to interacting with the faculty and laboratories in the department, students have contacts with a much larger number of students, fellows, and faculty in other biological and biomedical programs throughout the University. During their first year, graduate students in the department take advanced graduate courses and sample several areas of research by doing laboratory rotations in three or four labs in the department. At the end of the first year, students select a lab in which to do their dissertation research. While the dissertation research is generally performed in one lab, collaborative projects with more than one faculty member are encouraged. In addition to interacting with their faculty preceptor, graduate students receive input regularly from other faculty members who serve as advisers on their dissertation committee. Study for the Ph.D. generally requires between four and five years of graduate work, most of which is spent on the dissertation research. Graduate students are generally enrolled in the Ph.D. program, although a limited number of M.D. candidates can combine research training in genetics with their medical studies. Ph.D. candidates who have passed the qualifying exam in the second year can opt to receive the M.S. degree.

There are opportunities for graduate students to teach in graduate level and professional school courses, although there is no formal teaching requirement. In addition, students are encouraged to participate in an education outreach program that is administered through the department and which involves numerous opportunities to interact with secondary school students and teachers, lay groups, and local science museums. Students who have recently received a bachelor's, master's, M.D., or Ph.D. degree in related fields may apply for graduate study in the Department of Genetics. Prospective students must have a background in general biology, mathematics, physics, and chemistry. Decisions for admission are based on a comparison of the relative merits of all the candidates' academic abilities and potential for research. Students who wish to pursue a combined M.D./Ph.D. degree are considered for admission into the graduate program in the Department of Genetics after they have been admitted to the M.D. program in the School of Medicine. All applicants...
are considered equally regardless of race, color, creed, religion, national origin, sexual preference, age, or gender. Students are admitted to the graduate program in the Autumn Quarter. Prospective students are encouraged to begin the application process early enough to ensure that they are able to submit a complete application by the previous December 15, and are able to apply for fellowships by the previous November 15. All students accepted into the Ph.D. program are provided with full tuition and a stipend to cover costs of living. Three training grants from the U.S. National Institutes of Health provide major support for the graduate training program in the department. Other student support is provided by department funds and from the research grants, both federal and private, of the faculty. In addition, a number of graduate students are funded by fellowships from the National Science Foundation or the Howard Hughes Medical Institute. Prospective students are encouraged to apply for fellowships from these institutes by requesting applications from these institutions. Applications are due on November 1 of each year.

Prospective students are encouraged to apply for fellowships from these institutes by requesting applications from the National Science Foundation, Oakridge Associated Universities, P.O. Box 3010, Oak Ridge, TN 37831-3010, telephone (615) 483-3344; Howard Hughes Medical Institute, Fellowship Office, National Research Council, 2101 Constitution Avenue, NW, Washington, D.C. 20418, telephone (202) 334-2872. Applications are due on November 1 of each year.

**COURSES**

For further information on the availability of courses, consult the quarterly Time Schedule, or inquire at the department office. Additional courses in or related to genetics are included in the listings of the departments of Biological Sciences, Biochemistry, Developmental Biology, Microbiology and Immunology, and Structural Biology.

201. Human Genetics—The theoretical and experimental basis for human genetics. Lectures/reading in molecular, chromosomal, cellular, developmental, population, and medical genetics, emphasizing the latter. Prerequisites: knowledge of biochemistry and basic genetics.

*4 units, Spr (Cox, Franke, Barsh)*

203. Advanced Genetics—(Same as Biological Sciences 203, Developmental Biology 203.) The underlying genetic logic used to dissect diverse biological phenomena. The genetic toolbox through studies of analytic methods and modern synthetic genetic manipulation, including original papers. Emphasis is on the use of genetic tools in dissecting complex biological pathways, developmental processes, and regulatory systems. Classical genetic approaches and newer approaches developed in the post-genome era (in which the entire genomic sequence of an organism is known). Graduate students with minimal experience in genetics should work through problems in Marte and Jones.

*3 units, Aut (Botstein, Stearns, Kim, Villeneuve)*

209. Genetics of Vision and Vision Disorders—Background information about the developmental biology of the eye, the physiology of vision, and the biology of vision disorders that have a genetic basis. Examples of genetically-related research problems involving study of vision and/or vision disorders.

*1 unit (Cohen) alternate years, given 2000-01*

210. Advanced Human Genetics—For students in the Genetics Ph.D. program; other graduate students by arrangement. Companion course for 201. Advanced principles of human and medical genetics. In-depth discussion of human genetics; examples from recent literature. Emphasis is on molecular genetics and on experimental approaches.

*2 units, Spr (Cox, Risch)*

217. Mammalian Developmental Genetics—(Same as Developmental Biology 217.) Topics: imprinting; early development and implantation; germ cell allotment; phenotypic consequences of targeted knockouts of developmental, hox, and other developmental genes in mammals; tumorigenesis; coat color mutations; classical mutations and positional cloning; mutagenesis and insertion and gene traps; growth controls and lgs; muscle and limb development; sex determination; classical genetics and gene mapping and inbred strains; segregation and T locus; and germ and embryonic stem cells and teratocarcinomas. Weekly lecture, plus one guest lecture or a literature discussion.

*2 units (Barsh, Nusse) given in 2000-01 and every 3rd year*

222. Method and Logic in Experimental Genetics—For graduate students only. Experimental design. Weekly topics central to research in genetics, biochemistry, and molecular biology: protein subunit equilibrium, domain structure of proteins, cooperativity, precursor/product relationships, and macromolecular interactions. Emphasis is on student participation and analysis of the logical principles underlying experiments in these areas. Papers, classic and contemporary, from primary literature relevant to the weekly topic.

*3 units, Win (Myers, Vollrath)*

231. Gene Therapy—Gene therapy is developing new vectors and disease applications. Approaches include viral and non-viral vectors, delivery methods, and target cells. History and ethical considerations. Lectures by Stanford faculty, and guest speakers from industry and other institutions. Students participate in question sessions after each lecture.

*3 units, Win (Blau, Calos, Nolan)*

344A. Genetic Epidemiology—(Same as Statistics 344A.) Methods for the design and analysis of studies in human genetics, focusing on the epidemiology of Mendelian disorders and the genetic and environmental contributions to common, complex familial traits. Topics: study designs for assessing the importance of genetic factors (family, twin, and adoption studies); methods for determining modes of inheritance (segregation analysis); identification and mapping of major genes through linkage analysis and disease-marker associations. Applications to birth defects, coronary heart disease, psychiatry, neurology, cancer, and immunology.

*3 units (Risch) alternate years, given 1999-2000*

344B. Topics in Statistical Genetics—(Same as Statistics 344B.) In-depth discussion of statistical methods currently used in human genetic analysis. Topics depend on interests of the students and instructors: concepts of likelihood as used in the genetic context; measures of familial aggregation, including issues of censoring and age-dependent data; genetic modeling of quantitative traits; modes of inheritance analysis, including segregation analysis; analysis of extended pedigrees; parametric and nonparametric approaches to linkage analysis and gene mapping, including family studies, radiation hybrid data, sperm typing, and DNA contig mapping; linkage disequilibrium; analysis of DNA profiles for individual identification; DNA sequence analysis.

*3 units (Risch)*

344C. Genetic Epidemiology: Applications—Sequel to 344A, focusing on application of methods from genetic epidemiology to various diseases: family studies, segregation analysis, linkage analysis, and population association studies. The disease topics are tailored to the interests of the students, from cancer (breast or colon cancer), neurological disorders (multiple sclerosis, epilepsy), birth defects (cleft lip and palate, pyloric stenosis), psychiatry (schizophrenia, manic-depression, Alzheimer’s disease), cardiovascular disease, autoimmune disease (diabetes, coeliac disease), etc.

*2 units, Spr (Risch) alternate years, not given 2000-01*

260. Supervised Study—Prerequisite: consent of instructor.

*any quarter (Staff)*

299. Directed Reading—Prerequisite: consent of instructor.

*any quarter (Staff)*

399. Individual Research—Prerequisite: consent of instructor.

*any quarter (Staff)*
GYNECOLOGY AND OBSTETRICS

Chair: Mary Lake Polan

The Department of Gynecology and Obstetrics does not offer degrees; however, qualified medical, graduate, or undergraduate students with an interest in basic research in reproductive biology may apply to arrange individual projects under the supervision of the faculty. The focus for the Division of Reproductive Biology is the study of molecular and cellular biology of the male and female reproductive organs.

COURSES

99Q. Ovarian Kaleidoscope: A Genomic Approach to Ovarian Physiology—Introduces the basic concept of molecular physiology using the mammalian ovary as a prototypic organ. Emphasis is on the present understanding of ovarian follicle development, development, ovulation, and menopause. The role of reproductive hormones in these processes. Understanding of ovarian physiology provides the basis for developing new contraceptives and the treatment of ovarian pathophysiology. Students participate in a web project, the Ovarian Kaleidoscope Database, a searchable database listing the function and expression pattern of ovarian genes. Prerequisite: general biology background.

3 units, Aut (Hsueh)

HEALTH RESEARCH AND POLICY

Emeriti: (Professors) Paul Basch, Byron Wm. Brown, Jr., Victor R. Fuchs, Count D. Gibson, Jr., Lincoln E. Moses, Ralph S. Paffenbarger, Jr.
Chair: Mark Hlatky
Professors: Bradley Efron, John W. Farquhar, Trevor Hastie, Mark Hlatky, Iain M. Johnstone, Jennifer L. Kelsey, Richard A. Olshen, Robert Tibshirani, Alice S. Whittemore
Associate Professors: Trevor J. Hastie, Abby King, Julie Parsonnet
Assistant Professors: Laurence Baker, Mary Bundorg, Lorene M. Nelson, Atsuko Shibata
Professor (Research): Philip W. Lavori
Associate Professor (Research): Dan Bloch
Assistant Professor (Research): Laura Lazzeroni
Courtesy Professors: Alan M. Garber, Alain Enthoven, Neil Risch
Consulting Associate Professor: Jane E. Pack
Consulting Assistant Professors: Trevor J. Hastie, Abby King, Julie Parsonnet
Consulting Assistant Professor (Research): Gillian Sanders
Senior Lecturer: Irene Corso
Lecturers: Nancy Moss, Angela Prehn
Consulting Professors: David S. P. Hopkins, Gary Friedman, Joseph Selby, Sandra Wilson
Consulting Associate Professor: Eugene Lewit
Consulting Assistant Professors: Paul Barnett, Ciaran Phibbs, John Piette
Visiting Professor: Elizabeth Holly
Visiting Associate Professor: Kathleen Lamborn, Marion Lee

The Department of Health Research and Policy has three divisions:

1. Biostatistics deals with scientific methodology in the medical sciences, emphasizing the use of statistical techniques.
2. Epidemiology provides training and experience in the application of epidemiologic methods to the study of disease etiology and control. It is also concerned with problems of health and disease in human populations in all parts of the world and with efforts toward improving levels of health.
3. Health Services Research is concerned with many aspects of health policy analysis in the public and private sectors.

The department, and each division, offers courses in its areas of specialization. These are described fully in the Stanford University School of Medicine Catalog.

GRADUATE PROGRAMS

The Program in Epidemiology and the Program in Health Services Research are housed in the Department of Health Research and Policy. These programs are described separately within the School of Medicine listings of this bulletin. Students with interest in pursuing advanced degrees with emphasis in biostatistics can do so through programs offered by the Department of Statistics. Division of Biostatistics faculty participate in these programs.

COURSES

Course work and instruction in the Department of Health Research and Policy conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this bulletin.

85Q. Stanford Introductory Seminar: Current Issues in Women’s Health—Preference to sophomores. Current issues in women’s health from an epidemiologic perspective. Possible topics (as they pertain to women): coronary heart disease, breast cancer (or other cancers), osteoporosis, HIV infection, eating disorders, depression, domestic abuse, benefits and risks of oral contraceptives, benefits and risks of hormone replacement therapy, new replacement therapies (e.g., SERMs), current prevention trials in women (e.g., the Women’s Health Initiative), menopause, menstruation, health issues for athletes, health issues in developing countries, adverse pregnancy outcomes, obesity, cigarette smoking. Prerequisite: knowledge of human biology.

3 units, Win (Kelsey)

98Q. Stanford Introductory Seminar: Cross-Cultural Issues in Medicine—Preference to sophomores. Cross-cultural issues that impact health care delivery, e.g., ethnicity, immigration, language barriers, and service expectations. Fosters an understanding of culturally unique and non-English speaking populations, developing interpersonal and communication skills with diverse ethnic groups.

3 units, Win (I. Corso)

202. Biostatistics and Epidemiology—Required for medical students. Introduces epidemiological concepts, techniques, and studies: statistical reasoning and the application of common statistical procedures used in lab and clinical investigations. Student-designed research project.

4 units, Win (Lavori, Parsonnet)

205. The U.S. Health Care System and Health Policy—Introduces issues in health care systems, organization, and financing including health insurance, managed care, health care costs, the uninsured, and health reform, focusing on the U.S. health care system.

2 units, Win (Baker, Hlatky)

206. Statistical Methods for Meta-Analysis—Same as Education 493B, Statistics 211.) Meta-analysis is a quantitative method for combining results of independent studies, and enables researchers to synthesize the results of related studies so that the combined weight of evidence can be considered and applied. Examples from the medical, behavioral, and social sciences. Topics: literature search, publication and selection bias, statistical methods (contingency tables, cumulative methods, sensitivity analyses, non-parametric methods). Project. Prerequisites: basic sequence in statistics and consent of instructor.

3 units, Win (Olkin)

209. Medicine and the Law—Studies areas of the law that pertain to the practice of medicine. Topics: medical malpractice, patient consent and confidentiality rights, human subject research, withdrawing life support
and physician-assisted suicide, futile medical care, legal requirements in psychiatry, physician discipline, and medical staff law.

3 units, Win (Eaton)

210. Health Law and Policy—(Same as Law 313.) Non-law students admitted with consent of instructor. Open to all law or medical students and to graduate and undergraduate students, by consent of the instructor. Introductory survey of the American health care system and its legal and policy problems. Topics: the special characteristics of medical care compared to other goods and services, the difficulties of assuring quality, the system raises.

3 term units, Aut semester (Greely)

211. Advanced Issues in Health Law and Policy: Genetics and Law—(Same as Law 649.) Open to 20 students from any Stanford graduate or professional program. Writing seminar on ethical, legal, and social issues raised by the revolution in human genetics. Topics: DNA fingerprinting, genetic privacy, property rights in genes, genetic testing, genetic discrimination, transgenics, and eugenics.

2 term units (Greely, Cox) not given 1999-2000

212. Cross-Cultural Medicine—Limited to medical students. Provides interviewing and behavioral skills to facilitate culturally relevant health care across all population groups. The explicit and implicit cultural influences operative in a variety of formal and informal medical contexts.

3 units, Spr (Corso)

213. Statistical Issues in Epidemiology—Selected advanced problems in the design and analysis of epidemiological studies, motivated by published investigations. Possible topics: issues in matching controls to cases in case-control studies, methods for analyzing data from cohort studies, and methods for the design and analysis of family and genetic studies. Prerequisites: 203, 225, 226, or equivalents.

3 units (Whittemore) alternate years, given 2000-01

214. Design and Conduct of Epidemiologic Studies—Intermediate-level. Provides students with the knowledge and skills to design, carry out, and interpret epidemiologic studies, particularity of chronic diseases. Topics: epidemiologic concepts, sources of data, cohort studies, case-control studies, cross-sectional studies, sampling, estimating sample size, questionnaire design, and effects of measurement error. Prerequisite: 202 or equivalent, or consent of instructor.

3-4 units, Aut (Kelsey)

215. Advanced Epidemiologic Methods—The principles of measurement, measures of effect, confounding, effect modification, and strategies for minimizing bias in epidemiologic studies. Prerequisite: 225 or consent of instructor.

3-4 units, Win (Nelson)

216. Molecular Epidemiology—Molecular and biochemical biomarkers for measuring exposure, host susceptibility, and endpoint (disease), as applied to epidemiologic studies of infectious diseases, cancer, and other chronic diseases. Topics: DNA fingerprinting to determine transmission pathways; biochemical markers of environment exposures; study design and methodological consideration; ethical and legal issues.

Prerequisite: 202 or 225, or consent of instructor.

3 units, Spr (Shibata, Parsonnet) alternate years, not given 2000-01

217. Epidemiology of Musculoskeletal and Neurologic Disorders—Epidemiologic contributions to understanding the etiology of conditions such as osteoporosis and fractures, congenital and developmental musculoskeletal disorders, arthritic disorders, disability, Alzheimer's disease and dementia, stroke, epilepsy, headache, chronic neurologic diseases, and head and back injuries. Methodologic issues important to the study of musculoskeletal and neurologic disorders are emphasized. Prerequisite: 225 or consent of instructors.

3 units (Kelsey, Nelson) alternate years, given 2000-01

218. Cancer Epidemiology—Lectures/discussions on key issues in cancer epidemiology. Topics: descriptive epidemiology and sources of incidence/mortality data; biological basis of carcinogenesis and its implications for epidemiologic research; methodological issues relevant to cancer research; causal inference; major environmental risk factors; genetic susceptibility; cancer control; examples of current research; and critique of the literature. Prerequisite: 202 or 225, or consent of instructor.

3 units (Shibata) alternate years, given 2000-01


3 units (Parsonnet) alternate years, given 2000-01

220. Workshop in Biostatistics—On-going research is presented by faculty, staff, students, and guests, and recent journal articles are discussed.

1 unit, Aut, Win, Spr (Staff)

221. Economics of Health and Medical Care—(Same as Medical Information Sciences 256, Economics 156/256; undergraduates register for 156.) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: institutions in the health sector; measurement and valuation of health; nonmedical determinants of health; medical technology and technology assessment; demand for medical care and medical insurance; physicians, hospitals, and managed care; international comparisons. Prerequisite: Economics 51 or consent of instructor. Recommended: some background in statistics or mathematics.

5 units, Win (McClellan)

222. U.S. Health Policy—Introduction to the institutions and policies that influence health care provision and costs in the U.S. Topics: the organization of the health care delivery system, the structure of hospitals, physician organizations, and the health care networks, and the financing of health care, including health insurance, Medicare, and Medicaid. Current issues in health care policy.

3 units (Baker) not given 1999-2000

223. Workshop in Biostatistics—(Same as Statistics 260A,B,C.) Applications of statistical techniques to current problems in medical science. Enrollment for more than 2 units of credit involves extra reading or consulting and requires consent of the instructor.

260A. 1-5 units, Aut (Olshen, Bloch, Efron, Hastie, Johnstone, Lavori, Tibshirani)

260B. 1-5 units, Win (Olshen, Bloch, Efron, Hastie, Johnstone, Lavori, Tibshirani)

260C. 1-5 units, Spr (Olshen, Bloch, Efron, Hastie, Johnstone, Lavori, Tibshirani)

3 units, Spr (Olshen)

266. Cardiovascular Disease Epidemiology and Prevention—Epidemiological, biological, and behavioral perspectives of cardiovascular disease and assessment and modification of the risk factors relating to it. The potential for disease prevention in the context of major prevention trials. Public policy ramifications. Topics: diet, weight control, smoking, Type-A behavior, and exercise. Prerequisites for undergraduates: Human Biology core and consent of instructor.
2-3 units, Aut (King)

280. Spanish for Medical Students—Teaches students useful medical Spanish. Emphasis is on oral communication skills. Topics: the human body, hospital procedures, diagnostics, food, and essential phrases for on-the-spot reference when dealing with Spanish-speaking patients.
3 units, Win (L. Corso)

281. Spanish II for Medical Students—Can be taken as continuation of 280 or independently as a stand alone course, depending on the student’s ability level.
3 units, Win (L. Corso)

282. Spanish III for Medical Students—Can be taken as continuation of 281 or independently as a stand alone course, depending on the student’s ability level.
3 units, Spr (L. Corso)

283. Core Seminar—Presentation of research in progress and tutorials in the field of health services research.
1 unit, Aut, Win, Spr, Sum (Baker, Garber, Hlatky, Owens)

290. Advanced Spanish Conversation—Intensive practice of oral language skills covering topics such as how to conduct a full pediatric, gynecological, and other specialty exams; patient health education and counseling; and diseases like diabetes, asthma, and TB. Prerequisites: Spanish proficient or consent of instructor.
3 units, Aut, Win, Spr (L. Corso)

291. Intensive Spanish for Medical Students—Covers over two quarters the regular Spanish for Medical Students three-quarter sequence.
6 units, Sum (L. Corso)

299. Directed Reading—Aspects of preventive medicine, public health, social aspects of disease and health, economics of medical care, occupational or environmental medicine, epidemiology, international health, or related fields. Prerequisite: consent of the instructor.
1-18 units, any quarter (Staff)

390. Quality in Health Care—(Same as Business E333.) Topics: What do modern industrial quality theories have to offer health care? How can quality be measured? What are the tools of quality improvement? What are the costs of poor quality in health care? How can high quality lower costs? Students read recent literature and meet with local professionals concerned with health care quality. Prerequisite: consent of the instructor.
4 units, Spr (Enthoven)

391. Political Economy of Health Care in the United States—(Same as Business E331.) The financial and public policy context in which the health care system operates, and the issues in public policy controlling it in the public expenditure. Issues: financing and organization for the delivery of health care in the U.S., how various existing and proposed financing and organizational arrangements affect the allocation of resources, fee-for-service practice and health maintenance organizations, hospital investment decisions and regional planning, health care costs, and national health insurance. Prerequisite: graduate student.
4 units, Spr (Enthoven)

392. Cost-Benefit Analysis in Health Care—(Same as Business E332, Medical Information Sciences 432.) For graduate students. How do you do cost-benefit analysis when the “output” is difficult or impossible to measure? How do MBA analytic tools apply in health services? Study discussion of the main literature on the principles of cost-benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application.
4 units, Aut (Garber, Owens, Singer)

399. Research—Qualified students undertake investigations sponsored by individual faculty members. Prerequisite: consent of the instructor.
1-18 units, any quarter (Staff)

HEALTH SERVICES RESEARCH PROGRAM

Director: Mark Hlatky (Professor, Health Research and Policy, and Medicine)

Executive Committee: Laurence Baker (Assistant Professor, Health, Research and Policy), Alan Garber (Professor, Medicine), Mary Goldstein (Assistant Professor, Medicine), Mark Hlatky (Professor, Health Research and Policy, and Medicine), Douglas Owens (Associate Professor, Medicine)

Participating Departments and Faculty:
Economics: Thomas MacCurdy (Professor), Mark McClellan (Assistant Professor), Ann Royalty (Assistant Professor)
Business: Alain Enthoven (Professor), Daniel Kessler (Associate Professor)
Health Research and Policy: Laurence Baker (Assistant Professor), Paul Barnett (Consulting Assistant Professor), Byron W. Brown (Professor, emeritus), Victor Fuchs (Professor, emeritus), Mark Hlatky (Professor), Jennifer Kelsey (Professor), Philip Lavori (Professor, Research), Richard Olshen (Professor), Ciaran Phibbs (Consulting Assistant Professor), John Piette (Consulting Assistant Professor), Anita Stewart (Visiting Scholar), Robert Tibshirani (Professor)

Industrial Engineering and Engineering Management: Margaret Brandeau (Professor)

Law: Henry Greely (Professor)
Medicine: Alan Garber (Professor), Mary Goldstein (Assistant Professor), Douglas Owens (Associate Professor), Gillian Sanders (Assistant Professor, Research)

Graduate Program

MASTER OF SCIENCE

The Master’s Degree Program in Health Services Research seeks to train students in the quantitative analysis of issues in health and medical care. The program emphasizes an individually designed program of coursework and completion of a master’s project under the mentorship of a faculty member. The typical student in the program is either a physician who has completed residency training and is preparing for a research career, or a student with a strong background in policy analysis who wishes to focus on problems in health or medical care. Faculty in-
terests include outcomes research, health economics, health care organization, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

To receive the degree, students are expected to demonstrate knowledge of issues in health services research and the quantitative skills necessary for research in this area. Students must take at least 45 units of coursework (9 of the units may be double-counted to meet other degree requirements) and write a University thesis. The course work requirements are:

1. At least 8 units from the following group of Health Research and Policy (HRP) core courses: 256, Economics of Health; 391, Political Economy of Health Care; 392, Cost-Benefit Analysis in Health Care.

2. At least 6 units of graduate-level statistics courses. The sequence of Statistics 190, Introduction to Statistical Methods (Post-Calculus) for Social Scientists; and HRP 203, Intermediate Biostatistics, is strongly recommended. (Note: HRP 202 does not count toward the statistics requirement.)

3. At least 3 units of HRP 283, Core Seminar.

4. At least 15 units of HRP research credit from 299, Directed Reading; 399, Research.

5. An additional set of approved elective courses to complete the program total of at least 45 units.

6. A background in health sciences equivalent to Medical Information Sciences 205, Introduction to Clinical Environments.

For additional information, address inquiries to the Program Administrator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T150, Stanford, California 94305-5405.

**IMMUNOLOGY PROGRAM**

**Director:** Mark M. Davis (Professor of Microbiology and Immunology)

**Predoctoral Committee:** Mark M. Davis (Professor of Microbiology and Immunology), David B. Lewis (Associate Professor of Pediatrics), Olivia Martinez (Assistant Professor of Surgery/Transplantation), Irene Ruiz (student representative)

**Participating Departments and Faculty:**

**Biological Sciences:** Patricia J. Jones (Professor)

**Cardiovascular Surgery:** Carol Clayberger (Associate Professor, Research; and Pediatrics)

**Chemistry:** Harden M. McConnell (Professor)

**Genetics:** Leonard A. Herzenberg (Professor), Lenore A. Herzenberg (Professor, Research)

**Medicine/Bone Marrow Transplantation Program:** Robert Negrin (Associate Professor), Judith Shizuru (Assistant Professor)

**Medicine/Immunology and Rheumatology:** C. Garrison Fathman (Professor), Jane R. Parnes (Professor), Samuel Strober (Professor)

**Medicine/Oncology:** Gilbert Chu (Associate Professor, and Biochemistry), Ronald Levy (Professor), Shoshana Levy (Professor, Research)

**Microbiology and Immunology:** Yuch-Hsin Chien (Associate Professor), Mark M. Davis (Professor), Hugh O. McDavitt (Professor)

**Molecular and Cellular Physiology:** Richard S. Lewis (Associate Professor)

**Molecular Pharmacology:** Garry P. Nolan (Assistant Professor, and Microbiology and Immunology), Phyllis Gardner (Associate Professor, and Medical/Clinical Pharmacology, and Cardiovascular Medicine)

**Pathology:** Eugene C. Butcher (Professor), Michael Cleary (Professor), Gerald R. Crabtree (Professor, and Developmental Biology), Edgar G. Engleman (Professor, and Medical/Immunology, and Rheumatology), Joseph S. Lipsick (Professor), Sara Michie (Assistant Professor), Raymond A. Sobel (Associate Professor), Irving L. Weissman (Professor, and Developmental Biology)

**Pediatrics:** Alan M. Kremsky (Professor), David B. Lewis, (Associate Professor), Elizabeth Mellins (Associate Professor), Dale T. Umetu (Professor)

**Structural Biology:** Peter Parham (Professor, and Microbiology and Immunology)

**Surgery:** Sheri Krams (Assistant Professor, Research), Olivia Martinez (Assistant Professor, Research)

**GRADUATE PROGRAMS**

**MASTER OF SCIENCE**

Students in the Ph.D. program in Immunology may apply for an M.S. degree in Immunology, assuming completion of appropriate requirements. Students must complete:

1. Three full-tuition quarters of residency as a graduate student at Stanford.

2. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 36 units of which must be at or above the 200 level.

3. Three quarters of graduate research (Immunology 300), consisting of rotations in the labs of three faculty members.

4. Course work in Immunology as follows: one course in basic immunology (Biology 230, Microbiology/Immunology 200 or equivalent); Advanced Immunology such as Immunology 200 and 201; Principles of Biological Technologies (Microbiology/Immunology 215); Cell Biology of Physiological Processes (Molecular and Cellular Physiology 221).

5. Graduate-level biochemistry and molecular biology (Biochemistry 200, 201, or equivalents).

6. Course work in Immunology 311 (Seminar in Immunology).

7. Participation in journal clubs, and attendance at the weekly Immunology seminar and at the annual Stanford Immunology Scientific Conference.

8. One written proposal and an exam before candidacy.

**DOCTOR OF PHILOSOPHY**

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The interdepartmental Immunology Program offers instruction and research opportunities leading to a Ph.D. in Immunology. The goal of the program is to develop young investigators who have a solid foundation in immunology as well as related sciences and who can carry out innovative research. The program features a flexible selection of courses and seminars to enrich the students' backgrounds, combined with extensive research training in the laboratories of the participating immunology faculty.

Students applying to the program typically have an undergraduate major in biological sciences, but majors in other areas are acceptable if the applicants have had sufficient course work in biology and chemistry. Formal application should be made by December 15. Applications are evaluated by the Immunology Predoctoral Committee based on scores on the GRE exams (including the subject test in either biology, biochemistry, or chemistry), which should be taken by the October test date; grades; evidence of prior research experience; letters of recommendation, including letters from research sponsor(s); and commitment to a career in biomedical research. Interested Stanford medical students are welcome to apply to the program; they should contact the program director.

Students admitted to the program are offered financial support covering tuition, a living stipend, insurance coverage, and an allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation and the Howard Hughes Medical Institute. Fellowship applications are due in November of the year prior to matriculation in the graduate program. Because of the small number of department-funded slots, students who have been awarded an
outside fellowship will have an improved chance of acceptance into the program.

On matriculation, each student is assisted in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee including at least two Immunology faculty, including the dissertation adviser, is constituted to guide the student during the dissertation research. The student must meet with the dissertation committee at least once a year. Candidates for Ph.D. degrees at Stanford must satisfactorily complete a three-year program of study that includes 72 units of graduate course work and research and nine full-tuition quarters of residency. At least 3 units must be taken with each of four different Stanford faculty members.

The requirements for the Ph.D. degree in Immunology include the following:

1. Training in biology and cognate disciplines equivalent to that provided by the undergraduate Biology major at Stanford.

2. Completion of the following courses (or their equivalents from undergraduate work):
   a) Basic Immunology (Biology 230 or Microbiology and Immunology 200)
   b) Advanced Immunology (Immunology 201, 202)
   c) Biochemistry and molecular biology, graduate level (Biochemistry 200, 201)
   d) Cell Biology of Physiological Processes (Molecular and Cellular Physiology 221)
   e) Statistics (Biology 141 or Health Research and Policy 202)
   f) Principles of Biological Technologies (Microbiology/Immunology 215)

3. Students in their second year and above must participate in the Seminar in Immunology (Immunology 311); students who have not yet achieved TGR status must register for 1 unit. Students attend the weekly Immunology Seminar Series (5-6 p.m. Tuesdays). Students read the papers of and have dinner with visiting seminar speakers two or three times each quarter, and meet with a faculty member to discuss the material.

4. Elective courses as agreed upon by the student, adviser, and advisory committee. Electives may be chosen from graduate courses and seminars in any of the biomedical science departments and programs.

5. Completion in the first year of three one-quarter rotations of research in immunology labs.

6. Teaching assistantship in two immunology courses.

7. For admission to candidacy, completion of two requirements by the end of the second year: a comprehensive written examination in immunology and related biomedical sciences must be completed satisfactorily by the end of Autumn Quarter of the second year. Finally, students must prepare and defend a research proposal on their dissertation research by the end of the second year. Administration and evaluation of these requirements is the responsibility of the student's dissertation committee.

8. Participation (through regular attendance and oral presentation) in one of the faculty-sponsored immunology journal clubs for at least the first two years. Students are also expected to attend the graduate students' journal club, the Tuesday evening immunology seminars, and the annual Stanford Immunology Scientific Conference.

9. Passing of the University oral examination on the dissertation research, which is to be taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the candidate presents his/her research.

10. Completion of a Ph.D. dissertation, resulting from independent investigation and constituting a contribution to knowledge in the area of immunology.

COURSES

Course work and lab instruction in the Immunology Program conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

201. Advanced Immunology—(Same as Microbiology and Immunology 211.) For graduate students and advanced undergraduates. Lecture/discussion featuring current problems in immunology. Topics: genetics and structure/function relationships of antibodies, T-cell receptors, MHC antigens; accessory molecules; lymphocyte differentiation and activation; cellular regulation of immune responses; autoimmunity and other problems in clinical immunology. Prerequisites: biochemistry, basic or introductory immunology course, consent of instructor (for undergraduates).

3 units, Win (Chien, Staff)

202. Advanced Immunology—(Same as Microbiology and Immunology 212.) Critical readings of the immunological literature and specific areas of immunology. Classic problems and emerging areas are covered based on primary literature. Student and faculty presentations. Prerequisite: 201.

3 units, Spr (Davis, Lipstick)

215. Principles of Biological Technologies—(Same as Microbiology and Immunology 215.) The principles underlying commonly utilized technical procedures in biological research. Lectures on gel electrophoresis, nucleic acid hybridization, protein purification and stabilization, light microscopy, and computer search algorithms for protein and nucleic acid databases. Prerequisites: biochemistry, organic chemistry, and physics.

2 units, Aut (Davis)

221. Cell Biology of Physiological Processes—(Same as Biological Sciences 214.) The basic mechanisms of membrane and cellular biogenesis in relation to physiological processes. Emphasis is on the regulatory and signaling mechanisms involved in coordinating complex cellular phenomena such as cellular organization, function, and differentiation. Topics: cellular compartmentalization, transport and trafficking of macromolecules, organelle biogenesis, cell division, motility and adhesion, and multicellularity. Prerequisites: Biology core, Biochemistry 201.

5 units, Win (Kopito, W. Nelson)

290. Teaching of Immunology—Practical experience in teaching by serving as a teaching assistant in an immunology course.

(Staff)

300. Research—Research for graduate students in the Ph.D. program in Immunology.

1-15 units (Staff)

311. Seminar in Immunology—Enrollment limited to graduate students (second-year and above) in the Ph.D. Program in Immunology. Current research topics in immunology. Students read and discuss papers of speakers in the Immunology Seminar Series and meet with the speakers to discuss their research.

1 unit, Aut, Win, Spr (Staff)

Special Topics in Immunology—Graduate student initiated, in journal club style. Previous topics included evolutionary immunology and the principles of vaccine development.

1 unit (Staff)

MEDICAL INFORMATION SCIENCES PROGRAM

Committee: (Chair and Program Director) Edward H. Shortliffe; (Co-Director) Lawrence M. Fagan; Russ B. Altman, Douglas L. Brutlag, Parvati Dev, Alan M. Garber, Mark A. Musen, Yuval Shahar, Gio Wiederhold

Participating Faculty by Department:

Opportunities for research are not limited to the specific faculty and departments listed.
Anesthesia: David M. Gaba (Associate Professor)  
Biochemistry: Douglas L. Brutlag (Professor)  
Biostatistics: Byron W. Brown, Jr. (emeritus Professor), Richard A. Olshen (Professor)  
Business: Alain C. Enthoven (Professor)  
Computer Science: Russ B. Altman (Associate Professor, by courtesy),  
   Thomas O. Binford (Professor, Research), Edward A. Feigenbaum (Professor), Richard E. Fikes (Professor, Research), Michael R. Genesereth (Associate Professor), John Hennessy (Professor), Daphne Koller (Assistant Professor), John Koza (Consulting Professor), Joshua Lederberg (Consulting Professor), Marc Levoy (Associate Professor), Mark A. Musen (Associate Professor, by courtesy), Yuval Shahar (Assistant Professor, Research, by courtesy), Edward H. Shortliffe (Professor, by courtesy), Giao Wiederhold (Professor), Terry Winograd (Professor)  
Economics: Victor R. Fuchs (emeritus Professor), Alan M. Garber (Professor, by courtesy)  
Education: Lee S. Shulman (Professor)  
Electrical Engineering: Marc Levoy (Associate Professor), Albert Mackovski (emeritus Professor), Giao Wiederhold (Professor, Research, by courtesy)  
Engineering-Economic Systems and Operations Research: Samuel Holtzman (Consulting Associate Professor), Ronald A. Howard (Professor), Ross D. Shachter (Associate Professor)  
Genetics: David Botstein (Professor), Stanley N. Cohen (Professor), Richard M. Myers (Professor)  
Health Research and Policy: Byron W. Brown, Jr. (Professor), Alan M. Garber (Professor, by courtesy), Mark A. Hlatky (Professor), Richard A. Olshen (Professor), Douglas K. Owens (Associate Professor)  
Mathematics: Samuel Karlin (emeritus Professor)  
Medicine: Russ B. Altman (Associate Professor), Terrance Blaschke (Professor), Robert W. Carlson (Professor), Parvati Dev (Senior Research Scientist), Lawrence M. Fagan (Senior Research Scientist), James F. Fries (Professor), Alan M. Garber (Professor), Mary Goldstein (Assistant Professor), Peter D. Karp (Consulting Assistant Professor), John Koza (Consulting Professor), Mark A. Musen (Associate Professor), Douglas K. Owens (Associate Professor), Glenn Rennels (Consulting Assistant Professor), Thomas C. Rindfleisch (Senior Research Scientist), Gillian Sanders (Assistant Professor, Research), Yuval Shahar (Assistant Professor, Research), Edward H. Shortliffe (Professor), Michael Walker (Consulting Assistant Professor)  
Neurosurgery: John R. Adler (Professor), Ramin Shahidi (Assistant Professor, Research)  
Obstetrics and Gynecology: Emmet J. Lamb (emeritus Professor)  
Pathology: Howard H. Sussman (Professor)  
Radiation Oncology: Arthur L. Boyer (Professor), Lei Xing (Assistant Professor, Research)  
Radiology: Gary M. Glazer (Professor), Gary H. Glover (Professor), Sandy A. Napel (Associate Professor), Norbert J. Pelc (Professor), Geoffrey Rubin (Assistant Professor)  
Statistics: Trevor J. Hastie (Associate Professor), Jun Liu (Assistant Professor)  
Structural Biology: Michael Levitt (Professor)  
Surgery: Charles Taylor (Assistant Professor, Research)  

This interdisciplinary program was created in response to a recognized need for well-trained researchers and academic leaders in the expanding field of medical information sciences (medical informatics).

Stanford University's extensive computing facilities are described in the "Computer Science" section of this bulletin. In addition, the Medical Information Sciences Program has a network of personal computers, workstations, and servers running the Unix, Windows NT, Windows 95 and Macintosh operating systems. These machines are available for course work and research projects by trainees in the program.

GRADE CURRICULUM

All students are expected to participate regularly in the Medical Informatics Student Seminar (201) and Colloquia (200), regardless of whether they register for credit in those courses. In addition, all students are expected to fulfill requirements in the following five categories:

1. Medical Informatics (15 units): students are expected to understand current applications of computers in medicine and to develop a broad appreciation for research in the management of biomedical information. Required courses are the two-quarter sequence MIS 210A and 210B (Introduction to Medical Informatics), plus 212 (Project Course), all of which should be taken during the first year in the program. First-year students are required to take MIS 302 throughout the year, and second-year students are required to take 303, regardless of whether they choose to register for credit. Students must also take an additional 6 units of MIS course work (which may include cross-listed courses from other departments, but not including MIS 200, 201, 299, 302, or 303), selected in consultation with the academic advisor.

2. Computer Science (9 units): the student is expected to acquire a knowledge of the use of computers, computer organization, programming, and symbolic systems. It is assumed that students have had prior computing experience at least equivalent to Computer Science (CS) 109 and 150. All students are required to take a minimum of 9 units of courses in the Department of Computer Science. If similar courses have not been taken previously, these units must include CS 121, 161, and a course that requires significant programming and knowledge of machine architectures (for example, Electrical Engineering 182, CS 110, or the CS 193 series). For those who have taken such courses previously, replacement units may be taken from any other course in CS selected by the student and approved by the academic advisor. A course in databases is especially recommended. With the exception of CS 110, all other courses applied to the degree requirements must be numbered 137 or higher.

3. Decision Science and Statistics (9 units): students are required to take at least three courses that span the following five topics: basic probability theory, Bayesian statistics, decision analysis, cost-effectiveness analysis, and experimental-design techniques. Prior courses in
biomedical or applied projects in medical informatics.

4. Teaching: all students are expected to act as Teaching Assistants (TAs) for at least one course during their first two years of training. Graduates of this program are prepared to contribute creatively to the biomedical and engineering fields of endeavor. The first year involves acquiring the fundamental topics selected and the previous training of the student. The varying backgrounds of students are well recognized and no one is required to take substitutions, should be chosen in consultation with the student's academic adviser. Also recommended is a course in the psychology of human problem solving (for example, Psychology 256).

4. Biomedical Domain Knowledge (7 units): students are expected to acquire a basic understanding of pertinent life sciences and how to analyze a domain of application interest. Prior courses in biology at least equivalent to Biological Sciences 31 and 32 are prerequisites. Required is MIS 205 and at least one of the following: MIS 204, 6 units of the Clinical Physiology series (Physiology 200-204), Human Biology 112, Biochemistry 200 and 203, or Surgery 101 (Human Structure). At least one additional course in the human domain of the student's application interest is also required.

5. Social and Ethical Issues (6 units): candidates are expected to be familiar with key issues regarding ethics, public policy, financing, organizational behavior, management, and pertinent legal topics. Students may select at least 6 units from suitable courses that include MIS 250, 256, 432 and 250; CS 201; Health Research and Policy 390, 391, and 392, or any other advanced course in policy and social issues proposed by the student and approved by the MIS academic adviser.

The core curriculum generally entails a minimum of 46 units of course work, but can require substantially more or less depending upon the courses selected and the previous training of the student. The varying backgrounds of students are well recognized and no one is required to take courses in an area in which he or she has already been adequately trained; under such circumstances, students are permitted to skip courses or substitute more advanced work. Students design appropriate programs for their interests with the assistance and approval of their MIS academic adviser.

MASTER OF SCIENCE

The University requirements for the M.S. degree are described in the “Graduate Degrees” section of this bulletin.

This degree is designed for individuals who wish to undertake in-depth study of medical informatics. Normally, a student spends two years in the program and will implement and document a substantial project during the second year. The first year involves acquiring the fundamental concepts and tools through course work and research project involvement. Graduates of this program are prepared to contribute creatively to basic or applied projects in medical informatics.

PROGRAM REQUIREMENTS

Programs of at least 54 units that meet the following guidelines are normally approved:

1. Completion of the core curriculum.
2. A minimum of 6 additional units of courses in Computer Science numbered 135 or higher, courses in Engineering-Economic Systems and Operations Research or Statistics numbered 200 or higher, Psychology 256 or 267, or relevant courses in other departments approved by the student’s academic adviser.
3. Electives: additional courses to bring the total to 54 or more units.
4. Teaching: all students are expected to act as Teaching Assistants (TAs) for at least one course during their first two years of training. This will generally be Medicine 292 (the medical informatics short course), although another course approved by the program faculty may occasionally be substituted.

DOCTOR OF PHILOSOPHY

The University’s basic requirements for the doctorate (residence, dissertation, examination, and so on) are discussed in the “Graduate Degrees” section of this bulletin.

Individuals wishing to prepare themselves for careers as independent researchers in medical informatics, with applications experience in bioinformatics, clinical informatics, or imaging informatics, should apply for admission to the doctoral program. The following are additional requirements imposed by the MIS Interdisciplinary Committee:

1. A student should plan and successfully complete a coherent program of study including the core curriculum, oral examination, and additional requirements for the master’s program. In addition, doctoral candidates are expected to take MIS 211 and to complete at least one more advanced course (see categories under item 2 of the master’s program requirements). The master’s requirements, including the oral examination, should be completed by the end of the second year in the program (six quarters of study, excluding summers). Doctoral students are generally advanced to Ph.D. candidacy after completing the oral examination. A student’s academic adviser has primary responsibility for the adequacy of the program, which is regularly reviewed by the Graduate Study Committee of the MIS program.

2. To remain in the Ph.D. program, each student must attain a grade point average (GPA) as outlined in the master’s programs above, and must pass a comprehensive exam covering introductory level graduate material in any curriculum category in which he or she fails to attain a GPA of 3.0. The student must fulfill these requirements and apply for admission to candidacy for the Ph.D. by the end of six quarters of study (excluding summers). In addition, reasonable progress in the student’s research activities is expected of all doctoral candidates.

3. During the third year of training, generally in the Winter Quarter, each doctoral student is required to give a preproposal seminar that describes evolving research plans and allows program faculty to assure that the student is making good progress toward the definition of a doctoral dissertation topic. By the end of nine quarters (excluding summers), each student must orally present a thesis proposal to a dissertation committee that generally includes at least one member of the Graduate Study Committee of the MIS program. The committee determines whether the student’s general knowledge of the field, and the details of the planned thesis, are sufficient to justify proceeding with the dissertation.

4. As part of the training for the Ph.D., each student is required to complete 2 units of teaching assistant service in MIS courses, 1 unit (10 hours per week for one quarter) being required during the first two years as evidence of satisfactory progress toward the degree.

5. The most important requirement for the Ph.D. degree is the dissertation. Prior to the oral dissertation proposal and defense, each student must secure the agreement of a member of the program faculty to act as dissertation adviser. The principal adviser need not be an active member of the MIS program faculty, but all committee members should include at least one member of the MIS faculty.

6. No oral examination is required upon completion of the dissertation. The oral defense of the dissertation proposal satisfies the University oral examination requirement.

7. The student is expected to demonstrate an ability to present scholarly material orally and present his or her research in a lecture at a formal seminar.

8. The student is expected to demonstrate an ability to present scholarly material in concise written form. Each student is required to write a paper suitable for publication, usually discussing his or her doctoral research project. Each paper must be approved by the student’s academic adviser as suitable for submission to a refereed journal before the doctoral degree is conferred.

9. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a member of the program faculty, and a third member chosen from anywhere within the University. The principal adviser and at least one of the other committee members must be Academic Council members.
VISITING SCHOLAR (SPECIAL PROGRAM)

This one-year program is designed as postdoctorial training for individuals with established research credentials and accomplishments who may wish to acquaint themselves broadly with the field of medical information sciences, emphasizing formal course work and an optional year-long research project. Candidates are permitted to complete the program in no less than four quarters. In general, one position is available in each academic year. Students in this program are drawn from applicants with doctoral degrees in computer science, decision theory, medicine, or related fields; for example, an academic physician on sabbatical might wish to undertake this program of study. Trainees do not undertake research projects. Individuals interested in pursuing this program complement their area of primary academic or research activity by providing them with a heightened ability to work effectively in collaborative research projects. Individuals interested in pursuing this program should contact the program administrator for information regarding the application procedures and schedule.

COURSES

200. Medical Informatics Colloquium—Series of colloquia offered by program faculty, students, and occasional guest lecturers. Credit available only to students in an MIS degree program. (May be taken no more than three times for credit.)
1 unit, Aut, Win, Spr

201. Medical Informatics Student Seminar—For all students and faculty. Participants report on recent relevant articles from the MIS literature or their research projects. The ongoing experience, with feedback from faculty, is intended to teach presentation skills to MIS trainees. Credit available only to students in an MIS degree program. (May be taken no more than three times for credit.)
1 unit, Aut, Win, Spr

202. Clinical Diagnosis—Open only to students in an MIS degree program. Designed for learning the techniques of interviewing and symptom analysis through the study of a variety of common and well-defined clinical entities, and by role-playing in a problem-solving setting. See instructor.
2 units

204. Physiology for Informatics—Seminar. System by system review of physiology, emphasizing important physiological concepts and systems for information technology. Topics: basic molecular biology, cellular physiology, and coverage of basic physiological systems (nervous, cardiovascular, renal, immune, pulmonary, gastrointestinal, and endocrine). Applications of biomedical information technology in each area. Enrollment limited. Prerequisite: consent of instructor.
3-5 units, any quarter (Altman)

205. Introduction to Biomedical Environments—Open only to students in an MIS or Health Services Research degree program who are not enrolled in the M.D. program and do not have an M.D. degree. Background introduction to the sites to be visited; selected faculty introduce a variety of settings at Stanford Medical Center and the Veterans Affairs Medical Center: the medical wards, radiology, molecular biology research laboratories, outpatient clinics, emergency room, operating room, intensive care unit, psychiatry ward, and clinical lab. See instructor.
1 unit, any quarter (Shortliffe)

210A. Introduction to Medical Informatics: Fundamental Methods—(Same Computer Science 270A.) Issues in the modeling, design, and implementation of computational systems for use in biomedicine. Topics: controlled terminologies in medicine and biological science, ontologies, fundamental algorithms, basic knowledge representation, information dissemination and retrieval. Emphasis is on the principles of modeling data and knowledge in biomedicine and on the translation of resulting models into useful automated systems.
3 units, Aut (Musen, Altman)

210B. Introduction to Medical Informatics: Systems and Requirements—(Same as Computer Science 270B.) Continuation of 210A. Survey of the major application areas in medical informatics, including clinical information systems, imaging systems, bioinformatics, public policy, decision support, and signal processing. Emphasis is on the system requirements, relevant data, algorithms, and implementation issues in each area. Prerequisite: 270A.
3 units, Win (Shortliffe, Shahar, Dev)

211. Decision Making Methods for Biomedicine—(Same as Computer Science 271.) For undergraduates or graduate students. Builds on 210B. Intermediate biomedical decision making and survey of the methods for the implementation of such concepts in computer based decision-support tools. Emphasis is on Bayesian statistics, decision analysis, cost-effectiveness analysis, technology assessment, neural networks, artificial intelligence/expert systems, belief networks, influence diagrams, and the synergies among such approaches. Prerequisites: 210B and at least one programming course.
3 units, Win (Higgins, Garber, Owens, Sanders, Shortliffe)

212. Medical Informatics Project Course—(Same as Computer Science 272.) For students who have completed 210, 211, or 214, and who wish to implement those ideas in a computer program. Students may take 214 concurrently and complete a project that is coordinated between the two courses. Prerequisites: programming experience, 210B.
3 units, Spr (Koza, Shahar)

214. Representations and Algorithms for Computational Molecular Biology—(Same as Computer Science 274.) Introduction to the basic computational issues and methods used in the field of bioinformatics, including access and use of biological data sources on the Internet. Topics: basic algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, computing with networks of genes, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of diverse data sources, knowledge representation and controlled terminologies for molecular biology, graphical display of biological data, genetic algorithms and genetic programming applied to biological problems. See instructor for unit options. Prerequisites: programming skills and understanding of matrix algebra.
1-4 units, Spr (Altman, Koza)

1 unit, Spr (Altman, Koza)

226. Genetic Algorithms and Genetic Programming—(Same as Computer Science 426.) The genetic algorithm is a domain-independent algorithm for search, optimization, and machine learning patterned after Darwinian natural selection and naturally occurring genetic operators such as recombination, mutation, gene duplication, gene deletion, gene regulation, and embryonic development. Genetic programming is a domain-independent automatic programming technique that extends the genetic algorithm to the breeding of populations of computer programs. Topics: introduction to genetic algorithms and genetic programming; mathematical basis for genetic algorithms; implementation on parallel computers and field-programmable gate arrays; evolution of machine language programs; applications to problems of system identification, control, classification, analysis of genome and protein sequences, and automatic synthesis of the design of topology, sizing, placement, and routing of analog electrical circuits.
3 units, Win (Shachter)

3 units, Win (Shachter)
230. Seminar on Knowledge Acquisition for Expert Systems—For graduate students. Discussion of experimental approaches to the construction of expert-system knowledge bases. Topics: interviewing techniques, formal and informal approaches to modeling expert knowledge, and automated tools that facilitate knowledge acquisition. Enrollment limited to 20. Prerequisite: one course in artificial intelligence.
2 units (Musen) given 2000-01

231. Computational Molecular Biology—(Same as Biochemistry 231.) For molecular biologists and computer scientists desiring a practical, hands-on approach to computational molecular biology; recommended for molecular biologists and computer scientists desiring to understand the major issues concerning representation and analysis of biological sequences and structure. Existing methods critically described with the strengths and limitations of each. Future directions for development of new methods. Practical assignments utilizing the tools described. Topics: accessing molecular databases, pattern search, classification of sequence and structure, alignment of sequences, rapid similarity searching, phylogenies, automated pattern learning, representing protein structure, modeling protein structure by homology, protein-protein docking and protein-ligand docking. Final project utilizes or analyzes the methods presented. Lecture/lab. Enrollment limited to 40. Prerequisite: introductory molecular biology at the level of Biological Sciences 52 or consent of instructor. Recommended: 210.
3 units, Aut (Bruagl)

232. Seminar on Temporal Reasoning and Planning in Biomedicine—For graduate students. Topics: reasoning about time-oriented biomedical data; abstraction of meaningful concepts from time-stamped data; temporal-pattern matching; temporal databases; representation, execution, and quality assessment of therapy guidelines and other skeletal plans; acquisition of planning and temporal-reasoning knowledge. Enrollment limited to 20. Prerequisite: one course in artificial intelligence.
2 units, Aut (Shahar) alternate years, not given 2000-01

3 units, Spr (Tibshirani)

239. Computer-Based Medical Education—Directed reading and research for graduate-level students in the use of modern hypermedia techniques in education. Possible topics: replacement of a lecture or a lab session, primary learning material (an electronic book), review material (question banks), and clinical cases from simulations to simulations.
1-6 units, any quarter (Dev)

250. The U.S. Health Care System and Health Policy—(Enroll in Health Research and Policy 205.)
2 units, Win (Baker, Hlatky)

256. Economics of Health and Medical Care—(Same as Economics 156/256, Health Research and Policy 256.) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: institutions in the health sector; measurement and valuation of health; nonmedical determinants of health; medical technology and technology assessment; demand for medical care and medical insurance; physicians, hospitals, and managed care; international comparisons. Prerequisite: Economics 51 or consent of instructor. Recommended: some background in statistics or mathematics.
5 units, Win (McClellan)

278. Reasoning under Uncertainty—(Enroll in Computer Science 228.)
3 units, Win (Koller)

299. Directed Reading and Research—For students wishing to receive credit for directed reading or research time.
any quarter

301. Special Topics in Medical Informatics
1-6 units, any quarter (Staff)

302. Introduction to Current Research—Survey of Stanford-based research in medical informatics, with weekly seminars led by faculty and senior researchers. Prerequisite: MIS degree candidacy or consent of instructor.
1 unit, Aut, Win, Spr (Staff)

303. History of Medical Informatics—Weekly seminar series that surveys key papers and investigators in the field of medical informatics, led by Medical Information Sciences faculty. Prerequisite: MIS degree candidacy or consent of instructor.
1 unit, Aut, Win, Spr (Staff)

315. Topics in Image Informatics—In-depth study of selected active research topics in image informatics, chosen from: scientific and medical visualization, interfaces, virtual environments, relationship to knowledge representations, media databases, data mining in media databases, standards for storage and transmission. Readings from the literature, presentations, and a project. Prerequisites: programming experience in any of C, C++, Java, Matlab, and some prior exposure to graphics or image processing.
3 units, Spr (Dev)

328. Protein and Nucleic Acid Structure, Dynamics, and Engineering—(Enroll in Structural Biology 228.)
3 units, Win (Levitt)

432. Cost-Benefit Analysis in Health Care—(Same as Business E332, Health Research and Policy 392.) How do you do cost-benefit analysis when the “output” is difficult or impossible to measure? How do the MBA analytic tools apply in health services? Study/discussion of the main literature on the principles of cost-benefit analysis as applied to health care. Critical review of actual case studies. Emphasis is on the art of practical application.
4 units, Aut (Garber, Owens, Singer)

MICROBIOLOGY AND IMMUNOLOGY

Emeritus: (Professors) Sidney Raffel, Leon T. Rosenberg, John P. Stew ard, Bruce A. D. Stocker; (Professor (Research) Esther M. Leder ard, Bruce A. D. Stocker*

Professors: (Microbiology and Immunology, Pediatrics), John C. Boothroyd, Mark M. Davis, Stanley Palkow, Stephen J. Gal li, Harry B. Greenberg (Microbiology and Immunology, Medicine), A. C. Matin, Hugh O. McDevitt, Edward S. Mocarski, Peter Parham (Microbiology and Immunology, Structural Biology), Charles Prober (Microbiology and Immunology, Pediatrics), Peter Sarnow, Gary K. Schoolnik (Microbiology and Immunology, Medicine), Lucy S. Tompkins (Microbiology and Immunology, Medicine)

Associate Professors: Yueh-hsiu Chien, Haldar Katsuri, Karla Kirkegaard

Associate Professor (Teaching): Robert D. Siegel
Assistant Professors: Christopher Contag (by courtesy, Pediatrics), Christopher Garcia, Peter Jackson (Microbiology and Immunology,
under special circumstances. Candidates for master's degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by at least two members of the department faculty.

**GRADUATE PROGRAMS**

**MASTER OF SCIENCE**

A regular M.S. program is not offered, although this degree is awarded under special circumstances. Candidates for master’s degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by at least two members of the department faculty.

**DOCTOR OF PHILOSOPHY**

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

**Application, Admission, and Financial Aid**—Prospective Ph.D. candidates should have completed a bachelor’s degree in a discipline of biology or chemistry, including course work in biochemistry, chemistry, genetics, immunology, microbiology, and molecular biology. The deadline for receipt of applications with all supporting materials is December 15.

Applicants must file a report of scores on the general subject tests and on an advanced test (normally in cellular and molecular biology, chemistry, or biochemistry) of the Graduate Record Examination (GRE). It is strongly recommended that the GRE be taken before October so that scores are available when applications are evaluated.

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend and tuition award. Highly qualified applicants may be honored by a nomination for a Stanford fellowship. Successful applicants have been competitive for predoctoral fellowships such as those from the National Science Foundation and Howard Hughes Medical Institute.

**Program for Graduate Study**—The Ph.D. degree requires course work and independent research demonstrating an individual’s creative, scholarly, and intellectual abilities. On entering the department, students meet an advisory faculty member and together they design a timetable for completion of the degree requirements. Typically, this consists of first identifying gaps in the student’s undergraduate education and determining courses that should be taken. Then, a tentative plan is made for two to four lab rotations (one rotation per quarter). During the first year of graduate study in the department, each student also takes six or seven upper-level (200-series) courses. Three of these courses, Principles of Biotechnologies, Pathogenesis of Bacteria, Viruses and Eukaryotic Parasites, are specific requirements of this department, and one is usually Immunology. Three courses, Advanced Genetics, Biochemistry, and Cell Biology, are part of the "core curriculum" that is required of many graduate students in Stanford Biosciences.

In Winter Quarter of the second year, each student defends orally a formal research proposal on a topic outside the intended thesis project. The outline of this proposal is due to the Graduate Program Steering Committee by January 30th. Based on successful performance on this proposal, the student is admitted to candidacy. In the Autumn Quarter of the third year, a research proposal based on the student’s own thesis topic is defended by his or her thesis committee. Teaching experience and training are also part of the graduate curriculum. All graduate students are required to act as teaching assistants for two quarters. In addition, first- and second-year graduate students are required to participate in a biweekly journal club.

**COURSES**

25N. Stanford Introductory Seminar: Modern Plagues—Preference to freshmen. The molecular and medical aspects of several new and old microorganisms that infect humans. Goal: to place modern human plagues in scientific and historical perspective and to provide an introduction to the fields of molecular biology and microbiology.

2 units, Aut, Win, Spr (Boothroyd, Falkow, Kirkegaard)

26Q. Stanford Introductory Seminar: The Threat of Emerging Antibiotic Resistance and What We can do About It—Preference to sophomores. Resistance of bacteria to antibiotics has reached alarming proportions. From the 1930s to the early '70s, discovery of several classes of highly effective antimicrobial agents enabled us to nearly eliminate the threat of bacterial disease. But this situation is drastically changed as a result of wide-spread antibiotic resistance in bacteria. The seminar deals with causes and potential solutions.

3-5 units, Spr (Matin)

115A. Humans and Viruses—(Same as Human Biology 115A.) Upper division undergraduate, illustrating important concepts in biology and the social sciences, and focusing on emerging infections, viral classification, transmission and prevention, vaccination and treatment, eradication of disease, viral pathogenesis, mechanisms of virally induced cancer, and viral evolution. Sample topics: the molecular biology of genetic shift and drift in influenza virus, cellular tropism of HIV, developmental biology of virally induced birth defects, clinical aspects of infantile diarrhea, social aspects of the common cold, policy issues of blood antibody tests, and factors in pathogenesis and transmission of prions. Prerequisites: Human Biology core, or consent of instructor.

4 or 6 units, Win (Siegel)

115B. Seminar: The Vaccine Revolution—(Same as Human Biology 115B.) Advanced undergraduate. The human aspects of viral disease focusing on recent discoveries, especially in the area of vaccine development and emerging infections. Journal club format: students select articles from primary scientific literature, write formal summaries, and synthesize it into a detailed literature review on a specific topic. Emphasis is on the development of critical reading, analysis, experimental design, and interpretation of data. Students give four oral presentations and lead discussions based on their scientific journal reading. Enrollment limited to 10. Prerequisites: 115A, consent of instructor.

5 units, Spr (Siegel)

185. Topics in Microbiology—Introduction to microbiology for undergraduates: diversity, molecular regulation, growth, bioenergetics, and unique metabolic processes. Prerequisites: Chemistry 31, 33, 35. Recommended: Biological Sciences 31.

3 units, Win (Matin, Staff)

198A-F. Undergraduate Directed Reading—Prerequisite: consent of instructor.

15 units maximum, any quarter (Staff)

199. Undergraduate Research—Individual study or research in microbiology or immunology by arrangement with a faculty member. Possible fields: microbial molecular biology and physiology, microbial pathogenicity, immunology, virology, and molecular parasitology. Prerequisites: appropriate backgrounds for various areas, consent of instructors.

1-15 units, any quarter (Staff)

200. Immunology for Medical Students—Introduces the basic concepts of immunology and the role of the immune system in a wide variety of diseases, utilizing case presentations of diseases in which the immune
system plays a major role (autoimmune diseases, infectious disease, transplantation, immunodeficiency diseases, hypersensitivity reactions, and allergic diseases). Basic concepts of the development and function of the immune system are integrated with case material to illustrate how the immune system causes and prevents a variety of endocrine, renal, dermatologic, neurologic, and musculoskeletal diseases, and how organ and tissue transplantation can be used to restore normal function following destruction of particular organs or tissues by immune or other mechanisms.

3 units, Win (McDevitt, Weissman)

200A. Problem Solving in Immunology—Optional, complements 200. Weekly problem sets based, wherever possible, on case reports and publications drawn from the clinical literature concerning the topics covered in lectures and case presentations during the week. Emphasis is on application of the fundamental concepts of immunology to the clinical problems under consideration.

1 unit, Win (McDevitt, Weissman)

201. Infections Basis of Disease—Presentation of the spectrum of human illness induced by viruses, bacteria, fungi, and medical parasitic, including protozoans and helminths. Classification, epidemiology, transmission, pathogenesis, diagnosis, treatment, control, vaccination, and other preventive measures. Emphasis is on the syndromic approach to disease. Lectures, demonstrations, lab sessions, and small group evaluation of clinical correlates. Use of interactive multimedia instructional program, MICROBE, CWP, and labs. Prerequisite: medical student status.

9 units, Aut (Siegel, Staff)

203. Biological Stress Response—In-depth coverage of current literature, with student participation. Possible topics: the nature and molecular regulation of the stress response; biochemistry and structural biology of molecular chaperones; the role of stress proteins in the pathogenic process; psychoneuroendocrinology; multidrug resistance. Enrollment limited. Prerequisites: Biology Core, upper-division course in molecular biology/genetics or biochemistry.

3 units, Spr (Matin, Staff) alternate years, given 1999-2000


3 units, Spr (Mocarski, Kirkegaard, Sarnow)


1 unit, Spr (Staff)

210. Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites—For graduate, medical, and advanced undergraduate students. Required of first-year graduate students in Microbiology and Immunology. Emphasis is on understanding the molecular mechanisms by which microorganisms invade animal and human hosts, express their genomes, interact with macromolecular pathways in the infected host, and induce disease. Problem sets and recent literature pertaining to microbial pathogenesis. Prerequisite: understanding of biochemistry and molecular biology.

4 units, Spr (Sarnow, Boothroyd, Kirkegaard, Mocarski, Relman)

211, 212. Advanced Immunology—(Same as Immunology 201, 202.) For graduate students and advanced undergraduates. Lecture/discussion featuring current problems in immunology. Topics: genetics and the structure/function relationships of antibodies, T-cell receptors, MHC antigens; accessory molecules; lymphocyte differentiation and activation; cellular regulation of immune responses; autoimmunity and other problems in clinical immunology. Prerequisites: biochemistry, basic immunology, consent of instructor (for undergraduates).

211. 3 units, Win (Chien, Staff)

212. Prerequisite: 211.

3 units, Spr (Staff)

215. Principles of Biological Technologies—(Same as Immunology 215.) Required of first-year graduate students in Microbiology and Immunology. The principles underlying commonly utilized technical procedures in biological research. Lectures on gel electrophoresis, nucleic acid hybridization, protein purification and stabilization, light microscopy and computer search algorithms for protein and nucleic acid databases. Prerequisites: biochemistry, organic chemistry, and physics.

2 units, Aut (Davis)

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research. Held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world will present his or her work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences.

1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

MOLECULAR AND CELLULAR PHYSIOLOGY

Emeriti: (Professor) Julian M. Davidson

Chair: W. James Nelson


Associate Professors: Brian K. Koblika, Richard S. Lewis, V. Daniel Madison, Thomas L. Schwarz

Assistant Professor: Richard S. Lewis

Courtesy Professor: Jeffrey J. Wine

Courtesy Associate Professors: Anson W. Lowe, William Weis

The Department of Molecular and Cellular Physiology is located in the Beckman Center for Molecular and Genetic Medicine.

The creation and growth of the department is a reflection of the rapid development of the field of cellular signaling as it relates to intracellular, and interorgan communication. The faculty have common interests in cellular signaling, with a special focus on molecular mechanisms controlling: synaptic transmission and memory; regulation of vesicle trafficking and targeting in neurons and epithelia; structure/function analysis of G protein coupled receptors, potassium and calcium channels; calcium signaling in activated T lymphocytes; cell-cell interactions in epithelia and neuromuscular junctions; and structural and functional polarity in neurons and epithelia. The research programs draw on a wide range of techniques including biochemistry, cell biology, electrophys-
ology, imaging with light or electron microscopy, and molecular genetics. The department teaches physiology to medical and graduate students.

**GRADUATE PROGRAMS**

The department offers required and elective courses for students in the School of Medicine and is also open to other qualified students with the consent of the instructor. Training of medical, graduate, and postdoctoral students is available. The program offers a course of study leading to the Ph.D. degree. No B.S. is offered, and an M.S. is offered only in unusual circumstances where a student completes the course work, rota- and, the written section of the qualifying exam, but is unable to complete the requirements for the Ph.D.

**DOCTOR OF PHILOSOPHY**

Students with undergraduate or master’s degrees who have completed a year each of college chemistry (including lectures in organic and physical chemistry), physics, calculus, and biology are considered for admission to graduate study. Applicants submit a report of scores from the Graduate Record Examination (verbal, quantitative, analytical, and an advanced subject test in one of the sciences) as part of the application.

Students who do not speak English as their native language must submit scores from TOEFL unless waived by Graduate Admissions, the Registrar’s Office.

Study toward the Ph.D. is expected to occupy five years, including summers. A minimum of seven quarter-long courses are required. Students must take Molecular Cellular Physiology 210, and a choice of two out of these three: Neurobiology 200, Biochemistry 200-201, or Molecular and Cellular Physiology 221. Students are also required to take the Molecular and Cellular Physiology seminar series. At least three of the student’s courses must be more focused, advanced, graduate-level courses in areas such as molecular and cellular physiology, cellular signaling, cell biology, or pharmacology. Each student presents a journal club to the department at least every other year, starting their second year. Acceptable grades for all course work must be a minimum of “B-,” and at least two grades equal to “A-” or above are necessary (but not sufficient) for continuation in the program.

**Qualifying Examination**—At the end of the second year in residence as a graduate student, each Ph.D. candidate presents a written thesis proposal to be defended at an oral comprehensive examination. General knowledge of relevant physiology is also tested orally at a separate examination. The examinations may be taken only after all course work has been completed by the required standard. Students undertake individual research studies as early as possible after consultation with their preceptor. Upon passing this exam, the student is advanced to candidacy for the Ph.D.

**Dissertation and University Oral Examination**—The results of independent, original work by the students are presented in a dissertation. The oral examination is largely a defense of the dissertation.

**Advisers and Advisory Committees**—A graduate advisory committee, currently Professors Madison, Schwarz, and Smith, advises students during the period before the formation of their qualifying committees.

**Financial Aid**—Students may be funded by their adviser’s research grants, faculty research, or by extramural funds. Students are encouraged to obtain funding from outside sources (for example, NIH, NSF, Hughes, and so on).

**COURSES**

Course work and laboratory instruction in the Department of Molecular and Cellular Physiology conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

199. Undergraduate Research—Investigation sponsored by individual faculty members, available to undergraduates, hours and units arranged. Fields of research open to students are decided in consultation with sponsoring faculty member. Any quarter (Staff)

200. Physiology: Cardiovascular—Offered jointly with the Department of Medicine. Lectures, small group instruction, clinical presentations, and lab demonstrations of normal and disordered human cardiovascular physiology. Prerequisite: understanding of general biochemistry.

6 units, Spr (Schwarz)

201. Physiology: Endocrine—Offered jointly with the Department of Medicine. Lectures, clinical presentations, and demonstrations on normal and disordered function in the endocrine system. Prerequisite: understanding of general biochemistry.

4 units, Win (Hoffman, Scheller)

202, 203, 204. Physiology: 202-Gastrointestinal; 203-Renal; 204-Respiratory—Offered jointly with the Department of Medicine. Lectures, clinical presentations, and demonstrations on normal and disordered function in the respiratory, renal, and acid-base systems. Prerequisite: understanding of general biochemistry.

6 units, Aut (202, 1 unit; 203, 3 units; 204, 2 units)

(Gastrointestinal: Lowe; Renal: Meyer; Respiratory: Raffin)

206. Pathophysiology—Offered jointly with the Department of Medicine. The physiology of disease, emphasizing clinical situations where two or more organ systems come together at the molecular, cellular, and organ level. The physiology of individual organ systems and the genetics and physiology of diseases such as cystic fibrosis, muscular dystrophy, and hypertension.

2 units, Win (Tien)

210. Principles of Cell Physiology—Required for all MCP graduate students; open to graduate, medical, and advanced undergraduate students (with consent of instructor). Examines the basic biophysical principles that govern cell physiology and applies these principles to aid in understanding a wide range of physiological processes. Energy transduction, diffusion, membrane properties, and electrical potentials and gradients are discussed and related to current problems in ionic and electrical signaling, solute and solvent transport, and cellular homeostasis. Lecture/discussions introduce basic concepts; students use these principles to solve specific physiological problems.

4 units, Spr (Aldrich, Lewis)

213. Special Topics in Molecular and Cellular Physiology—Seminar of guided reading/discussion in introductory and advanced physiological topics agreed on by an individual instructor and interested students. Prerequisite: consent of instructor.

(Staff)

215. Synaptic Transmission—Primarily for graduate students with an interest in synaptic function; interested medical students and advanced undergraduates may enroll. The anatomical, physiological, and biochemical basis of synaptic function in the peripheral and central nervous system. Lectures and discussions of relevant research papers.

3 units, Aut (Smith, Schwarz, Madison) alternate years, not given 2000-01

216. Ion Channels and Membrane Physiology—(Same as Neurobiology 216.) For students with some background in neurobiology who wish to learn the basic mechanisms of signaling in nerve cells. Reading/discussion of original research papers, emphasizing concepts, quantitative analysis of experimental results, and critical evaluation of evidence. Topics: gating mechanisms in voltage-sensitive and chemo-sensitive ion channels and ionic mechanisms in sensory transduction. Student presentations and small group discussions.

3 units (Aldrich, Baylor) alternate years, given 2000-01

218. Transmembrane Signal Transduction—The molecular mechanisms of signal transduction for a variety of structurally and functionally different plasma membrane receptors. Topics: the structure of receptors and the interaction of the receptor protein with the lipid bilayer, ligand
221. Cell Biology of Physiological Processes—(Same as Biological Sciences 214.) Basic mechanisms of membrane and cellular biogenesis in relation to physiological processes. Emphasis is on the regulatory and signaling mechanisms involved in coordinating complex cellular phenomena such as cellular organization, function, and differentiation. Topics: cellular compartmentalization, transport and trafficking of macromolecules, organelle biogenesis, cell division, motility and adhesion, and multicellularity. Prerequisites: Biology core, Biochemistry 201.
   5 units, Win (Kobilka)

222. Imaging: Biological Light Microscopy—Survey of instruments which use light and other radiation for analysis of cells in biological and medical research. Topics: basic light microscopy through confocal fluorescence and video/digital image processing. Lectures on physical principles; involves partial assembly and extensive use of lab instruments. Lab. Prerequisites: some college physics, Biology core.
   3 units, Spr (S. Smith)

299. Directed Reading—Prerequisite: consent of instructor. any quarter (Staff)

399. Advanced Research—Investigation sponsored by individual faculty members undertaken by interested, qualified medical or graduate students. Research fields include endocrinology, neuroendocrinology, and topics in molecular and cellular physiology.
   any quarter (Staff)

MOLECULAR PHARMACOLOGY

Emeriti: (Professors) Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Tag E. Mansour
Chair: Helen M. Blau
Professors: Terrence Blaschke (jointly with Medicine), Helen M. Blau, Oleg Jardetzky, Richard A. Roth, James P. Whitlock, Jr.
Associate Professors: James E. Ferrell, Jr., Phyllis Gardner (jointly with Medicine), Daria Mochly-Rosen
Assistant Professors: Karlene A. Cimprich, Garry P. Nolan
Associate Professor (Teaching): Ellen Porzig
Consulting Professors: Gordon Ringold, Alejandro Zaffaroni

GRADUATE PROGRAMS

MASTER OF SCIENCE

Students in the Ph.D. program may apply for an M.S. degree, after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the “Graduate Degrees” section of this bulletin.

The Department of Molecular Pharmacology offers interdisciplinary training in biochemistry, genetics, and molecular and cellular biology in preparing students for independent careers in biomedical science. Research and training in the department focuses on the mechanisms by which hormones, drugs, and toxic compounds alter cell function. At the heart of these issues lies the analysis of cell signaling and gene expression. The program leading to the Ph.D. degree includes formal and informal study in biochemistry, computer science, genetics, neuroscience, pharmacology, and physiology. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student’s interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four-to-six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and a limited number of undergraduate students. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department presents two basic courses in medical pharmacology (201 and 202) and advanced courses open to qualified medical and other graduate students. Consult the Time Schedule for additional advanced courses.

COURSES

Course work and lab instruction in the Department of Molecular Pharmacology conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

BASIC

201 and 202 provide a broad exposure to the principles of pharmacology and the properties of the major drug groups.

201. Pharmacology—Topics: receptors; pharmacokinetics; and autonomic, CNS, and cardiovascular pharmacology. Emphasis is on the mechanisms of drug action in humans. Prerequisite: biochemistry.
   5 units, Aut (Staff)

   5 units, Win (Staff)

ADVANCED

Open to all University students; instructor’s consent required prior to registration. These courses require a good knowledge of physiology and biochemistry and sometimes of microbiology or genetics. Students should consult with the instructor about the adequacy of their preparation.

210. Cell Signaling—The molecular mechanisms through which cells receive and respond to external signals, taught out of the primary literature. Topics: biochemical, cell biological, genetic, and pharmacological approaches to specific signaling problems. Complements those areas of cell signaling covered by 221/Biological Sciences 214, and Neurobiology 230, focusing on protein phosphorylation and cell cycle control. Prerequisites: Biochemistry 201 or 202. Recommended: 221/Biological Sciences 214.
   4 units (Ferrell, Staff) alternate years, given 2000-01

231. Molecular Biology of Gene Therapy—Cell mediated gene therapy as a novel form of drug delivery. Vectors, cell types, and relevant genetic and acquired diseases are discussed in a series of lectures, and in student and guest presentations. Prerequisites: biochemistry and molecular biology.
   2-3 units, Spr (Nolan, Blau) alternate years, not given 2000-01

240. Drug Discovery—The scientific principles and technologies involved in making the transition from a basic biological observation to the creation of a new drug, with emphasis on molecular and genetic issues.
   4 units, Aut (Mochly-Rosen, Cimprich)
241. Aging and Gene Therapy—Open to graduate students and medical students. Frontiers in the molecular pharmacology of diseases of aging. Topics: aging as a cellular process, the molecular basis of aging, development of novel gene-therapy based approaches towards the future treatment of syndromes of aging. The molecular neurobiology of aging, cardiovascular diseases, autoimmune diseases, cancer and the consequences of aging on organs, stem cells and reproductive potential. Specialists in the area and invited experts from outside Stanford present cutting-edge work and theories of the basic processes affecting aging. 
3 units, Spr (Blau, Nolan, Porzig)

251. Aging: Health and Disease—Open to graduate students and medical students. Interdisciplinary. The psycho-social aspects of aging: health policy considerations of geriatric medicine, changes in cognition and reproductive potential, effects of exercise and nutrition, cultural perspectives on aging and medical ethical issues including social and family support of aging patients. The cellular and molecular basis of aging: life span and animal models for aging, genetics of aging, aging syndromes, nuclear clocks, senescence and telomers, and non-disjunction in gametogenesis. Future approaches to novel treatments for the diseases of aging: Parkinsons, Alzheimers, cardiovascular illnesses, cancer, arthritis, and osteoporosis. Aging is evaluated as a normal developmental process, focusing on its effects on human reproductive, skeletal, hematopoietic, and nervous systems. 
3 units (Blau, Porzig) given 2001-02

270. Research Seminar—Weekly seminars on current research in pharmacology. Seminars are reviewed and discussed in a separate conference with a member of the faculty.
2 units, Aut, Win, Spr (Staff)

280. Tutorial Program—Primarily for graduate students in pharmacology. Guided readings in the literature of any area of pharmacology. A critical review paper may be required.
any quarter (Staff)

299. Directed Reading
any quarter (Staff)

399. Research
any quarter (Staff)

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within the school where the course is listed.
1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

GRADUATE PROGRAM

Graduate students in the Department of Neurobiology obtain the Ph.D. degree through the interdepartmental Neurosciences Ph.D. program. Accepted students receive funding for tuition and a living stipend. Applicants should familiarize themselves with the research interests of the faculty and, if possible, indicate their preference on the application form which is submitted directly to the Neurosciences Program.

Medical students also are encouraged to enroll in the Ph.D. program. The requirements of the Ph.D. program are fitted to the individual interests and time schedules of the student. Postdoctoral training is available to graduates holding Ph.D. or M.D. degrees, and further information is obtained directly from the faculty member concerned.

Research interests of the department include: mechanisms of visual transduction and information transmission in vertebrate retina; structure, function, and development of auditory and visual systems; integrative mechanisms and regeneration in the central and peripheral nervous system; mechanisms of ion channel function; and neuronal growth and differentiation.

COURSES

Course work and lab instruction in the Department of Neurobiology conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

The department offers a one-quarter course (Neurobiology 200) on the structure and function of the nervous system, which is open to medical and graduate students, and advanced undergraduates. Advanced courses are open to students who have completed the basic course.

199. Directed Reading (Undergraduate)—Prerequisite: consent of instructor.
1-18 units, any quarter (Staff)

200. The Nervous System—Introduction to the structure and function of the nervous system, including neuroanatomy, neurophysiology, and neurochemistry. Topics range from the properties of neurons to the mechanisms and organization underlying higher functions. Coherent framework prepares for general work in neurology, neuropathology, clinical medicine, and for more advanced work in neurobiology. Lecture and lab components must be taken together.
9 units, Win (Barres, Baylor, Knudsen, McMahan, Newsome, Raymond, Schulman, Shooter, Stryer)

216. Ion Channels and Membrane Physiology—(Same as Molecular and Cellular Physiology 216.) For students with some background in neurobiology who wish to learn the basic mechanisms of signaling in nerve cells. Reading/discussion of original research papers, emphasizing concepts, quantitative analysis of experimental results, and critical evaluation of evidence. Topics: gating mechanisms in voltage sensitive and chemosensitive ion channels and ionic mechanisms in sensory transduction. Student presentations and small group discussions.
3 units, Aut (Aldrich, Baylor) alternate years, given 2000-01

217. Synaptogenesis and Synaptogen—Seminar evaluating current views on the sequence of steps and mechanisms involved in synapse formation. Emphasis is on the neuromuscular synapse; its development in the embryo and its regeneration in the adult. Students read original articles, write summaries, and present them for discussion.
4 units, Aut (McMahan) alternate years, given 2000-01

218. Neural Basis of Behavior—Advanced seminar exploring the principles of information processing by the central nervous system of vertebrates, and the relationship of functional properties of neural systems with perception and behavior. Emphasis is on the visual and auditory systems. Study of original papers, directed group discussions, and student presentations. Prerequisite: Neurobiology 200 or consent of instructor.
4 units, Spr (Knudsen, Newsome) alternate years, not given 2000-01
230. Signal Transduction Mechanisms—Molecular mechanisms of transduction of sensory and hormonal stimuli by prokaryotes and eukaryotes. Topics: bacterial chemotaxis and phototaxis; vision in invertebrates and vertebrates; olfaction; and hormonal actions mediated by G-proteins, e.g., adenylate cyclase cascade and the phosphoinositide cascade; molecular evolution of transducing proteins. The structure and interplay of receptors, enzymes, and ion channels mediating these processes. Experimental approaches include gene cloning and site-specific mutagenesis, isolation and reconstitution of functional transducing assemblies, and patch clamping and other electrophysiological methods. Emphasis is on recurring motifs of excitation and adaptation, and transduction and their evolution.

4 units (Stryer) alternate years, given 2000-01

254. Molecular and Cellular Neurobiology—(Same as Biological Sciences 154/254.) Lecture/seminar for advanced undergraduates and graduate students, focusing on cellular and molecular mechanisms in the organization and function of the nervous system. Topics: cell biology of the neuron, wiring of the neuronal network, synaptic structure and synaptic transmission, signal transduction in the nervous system, the molecular basis of behavior including learning and memory, and the molecular pathogenesis of neurological diseases. Prerequisite for undergraduates: Biological Sciences 31 and 32 or equivalent, plus at least one of 118, 119, 128, 129, or 153, or consent of the instructors.

4 units, Aut (Luo, Schulman)

299. Directed Reading—Prerequisite: consent of instructor.
1-18 units, any quarter (Staff)

300. Professional Development and Integrity in Neuroscience—Required of Neurosciences Ph.D. students every quarter. Develops professional skills in critical assessment and oral presentation of findings from current neuroscience literature in the visual presentation of quantitative data and writing research grants. The role of animals in lab research, fraud in science, the responsibility of authors and reviewers, science in a multicultural environment, and the relationship between student and mentor. Student and faculty presentations and discussions.

2 units, Aut, Win, Spr (Schulman)

399. Individual Research—Prerequisite: consent of instructor.
1-18 units, any quarter (Staff)

NEUROSCIENCES PROGRAM

Director: Eric I. Knudsen (Professor of Neurobiology)

Participating Faculty:
Anesthesia: Rona Giffard (Associate Professor), Joan E. Kendig (Professor), M. Bruce MacIver (Assistant Professor, Research), Mervyn Maze (Professor)

Biological Sciences: Bruce Baker (Professor), William F. Gilly (Professor), H. Craig Heller (Professor), Ron Kopito (Professor), Liqun Luo (Assistant Professor), Susan McConnell (Associate Professor), Robert M. Sapolsky (Professor), Stuart Thompson (Professor)

Developmental Biology: Matthew P. Scott (Professor)

Genetics: David R. Cox (Professor)

Molecular and Cellular Physiology: Richard Aldrich (Professor), Brian Kobilka (Associate Professor), Richard S. Lewis (Associate Professor), V. Daniel Madison (Associate Professor), Richard H. Scheller (Professor), Thomas Schwarz (Associate Professor), Stephen Smith (Professor), Richard Tsien (Professor)

Molecular Pharmacology: Helen Blau (Professor), Daria Mochly-Rosen (Associate Professor)

Neurobiology: Ben Barres (Associate Professor), Denis A. Baylor (Professor), Eric I. Knudsen (Professor), U. J. McMahan (Professor), William T. Newsome (Professor), Jennifer Raymond (Assistant Professor), Howard Schulman (Professor), Eric M. Shooter (Professor), Lubert Stryer (Professor)

Neurology and Neurological Sciences: John A. Huguenard (Associate Professor, Research), William C. Mobjley (Acting Professor), David A. Prince (Professor), Thomas A. Rando (Professor), Lawrence Steinman (Professor)

Neurosurgery: Gary K. Steinberg (Professor)
Pathology: Lawrence F. Eng (Professor, Research)

Psychiatry and Behavioral Sciences: William C. Dement (Professor), Judith Ford (Associate Professor, Research), Terrence A. Ketter (Associate Professor), Edith Sullivan (Associate Professor, Research)

Psychology: Russell D. Fernald (Professor, Teaching), John Gabrieli (Associate Professor), David Heeger (Associate Professor, Teaching), Brian Wandell (Professor), Jeffrey J. Wine (Professor)

GRADUATE PROGRAM

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The interdepartmental Neurosciences Program offers instruction and research opportunities leading to a Ph.D. in Neurosciences. The requirements for a Ph.D. degree follow those of the University and in addition are tailored to fit the background and interests of the student. Accepted students receive an award covering tuition, basic health plan, and a living stipend. Qualified applicants should, where possible, apply for the predoctoral fellowships in open competition, especially those from the National Science Foundation and the Howard Hughes Medical Institute. December 15 is the deadline for receipt in the Neurosciences Program office of applications with all supporting material.

Applicants should familiarize themselves with the research interests of the faculty and indicate their preferences clearly on the application form. Since students enter with differing backgrounds and the labs in which they may elect to work cover several different disciplines, the specific program for each student is developed individually with an advisory committee. All students are required to complete the basic courses in neurobiology (Neurobiology 200 or its equivalent). Students are also required to take at least five advanced neuroscience courses. At least one course must be taken from each of the following categories: Clinical Neurosciences, Developmental Neuroscience, Integrative and Behavioral Neurosciences, Membrane Excitability; and one course in either Computational Neuroscience or Neuronal Communication.

Students usually rotate through several labs during their first year, although they may choose to begin thesis research on entry. After the first rotation, students may rotate both within and outside the Neurosciences Program. Required course work should be completed by the end of the second year. Passing of a comprehensive oral preliminary examination given by the student’s advisory committee is required for admission to Ph.D. candidacy. This examination is usually taken by the end of the second year. The student is required to present a Ph.D. dissertation which is the result of independent investigation contributing to knowledge in an area of neuroscience and to defend his or her dissertation in a University oral examination, which includes a public seminar.

Medical students may participate in this program provided they meet the prerequisites and satisfy all the requirements of the graduate program as listed above. The timing of the program may be adjusted to fit their special circumstances.

COURSES

Course work and lab instruction in the Neurosciences Program conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.
The following courses fulfill program requirements. Consult the course selections of individual departments for complete descriptions.

**BIOLOGICAL SCIENCES**

**258. Neural Development**
4 units (McConnell) alternate years, given 2000-01

**MOLECULAR AND CELLULAR PHYSIOLOGY**

**215. Synaptic Transmission**
5 units, Aut (Smith, Schwarz, Madison)
alternate years, not given 2000-01

**NEUROBIOLOGY**

**200. The Nervous System**
9 units, Win (Barres, Baylor, Knudsen, McMahan, Newsome, Raymond, Schulman, Shooter, Stryer)

**218. Neural Basis of Behavior**
4 units, Spr (Knudsen, Newsome) alternate years, not given 2000-01

**230. Signal Transduction Mechanisms**
4 units (Stryer) alternate years, given 2000-01

**300. Professional Development and Integrity in Neuroscience**
2 units, Aut, Win, Spr (Schulman)

**NEUROLOGY AND NEUROLOGICAL SCIENCES**

**205. Clinical Neuroscience**
2 units, Win (Huguenard)

**PSYCHOLOGY**

**206. Behavioral Neuroscience**
1-3 units (Wandell, Wine) alternate years, given 2000-01

**276. Computational Neuroscience**
1-3 units (Heeger) alternate years, given 2000-01

**PATHOLOGY**

Emeriti: (Professors) Margaret E. Billingham, Ronald F. Dorfman, Lysia K. Forno, David Glick, David Korn; (Clinical Assistant Professor) Charles T. Uyeda

Chair: Stephen J. Galli


Associate Professors: Gerald J. Berry, P. Joanne Cornbleet, Steven K. H. Foug, Susan A. Galel, Sharon Geaghan, Teri Longacre, Kent W. Nowels, Donald P. Regula, Robert V. Rouse, Raymond A. Sobel, James L. Zehnder

Assistant Professors: Jeffrey Axelrod, Athena M. Cherry, Peter Jackson, Sabine Kohler, Sara A. Michie, Azend Sidow, J. Matthijs van de Rijn

Professor (Research): Lawrence F. Eng

Professors (Clinical): Dickran S. Horoupian, Jon C. Kosek

Acting Assistant Professors: Vivek Bhargava, Keith A. Wharton

Visiting Professor: Samuel D. Parks

Visiting Assistant Professor: Douglas L. Eng

Clinical Professors: James L. Bennington, Jerome S. Burke, Stephen S. Chen, John T. Differding, Seth L. Haber, Maie K. Herrick, Paul L. Herrmann, John E. McNeal, Mahendra Ranchod

Clinical Associate Professors: Robert W. R. Archibald, Barbara M. Egbert, Steven Levine, Charles M. Lombard

Clinical Assistant Professors: Claudia Greco, James E. Meeker, Thomas W. Rogers, Jon C. Ross, William W. Ruehl, Joshua Sickel, Sharon H. Van Meier

Staff Physicians and Clinical Instructors: David B. Bingham, Jeff Harvell, Delia Menozzi, John Higgins, Jim Malone, Erik Ranheim

Clinical Lecturer: Glen B. Haydon

Clinical Instructors: Jorge Rodriguez-Soto, Frank Scappatici

**PROGRAMS OF STUDY**

The Department of Pathology offers a sequence of basic courses in general and special pathology, including neuropathology, which is open to medical students only. Interested and qualified graduate students may petition the course director to audit the lecture portion of these courses. In addition, there are a number of advanced courses in selected aspects of pathology. The department does not offer advanced degrees in pathology, but qualified graduate students who are admitted to the Biophysics Program, the Cancer Biology Program, or other interdepartmental programs may elect to pursue their thesis requirements in the research laboratories of the Department of Pathology. The discipline of pathology has traditionally served as a bridge between the preclinical and clinical sciences and is concerned with the application of advances in the basic biological sciences, both to the diagnosis of disease in man and to the elucidation of the mechanisms of normal molecular, cellular, and organ structure and function that manifest themselves in clinical disease. Accordingly, the department's research interests encompass a broad range that extends from fundamental molecular biology to clinical-pathological correlations, with a primary emphasis on experimental oncology.

At present, investigation in the department includes basic studies in different areas utilizing molecular biological, biochemical, and genetic cell biological techniques: DNA replication in yeast and cultured eukaryotic cells, cell cycle control in animal cells and yeast, identification and pathogenetic role of chromosomal aberrations in human malignancies and mechanisms of activation of oncogenes in human and animal cells, lymphocyte and neutrophil-interactions with endothelial cells, cell type specification and signal transduction pathways leading to specific gene expression or modulation of cytoskeletal behavior; cytoskeletal architecture, cell-matrix interaction, developmental biology of hematopoietic stem cells and thymus, regulation of the immune system, and mechanisms of immune and other responses in the central nervous system. In addition, a variety of studies focus on the development of novel diagnostic and immunotherapeutic treatment modalities and techniques for solid tumors, lymphomas, HIV, and genetic diseases. Research training in all of these areas is available for qualified medical and graduate students by individual arrangement with the appropriate faculty member. A summary of the research interests of the department faculty is available on request.

**COURSES**

Course work and lab instruction in the Department of Pathology conform to the Policy on the Use of Vertebrate Animals in Teaching Activities as stated in the back of this catalog.

**211, 212. Advanced Immunology**—(Enroll in Immunology 201, 202.)

211. 3 units, Win (Chien, Staff)

212. 3 units, Spr (Davis, Lewis, Staff)

**213. Gross Autopsy Pathology Laboratory**—Examine/discuss unfixed dissected organs from current autopsies and correlate morphologic findings with the clinical history. Students view postmortem examinations and may participate (in a small group) in one postmortem examination with the assistance of residents and staff, and present the case to the class. Class scheduling is flexible. Additional unit for participation in a postmortem examination. Pre- or corequisite: 230B or 230C.

2 units, Aut, Win (D. Regula, K. Bensch, Staff)
215. Molecular Mechanisms of Disease—Provides graduate students in the basic sciences with an exposure to current research topics in human disease. Each week, one scientist from academia or industry presents a seminar on the pathogenesis of a particular disease, with an emphasis on molecular approaches, followed by a discussion. A review article and one or two research papers from the current literature are assigned prior to each meeting.

1 unit, Win (Lipsick, Staff)

230A,B,C. General and Special Pathology—Three-quarter introduction to principles in general pathology and a detailed pathology of human disease based on the disordered structure and function of individual organ systems (special pathology). Lecture and lab discussion groups. Course director: Regula.

230A. General and Special Pathology 6 units, Spr (Regula, Lombard, Staff)

230B. Special Pathology 6 units, Aut (Regula, Lombard, Staff)

230C. Special Pathology 6 units, Win (Regula, Hendrickson, Horoupian, Staff)

290. Research in Experimental Neuropathology—Introduction to research methods in experimental neuropathology for students interested in a long-term project in this area. Participation in research is under the close supervision of a staff member in neuropathology. Facilities available include electron microscopy, tissue culture, neurochemistry, and immunocytochemistry with antibody and molecular probes. Prerequisite: consent of instructor.

1-18 units, Spr (Eng, Forno)

292. DNA Repair and Mutagenesis—Enroll in Biological Sciences 205.

3 units, Spr (Hanawalt)

299. Directed Reading—Prerequisite: consent of faculty member.

1-18 units, any quarter (Staff)

399. Research—Department faculty are involved in active research programs at the Stanford Medical Center. Students interested in research at the molecular, cellular, and clinical-pathologic levels are encouraged to seek out faculty advisers. The department is equipped for modern research and maintains an active and vigorous postdoctoral research training program. Prerequisite: consent of the instructor.

1-18 units, any quarter (Staff)

RADIATION ONCOLOGY


Chair: Gary M. Glazer


Associate Professors: A. Gabrielle Bergman, Michael D. Dake, King C. L. Pi, Michael Marks, Robert E. Mindelzun, Michael E. Moseley, Sandy A. Napel, Matilde Nino-Murcia, Eric Olocco, George M. Segall, Charles P. Semba

Assistant Professors: Christopher F. Beaulieu, Robyn L. Birdwell, Francis Blankenberg, R. Kim Butts, Bruce Daniel, Debra M. Ikeda, Philippe Lang, Mahmood Razavi, Geoffrey D. Rubin, Suzanne Slonim, Daniel M. Spielman

Associate Professors (Research): Ann N. C. Leung, Sylvia Plewriis

Acting Assistant Professors: Huy M. Do, Daniel Y. Sze

The Department of Radiation Oncology does not offer degrees; however, its faculty teach a variety of courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Graduate students in the Biophysics Program and in the Cancer Biology Program may perform their thesis research in the department. Undergraduate students may also arrange individual research projects under the supervision of the faculty.
This discipline focuses on the use of radiation, ultrasound, and magnetic resonance as diagnostic, therapeutic, and research tools. The fundamental and applied research within the department reflects this broad spectrum as it relates to anatomy, pathology, physiology, and interventional procedures. Original research and development of new clinical applications in medical imaging is supported within the Radiological Sciences Laboratory.

Courses open to undergraduate and postgraduate students are listed below.

**COURSES**

1. **Selected Readings in Radiology Research**  
   *Aut, Win, Spr (Staff)*

2. **Experimental Nuclear Medicine**—Computer applications in medicine, particularly the use of radioisotopes as tracers. Recommended: some knowledge of physiology and calculus.  
   *Spr (Strauss)*

3. **Research**  
   any quarter (Staff)

**STRUCTURAL BIOLOGY**

**Chair:** Michael Levitt  
**Associate Chair:** Joseph D. Puglisi

**Professors:** Roger D. Kornberg, Michael Levitt, David B. McKay, Peter Parham

**Associate Professors:** Joseph D. Puglisi, William Weis  
**Professor (Teaching):** Patricia Cross  
**Assistant Professor:** Kenan C. Garcia  
**Visiting Associate Professor:** Boaz Shaanan

The department offers opportunities for course work and research in cell biology. Courses fall into two categories: (1) a series of one-quarter courses that treat special topics of current interest in cell biology at an advanced level; and (2) Structure of Cells and Tissues (211), a one-quarter course tailored to the needs of medical students that includes both lectures on structure-function relationships of mammalian cells and tissues and a lab on medical histology.

The emphasis of research in the department is on understanding fundamental cellular processes in terms of the structure and function of organelles and molecular assemblies. Techniques used include standard methods of biochemistry, cell culture, fluorescence microscopy, genetic engineering, and image processing and three-dimensional reconstruction from electron micrographs, microinjection of cells and nuclei, nanosecond fluorescence spectroscopy, and x-ray and electron diffraction. The department owns and operates a computing center equipped with advanced time-sharing and color graphics programs to illustrate problems. Systems include protein-nucleic acid complexes and antibody-antigen interactions. Prerequisites: knowledge of basic biochemistry and cell biology.

3 units, *Win (Levitt)*

**228. Protein and Nucleic Acid Structure, Dynamics, and Engineering**—The availability of three-dimensional atomic structures of proteins and nucleic acids allows interpretation of biological processes based on the physical and chemical properties of these molecules. Crystallographic studies include structural themes exemplified by local chain conformation, secondary structure, domains, families of folds, protein folding, and thermodynamic stability. How these structures move is considered by combining the results of experiments with theoretical molecular dynamics simulations: enzyme catalysis. Novel molecules are engineered from the experimental and predictive aspects, using interactive computer graphics programs to illustrate problems. Systems include protein-nucleic acid complexes and antibody-antigen interactions. Prerequisites: knowledge of basic biochemistry and cell biology.

3 units, *Win (Levitt)*

**229. The Eukaryote Chromosome**—The principles of chromosome structure and function. Topics: structure, dynamics, and topological forms of DNA; units and hierarchies of DNA coiling in chromosomes; centromeres, telomeres, and the basis of chromosome maintenance and sorting in mitosis; the mechanism of gene activation with regard to enhancer, promoter, and terminator sequences; the basis of sequence-specific protein-DNA interaction; organization and assembly of the cell nucleus. Prerequisites: knowledge of basic biochemistry and cell biology.

3 units, *Spr (Kornberg)*

**232. Macromolecular Structure: Diffraction Methods and Diffraction Results**—General methods and notable accomplishments of x-ray crystallography and solution scattering. Methodology topics: small-angle scattering, fiber diffraction, and x-ray crystallography at a level that makes current literature in the field understandable to the non-practitioner. Protein folding patterns, enzymology, receptor-effector systems, proteins of the immune system, and membrane proteins. Prerequisites: knowledge of basic biochemistry.

3 units, *Win (Weis, McKay)*

**450. Introduction to Biotechnology**—(Same as Biochemistry 450, Chemical Engineering 450, Civil and Environmental Engineering 450, Developmental Biology 450.) Faculty from the departments of Biochemistry, Biological Sciences, Chemical Engineering, Civil and Envi-
Environmental Engineering, Developmental Biology, Structural Biology, and invited industrial speakers review the interrelated elements of modern biotechnology. Topics: protein structure and dynamics, protein engineering, biocatalysis, gene expression, cellular metabolism and metabolic engineering, fermentation technology, and purification of biomolecules. Prerequisite: graduate student or upper-division undergraduate in the sciences or engineering.

2 units, Spr (Robertson)

241. Biological Macromolecules—The molecular principles of protein and nucleic acid structures. The forces that stabilize biopolymers is presented with the goal of understanding three-dimensional structures and their functional implications. Topics: protein folding, domain structures, enzyme active sites, DNA and RNA structure, and protein-nucleic acid complexes.

3 units, Aut (Ferrell, Herschlag, Puglisi, Weis)

242. Methods in Molecular Biophysics—Experimental methods in molecular biophysics from a theoretical and practical standpoint. Emphasis is on x-ray diffraction and nuclear magnetic resonance spectroscopy. Fluorescence spectroscopy, circular dichroism, calorimetry, and separation methods. Introduces students from diverse backgrounds to the potential utility of physical approaches in their own research to help them in evaluating literature incorporating these methods.

3 units, Win (McKay, Puglisi, Weis)

260. Supervised Study—Research or advanced tutorial for undergraduates.

1-18 units, any quarter (Staff)

299. Directed Reading

1-18 units, any quarter (Staff)

399. Individual Research

1-18 units, any quarter (Staff)

459. Frontiers in Interdisciplinary Biosciences—Literature/discussion on how to critically evaluate the cutting edge of current research, held in conjunction with a seminar series, occurring once per month for 1999-2000, and more frequently thereafter. Leading investigators in interdisciplinary research from Stanford and from throughout the world present their work in a particular area. Before the seminar, students and faculty read and critically discuss one or more papers from the primary research literature on a related topic. After the seminar, students meet informally with the speakers to discuss the research and future directions. Emphasis is on how to read papers in the primary research literature, and familiarization with the broad set of techniques and approaches used to study problems in the biosciences. This interdisciplinary course is listed in many departments in the schools of Engineering, Medicine, and Humanities and Sciences. Students should enroll in their affiliated department, if it is offered. If not, students may enroll in any department within their school where the course is listed.

1 unit, Aut, Win, Spr (Spudich, Robertson, Chu, Mobley)

SURGERY

The following Anatomy courses are open to undergraduates. For graduate and Medical School course offerings, see the Stanford University bulletin School of Medicine.

COURSES

101. An Undergraduate Course in Anatomy—A regional study of human structure, emphasizing the morphology of the trunk and extremities. Lectures in regional anatomy, dissection of the human body. The anatomy of the area through the dissection process. Enrollment limited to 32.

7 units, Win (Dolph, Glasgow)

101A. An Undergraduate Course in Anatomy—The head and neck portion of the cadaver. Lectures are followed by head and neck dissection. Enrollment limited to 32.

5 units, Spr (Dolph)
Independent Research Laboratories, Centers, and Institutes

Vice Provost and Dean of Research and Graduate Policy and Dean of the Independent Laboratories, Centers, and Institutes: Charles H. Krueger
Associate Dean of Research: Patricia Jones
Associate Dean of Graduate Policy: Thomas Wasow

Independent Research Laboratories, Centers, and Institutes perform multidisciplinary research that extends beyond the scope of any one of the University’s organized schools.

The following laboratories, centers, and institutes report to the Vice Provost and Dean of Research and Graduate Policy:

- Center for the Study of Language and Information
- Edward L. Ginzton Laboratory
- W. W. Hansen Experimental Physics Laboratory
- Institute for International Studies
- Institute for Research on Women and Gender
- Laboratory for Advanced Materials
- Stanford Humanities Center
- Stanford Institute for Economic Policy Research
- The Hoover Institution on War, Revolution and Peace and the Stanford Linear Accelerator Center (SLAC) report to the President and Provost. SLAC is independently operated under a contract with the Department of Energy.

Following is a description of each organization’s activities, including research activities and, where applicable, courses offered.

STANFORD INSTITUTE FOR ECONOMIC POLICY RESEARCH

Director: Lawrence Lau

The primary mission of the Stanford Institute for Economic Policy Research (SIEPR) is to encourage and support research on economic policy issues in areas such as economic growth, technology policies, environmental and telecommunication regulation, tax reform, international trade, and monetary policy. SIEPR pursues four interrelated goals in support of this mission: (1) stimulating graduate student and faculty research on economic policy issues of continuing importance; (2) communicating its findings broadly; (3) building a community of scholars conducting research on policy issues; and (4) linking the policy community at Stanford with decision-makers in business, government, and academia.

SIEPR is a University-wide research center, involving economists from the schools of Business, Engineering, Law, Humanities and Sciences, as well as the Hoover Institution and the Institute for International Studies. Affiliated faculty and students maintain appointments in their home departments while working on SIEPR projects. In addition, scholars visiting from other institutions may apply for affiliation with SIEPR.

Much of the research at SIEPR takes place in research centers or research programs. The Center for Research on Economic Development and Policy Reform (Anne O. Krueger, Director) fosters research on the economic problems of developing economies and economies in transition, as well as analyzing the political aspects of economic policy reform and historical episodes of reform. For more information about this program call (650) 725-8730. The Center for Research on Employment and Economic Growth (Timothy Bresnahan and Paul Romer, co-directors) is focusing on the 21st century, the relationship between long-term economic growth, the economic success of individuals and families in their jobs and careers, and the role played by higher education and how it can supply workers and technology in the work force.

Research programs within SIEPR and their directors are Energy, Natural Resources, and the Environment Program (James L. Sweeney), the Finance Program (John B. Shoven), the High Technology Impact Program (Paul A. David), the International Economy Program (Anne O. Krueger), the Program on the Japanese Economy (Masahiko Aoki), the Macroeconomics and Monetary Policy Program (John B. Taylor), the Program in Regulatory Policy (Roger Noll), the Tax and Budget Policy Program (John B. Shoven), and the Technology and Economic Growth Program (Timothy Bresnahan, Ralph Landau, and Nathan Rosenberg).

SIEPR does not offer courses for academic credit, admit students, or award degrees. SIEPR is located on the first floor of the Landau Economics Building at the corner of Serra and Galvez Streets, telephone (650) 725-1874.

EDWARD L. GINZTON LABORATORY

Director: David A. B. Miller

The Ginzton Laboratory houses the research activities of a number of faculty members from the departments of Applied Physics, Electrical Engineering, Materials Science and Engineering, Mechanical Engineering, and Physics. The multidisciplinary foundations of faculty, students, and research provide a dynamic academic environment for a broad spectrum of scientific research, including acoustic and optical techniques for semiconductor measurements, biophysics, fiber optics, high temperature superconductors, laser physics and applications, mesoscopic devices, microelectromechanical devices and systems, optoelectronic devices and systems, scanning optical microscopy, solid state physics, squeezed light, tunneling and force microscopy, and ultrafast and nonlinear optics.

W. W. HANSEN EXPERIMENTAL PHYSICS LABORATORY (HEPL)

Director: Robert L. Byer

HEPL is an independent laboratory celebrating 50 years of fundamental science and engineering research. HEPL faculty and students are engaged in research in accelerator physics, astrophysics, dark matter in the universe, free electron lasers, fundamental tests of relativity in space, gamma ray observations, gravitational wave detection, quantum condensed matter, and space based solar physics studies. Many of the programs involve satellite-based studies in fundamental physics and engineering.

STANFORD HUMANITIES CENTER

Director: Keith M. Baker
Associate Director: Susan E. Dunn

The Stanford Humanities Center promotes humanistic research and education at Stanford and nationwide. In particular, it stresses work of an interdisciplinary nature, accomplished through the following programs: one-year residential fellowships for advanced research by Stanford faculty, faculty members from other institutions, and Stanford graduate students; public presentations through lectures, colloquia, conferences, and publications of new research, interdisciplinary explorations, and fundamental issues in the humanities; research workshops that
bring faculty and graduate students together regularly to advance ongoing research on topics of interdisciplinary interest.

Fellows are selected on the basis of an open competition. They pursue their own research and participate in a weekly seminar at the center throughout the year. Faculty fellows also contribute to the intellectual life of the Stanford community through activities such as giving departmental courses, participating in ongoing research workshops, or organizing conferences. The courses given by fellows in 1999-2000 are listed below.

**COURSES**

**ART AND ART HISTORY**

   4 units, Aut (Burns)

267. Undergraduate Seminar: Buildings and Society in Europe, 1500-1800
   4 units, Win (Scott)

**ENGLISH**

   4-5 units, Spr (Kaufman)

**HISTORY**

65. Introduction to Comparative Studies in Race and Ethnicity
   5 units, Spr (Camarillo, Fredrickson)

161. Photographers and Photography in the American West
   5 units, Spr (Street)

200H. Junior Honors Colloquium
   3 units, Spr (Gregory)

214A/314A. Undergraduate/Graduate Colloquium: Universities in Medieval Europe
   5 units, Spr (Tachau)

263B/363B. Undergraduate/Graduate Colloquium: The Making of the Atlantic World, 1600-1960
   5 units, Win (Saville)

**INTRODUCTION TO THE HUMANITIES**

14. The Good Life
   5 units, Aut (Elam, Landy, Nightingale)

16. Freedom and Eros in Philosophy and Art
   5 units, Aut (Anderson, Berdini, Bobonich)

23A. Reason, Passion, and Reality
   5 units, Win (Bobonich, Moravcsik)

**MUSIC**

210. Dance and the American Musical Avant-Garde
   4 units, Spr (Levitz)

**UNDERGRADUATE PROGRAM**

**INTERSCHOOL HONORS PROGRAM IN ENVIRONMENTAL SCIENCE, TECHNOLOGY, AND POLICY**

IIS coordinates a University-wide interschool honors program in environmental science, technology, and policy. Undergraduates planning to participate in the honors program are required to pursue studies in environmental sciences, technology, and policy, with a concentration in a single discipline. After completion of the prerequisite units, students join small group honors seminars to work with specific faculty members in the environmental field on an honors thesis that incorporates both scientific principles and the policy aspects of selected environmental issues.

Courses in environmental studies appear under the course listings of the schools of Earth Sciences, Engineering, and Humanities and Sciences. Information about and applications to this program may be obtained from the Center for Environmental Science and Policy, E401 Encina Hall East; telephone (650) 723-5697.

**COURSES**

195. Interschool Honors Program in Science, Technology, and Policy—Students from the schools of Humanities and Sciences, Engineering, and Earth Sciences analyze important problems in a year-long small group seminar. Combines research methods, oral presentations, preparation of an honors thesis by each student, and where relevant, field study.
   9-15 units, Aut, Win, Spr (Naylor, Kennedy, Falcon, Matson)

The Institute for International Studies promotes individual and collaborative research on contemporary, policy-relevant issues that are international and interschool in character. Working in partnership with the seven schools at Stanford (Business, Earth Sciences, Education, Engineering, Humanities and Sciences, Law, and Medicine) and with the Hoover Institution, IIS fosters excellence in research and teaching across disciplinary, school, and national boundaries. The priority areas of research are in the fields of international and regional peace and security; economic development and political change in East and Southeast Asia; the global environment challenge; and the delivery of health care in a comparative perspective.

Opportunities for undergraduate research include the Goldman Interschool Honors Program in Environmental Science, Technology, and Policy. The institute also manages the prestigious Asia/Pacific Scholars Program for graduate level students, in addition to 11 undergraduate and graduate fellowship programs.

The constituent centers and programs within IIS include the Asia/Pacific Research Center, the Bechtel Initiative for Global Growth and Change, the Center for Environmental Science and Policy, the Center for Health Policy, the Center for International Security and Cooperation, the European Forum, the Stanford Computer Industry Project, and the Stanford Japan Center—Research.

In the areas of public service and outreach, IIS administers the Stanford Program on International and Cross-Cultural Education (SPICE), which develops internationally-oriented curricula for use by public school teachers.

The IIS central office is located at 100 Encina Hall, telephone (650) 723-4581. For more information about particular IIS programs, contact the programs directly (area code 650):

Asia/Pacific Research Center, 723-9741
Bechtel Initiative on Global Growth and Change, 723-1737
Center for Environmental Science and Policy, 725-2606
Center for Health Policy, 723-1020
Center for International Security and Cooperation, 723-9625
European Forum, 723-4716
Inter-University Center for Japanese Language Studies, 725-1490
Stanford Program on International and Cross-Cultural Education (SPICE), 723-1116
Stanford Computer Industry Project, 725-7096
Stanford Japan Center—Research, 011 75-752-7073, ext. 40
CENTER FOR THE STUDY OF LANGUAGE AND INFORMATION (CSLI)

Acting Director: David Israel

CSLI is devoted to research in the emerging science of information, computing, and cognition. It is an interdisciplinary endeavor, bringing researchers together from academe and industry in the fields of artificial intelligence, computer science, linguistics, logic, philosophy, and psychology. CSLI’s researchers are united by their common interest in the communication and information processing that ties together people and machines. Their blend of academic disciplines, psychology, communication, linguistics, philosophy, education, along with computer science, gives them a unique perspective on the human side of human interface problems. Like the interface problem, projects at CSLI have both an applied side and a theoretical side. The more applied projects are located in the Interface Lab, and the more theoretical projects are located in the Cognitive Science Center.

On the applied side, researchers are pursuing a wide variety of topics, including machine learning, planning and reasoning, machine-aided translation, language acquisition, text understanding, computer languages, software design strategies, human interface design, access to computers and the internet for people with disabilities, and distance education. On the theoretical side, roughly half the projects deal with languages (natural and computer), and the vehicles by which information is communicated between agents. The others deal with a variety of questions involving the acquisition and manipulation of information: how agents acquire and use information to guide action; what information processing architectures are best suited to various tasks; how representational format affects information processing and human comprehension, and so on.

Course work related to the research at CSLI can be found in the “Program in Symbolic Systems” section of this bulletin.

CSLI is located at the corner of Campus Drive West and Panama Street, in Ventura Hall and Cordura Hall; telephone (650) 723-3084.

LABORATORY FOR ADVANCED MATERIALS

Director: Alexander L. Fetter

The Laboratory for Advanced Materials (LAM) supports the research activities of a number of faculty members from the departments of Applied Physics, Chemical Engineering, Chemistry, Electrical Engineering, Materials Science and Engineering, Mechanical Engineering, and Physics. The multidisciplinary foundations of faculty, students, and research provide a dynamic academic environment for a broad spectrum of scientific research including high temperature superconducting materials and devices, mesoscopic devices, magnetic recording and storage media materials, electronic materials, opto-electronic materials, nanoprobes, materials and devices, highly correlated electronic systems, computational materials science, condensed matter theory and physics, polymeric and biological materials, crystal growth, and thin film synthesis of complex oxides.

The foundation of the research performed at LAM is the Center for Materials Research (CMR). CMR is one of many National Science Foundation Materials Research Science and Engineering Centers (MRSECs) located at various U.S. universities. It provides both analytical and synthesis facilities for the Stanford materials research community and supports multidisciplinary materials research projects involving faculty from many academic departments. It also has programs for undergraduate research, women, and minorities and for outreach to local high schools.

CMR supports a wide range of analytical facilities for advanced materials characterization. This includes electron microprobe analysis (EMPA), micro Raman spectroscopy, Rutherford backscattering (RBS), scanning electron microscopy (SEM), scanning probe microscopy (SPM), transmission electron microscopy (TEM), x-ray diffraction analysis, and x-ray photoelectron spectroscopy (XPS). To serve the synthesis and materials fabrication needs of the community, CMR also supports the vapor phase synthesis facility and bulk crystal growth capabilities. By special arrangement through CMR, high resolution transmission electron microscopy (TEM), nanoindentation, nuclear magnetic resonance spectroscopy (NMR), variable angle spectro-ellipsometry, as well as x-ray absorption spectroscopy techniques (that is, EXAFS, NEXAFS, SEXAFS) and core level photoemission and photoelectron diffraction techniques are available to the materials research community through the Stanford Synchrotron Radiation Laboratory (SSRL).

In addition to the multi-investigator, interdisciplinary research group (IRG) programs, CMR also sponsors seed research projects for new and risky ideas. Its professional staff also conduct research and development of new tools and techniques in areas related to advanced materials synthesis and characterization.

The Laboratory for Advanced Materials is housed in the McCullough Building and the Moore Materials Research Building.

INSTITUTE FOR RESEARCH ON WOMEN AND GENDER

Director: Laura L. Carstensen

During the last decade, research on women and gender has had a profound influence on the social and medical sciences, and the humanities. Since its founding, the Institute for Research on Women and Gender's primary mission is to support scholarship on subjects related to women and gender and to organize educational programs that communicate these findings to a broader public.

Stanford faculty, staff, graduate students, and members of the community work together to stimulate a more informed analysis of issues concerning gender.

Institute projects span a wide range of disciplines but rest on certain shared premises: that gender is a vital category of analysis for contemporary scholarship and policymaking and that the experiences of women as individuals and as a group can best be understood within their historical, social, and cultural contexts. The institute sponsors interdisciplinary research seminars and conferences that examine gender issues in areas such as art, education, employment, family structures, health care, history, law, literature, and psychology. Many scholarly publications have resulted from these activities.

HOOVER INSTITUTION ON WAR, REVOLUTION AND PEACE

Director: John Raisian

The Hoover Institution, founded in 1919 by Stanford alumnus Herbert Hoover, is a public policy research center where a distinguished group of scholars debate, study, refine and disseminate ideas designed to strengthen society within the context of three core values: individual freedom, private enterprise, and representative government.

Three thematic areas have been established that focus on the interaction of politics and government. Research centers on three broad programs:

American Institutions and Economic Performance, which explores ways to enable the U.S. economy and education, legal, and legislative systems to perform better, thereby providing an ever-higher quality of
life, increased economic opportunity, and greater economic freedom for all citizens.

Democracy and Free Markets, which seeks to understand and foster both the development of democratic processes and institutions and the shift from state control of economies to greater reliance on free markets.

International Rivalries and Global Cooperation, which examines not only questions of war and peace but all types of rivalries and cooperation (economic, political, religious, and cultural) and focuses on interrelationships between countries.

Studies within each of these three areas typically address issues relating to balancing government and private initiatives, promoting individual freedom, and strengthening free-market economies and democratic institutions.

**STANFORD LINEAR ACCELERATOR CENTER (SLAC)**

*Director: Jonathan Dorfan*

The Stanford Linear Accelerator Center is devoted to experimental and theoretical research in elementary particle physics, to the development of theory and new techniques in high energy accelerators, and to research and development in particle detectors. The Stanford Synchrotron Radiation Laboratory (SSRL), a division of SLAC, operates the SPEAR storage ring as a source of intense vacuum ultraviolet and x-ray beams for research in physics, chemistry, biology, and material science. The center is on 425 acres of Stanford property west of the main campus and is operated under a contract with the Department of Energy.

SLAC is operated by Stanford as a national facility so that qualified scientists from universities and research centers throughout the country and world, as well as those at Stanford, may participate in the high energy physics research program of the center. Stanford graduate students may, with the approval of their departments, carry out research for the Ph.D. degree with members of the SLAC faculty. Graduate students from other universities also participate in the research programs of visiting groups.

Research assistantships are available for qualified students by arrangement with individual faculty members. There are also opportunities for summer employment in the research groups at the center. Interested students should contact Professor Schindler, the Graduate Student Adviser.

**STANFORD SYNCHROTRON RADIATION LABORATORY (SSRL)**

*Director: Keith O. Hodgson*

SSRL is a national research facility supported by the Department of Energy for the utilization of synchrotron radiation for research in the natural sciences, medicine, and engineering. SSRL is a division of the Stanford Linear Accelerator Center.

SSRL has research programs in accelerator physics and development of advanced sources of synchrotron radiation, including short-wavelength free electron lasers. The lab is interdisciplinary with students from the following Stanford departments actively pursuing degrees: Applied Physics, Chemical Engineering, Chemistry, Electrical Engineering, Earth Sciences, Materials Science and Engineering, Physics, and Structural Biology.

Students interested in working at the facility should contact a member of the SSRL faculty, one of the Assistant Directors, or other members of the Stanford faculty who use SSRL in their research programs.
Libraries and Computing Resources

STANFORD UNIVERSITY LIBRARIES AND ACADEMIC INFORMATION RESOURCES

University Librarian and Director of Academic Information Resources: Michael A. Keller

Stanford University Libraries and Academic Information Resources develops and implements services within the University libraries that support research and instruction including academic computing functions. These services include acquiring and making available library collections in all formats, establishing policies and standards to guide the use of academic information resources, developing training and support programs for academic uses of computers, and maintaining the on-line library catalog.

In each library unit, reference staff provide general advice on locating and using both print and on-line information sources. Subject specialists and reference librarians offer assistance in specific disciplines either individually or in groups, by lecture to classes on request, tours, demonstrations, or special workshops.

The Academic Computing group supports and enhances instruction and research by providing library and academic computing services and resources. These services include information, advice, and education about academic technology or the use of technology in learning and teaching; operation of the computer clusters and classrooms in Meyer Library; faculty-specific computer resources; and residential computing services.

Information about the scope of collections, physical facilities, and services (such as general borrowing regulations, reserve books, book stack access, interlibrary loans, and photocopies) is available on the World Wide Web (http://www-sul.stanford.edu) and in printed publications and online guides (http://acomp.stanford.edu/acpubs/briefguide/). Anyone wishing further explanation of library services should consult the Privileges Desk or the reference staff in Cecil H. Green Library or academic information staff in the University Libraries branches.

CENTRAL CAMPUS LIBRARIES

The central campus libraries, the Cecil H. Green Library (East and Bing Wings) and the J. Henry Meyer Memorial Library, maintain research collections in the humanities, social sciences, area studies, and interdisciplinary areas. These collections number more than 2,5 million volumes. During regular academic sessions, they are open Monday through Thursday from 8 a.m. to 12 midnight, Friday from 8 a.m. to 6 p.m., Saturday from 9 a.m. to 5 p.m., and Sunday from 1 p.m. to 12 midnight. Library hours information, including hours for holidays, intersessions, and other libraries on campus, is available on the Web at: http://www-sul.stanford.edu/geninfo/libhours.html.

These libraries can seat more than 2,000 readers at one time in a variety of seating arrangements—carrels, lounge areas, tables, computer workstations, individual studies, and group study rooms. Readers will also be able to connect their laptops to the campus network in many library locations beginning in Autumn Quarter 1999.

Major service units housed throughout the Green and Meyer buildings include: the Information Center; the Humanities and Area Studies Reading Room; the Social Science and Government Documents Reading Room; Foreign Language and Area Collections; Access Services; Current Periodicals, Newspapers and Microtexts; and the Interlibrary Services Office. These libraries also house reserves for most graduate and undergraduate courses in the humanities and social sciences.

Green Library also houses the Department of Special Collections and the University Archives. Meyer Library houses the University's Digital Language Lab, computer clusters, technology-enhanced classrooms, and an Academic Technology Lab.

Throughout Green and Meyer, there are computers providing access to the on-line library catalog, photocopy machines, and courtesy and pay telephones.

BRANCH LIBRARIES

Humanities Branch Libraries include the Art and Architecture Library, the Cubberley Education Library, and the Music Library (including the Archive of Recorded Sound).


More information about these libraries is on the Web at: http://www-sul.stanford.edu/geninfo/libraries.html.

COURSES

The following are intended to serve those students for whom a more extended study of bibliographic organization is useful.

ART AND ART HISTORY

236. Art History Bibliography and Library Methods
3 units, Aut (Ross)

FRENCH AND ITALIAN

201E. New Methods and Sources: French and Italian Studies
1-4 units, Aut (Parrine)

GERMAN STUDIES

175A. Modernization, Technology, and Culture in Germany, 1900 to 1945—(Same as 175/275.)
4 units, Spr (Lowood)

MUSIC

200. Graduate Proseminar
4 units, Aut (K. Berger, Nagy)

SLAVIC LANGUAGES AND LITERATURES

200A. Introduction to Library and Archival Research in Slavic Studies
1-3 units, Aut (Fleishman)

LIBRARIES-COORDINATES

J. Hugh Jackson Library, Graduate School of Business
Director: Tim Wei
Lane Medical Library
Director: Peter Stangl
Crown Law Library
Director: Lance E. Dickson
Stanford Linear Accelerator Center Library
Head Librarian: Patricia Kreitz
HOOVER INSTITUTION ON WAR, REVOLUTION AND PEACE

Director: John Raisian
Deputy Director: Charles G. Palm

Since its founding by Herbert Hoover in 1919 as a special collection dealing with the causes and consequences of World War I, the Hoover Institution on War, Revolution and Peace has become an international center for documentation, research, and publication on political, economic, social, and educational change in the 20th century.

The library includes one of the largest private archives in the world and has outstanding area collections on Africa, East Asia, Eastern Europe, Russia and the former Soviet Union, Latin America, the Middle East, North America, and Western Europe.

Holdings include government documents, files of newspapers and serials, manuscripts, memoirs, diaries, and personal papers of men and women who have played significant roles in the events of this century, the publications of societies and of resistance and underground movements, and the publications and records of national and international bodies, both official and unofficial, as well as books and pamphlets, many of them rare and irreplaceable. The materials are open to all Stanford students, faculty, and staff, and to scholars from outside the University.

INFORMATION TECHNOLOGY SYSTEMS AND SERVICES (ITSS)

ITSS provides University leadership for the planning, development, acquisition, and operation of University-wide networking and telecommunications services, information systems, data administration, and information technology infrastructure support services for instruction, research, and administrative activities. Core services provided to the Stanford Community include:

Applications support information architecture, planning, and standards
Computer and campus network operations; and assessment and application of new technologies
Data administration, data warehouse services
Data, voice, and video communications
New information systems acquisition, assembly, and integration
Technology training, consulting, and help desks

More information about the complete range of ITSS services, supported systems, and application initiatives can be found on the web at: http://www-leland.stanford.edu/dept/itss.

COMPUTING SERVICES

Production computing services are provided by ITSS from both the Leland and Forsythe Operations Centers. These services include access to distributed software (for example, Netscape and Eudora), public domain software, major programming languages, commercial statistical packages, Stanford developed applications, and the Stanford University Network (SUNet). Stanford faculty, staff, and students who have a valid Stanford ID may apply for a SUNet ID (Stanford University Network Identifier) on the web at: http://www-leland.stanford.edu/group/itss/services/sunetid. SUNet IDs provide access to Stanford’s network and the Internet, an email account, disk space for Web pages and email, and site-licensed software. Additionally, ITSS computer based services include screen-text editing (WYLBUR, emacs, pico), electronic mail (EMS, elm, pine) and formatting (SCRIPT) for preparing reports, data, and theses; SPIRES, the Stanford-developed data-base management system; Oracle and Sybase relational database environments; Prism, the on-line collection of Stanford administrative files and services; and Folio, the on-line collection of Stanford’s academic and institutional data resources, including a large number of index and citation databases (ERIC, GeoREF, Lexis/Nexis, Merck, Federal Register); Socrates, Stanford’s on-line library catalog; Usenet newsgroups, World Wide Web services, and an increasing number of client/server based applications including the Oracle financial applications. Detailed information regarding these services is available on the web at: http://www-leland.stanford.edu/dept/itss/services. Specific questions regarding ITSS computing services can be sent to consultforsythe.stanford.edu, or call (650) 725-8181.

VOICE, VIDEO, DATA, AND NETWORKING

ITSS provides telephone, paging, and video conferencing services for Stanford faculty, staff, and students and also runs the paging service for the hospital. The internal network maintained by ITSS allows for high speed access to Stanford networking services and external networks including the Internet. Dial-in service through the modem pool allows remote access to University host computers. ISDN support has recently been added to the range of ITSS services, and an agreement with Internet Service Provider NetCom allows for discounted subscription rates for high-speed dial-in access for Stanford faculty, staff, and students. Additionally, ITSS manages Stanford’s cable television channel, Channel 51, and the STV cable subscription service for students residing on campus.

COURSES

UNIX, Leland, E-mail—Introductory information about UNIX on the Leland Systems, the EM-ACS text editor, electronic mail, and the Tresidder and Meyer Computer Clusters. Full class descriptions are available on the web at: http://consult.stanford.edu/introclasses.html.

The Stanford Computer Environment, the Internet, Portfolio, Windows, and Macintosh Applications—Word processing and text formatting, database management, statistical and programing applications, desktop publishing, spreadsheets, html, and communications. Class descriptions, schedules, and registration information are available on the web at: http://www-leland.stanford.edu/group/itss-customer/ip/.

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The Continuing Studies Program

Dean and Associate Provost: Charles Junkerman

The Continuing Studies Program provides adult members of the surrounding communities with the opportunity to take classes on a part-time basis for intellectual enrichment, both personal and professional. Courses are offered in all four academic quarters, with over 275 courses planned for the 1999-2000 academic year.

The faculty are drawn from the ranks of the University’s distinguished professoriate. The program presents a wide variety of courses, with a central concentration in such humanities disciplines as art, literature, history, and music.

Tuition discounts are available to University employees and their spouses/domestic partners, Stanford students and their spouses/domestic partners, Stanford Alumni Association members, teachers (K-12), and those over age 65.

For a course catalogue, contact the: Continuing Studies Program, Building 590, Room 103, Stanford, CA 94305, phone (650) 725-2650, fax (650) 725-4248, email: continuingstudies@stanford.edu, or visit the website at: http://continuingstudies.stanford.edu.

The Continuing Studies Program also administers The Stanford Channel, an educational cable television station; The Master of Liberal Arts Program; Summer Session; and portions of alumni education.

MASTER OF LIBERAL ARTS PROGRAM

Assistant Dean and Lecturer in English: Linda Paulson

Participating Faculty: Marc Bertrand (Professor, French), Eavan Boland (Professor, English), John Bravman (Professor, Material Sciences and Engineering), Wanda Corn (Professor, Art and Art History), Larry Friedlander (Professor, English), Hester Gelber (Professor, Religious Studies), Tom Hare (Professor, Asian Languages), Charles Junkerman (Dean, Continuing Studies Program), Marsh McCall (Professor, Classics), Mark Mancall (Professor, History), David Palumbo-Liu (Professor, Comparative Literature), Linda Paulson (English), Dennis Phillips (Professor, Education, and Philosophy), John Rick (Professor, Anthropological Sciences), Paul Robinson (Professor, History), Steven Zipperstein (Professor, History), Eriné Young (Co-director, Center for Biomedical Ethics)

Program Description—The Master of Liberal Arts (MLA) Program aims to provide a flexible, interdisciplinary program for returning adult students who seek a broad education in the liberal arts. The underlying premise of the MLA program is that knowledge gained through an interdisciplinary course of study leads to intellectual independence and satisfaction not always found in discipline-based programs of study. The goals of the MLA program are to develop advanced critical thinking, to foster intellectual range and flexibility, and to cultivate an individual’s ability to find the connections among different areas of human thought: art, history, literature, music, philosophy, political science, science, and theology.

The program is designed with part-time students in mind: seminars meet in the evening, and students complete the degree in 4-5 years. All master’s seminars are taught by members of the Stanford faculty who are experienced in working with students at the graduate level. Class size is limited to 20 students.

Degree Requirements—Candidates for the MLA degree must complete a minimum of 36 units of course work. These units must include two 3-unit core seminars for entering students, at least seven 3-unit MLA seminars, and a 2-unit master’s thesis. The remainder of the 36-unit requirement may be fulfilled by additional MLA seminars or by relevant Continuing Studies Program course offerings. Students must also fulfill distribution requirements by taking at least 2 units of credit in each of the following areas: humanities; social science or social policy; and science, engineering, or medicine.

MLA Seminars—To maintain minimum progress toward the degree, students should complete at least two of the required seven seminars per year. Each year, at least nine seminars are offered in the MLA program. Each MLA course requires a substantial seminar paper. Students are encouraged to use these papers as a way to investigate new fields of interest, as well as a way to develop different perspectives on issues in which they have an ongoing interest.

Core Seminars—The first core seminar for entering students, whose thematic focus varies from year to year, prepares students to do interdisciplinary graduate work at Stanford. Students concentrate on writing a critical argumentative graduate paper, conducting library research, presenting the results of their research, and productively participating in a collaborative seminar. This course is required of entering students in the Autumn Quarter of their first year; occasionally, it is offered in the Summer Quarter.

The second core seminar explores the history of literary criticism from classical times to the present, while at the same time focusing on such fundamental issues as the nature and formation of the canon, the validity of critical interpretation, and the relationship between literature, philosophy, and history. This course is required of entering students in the Spring Quarter of their first year.

Master’s Thesis—The MLA program culminates in the master’s thesis. Students approaching the end of the program write a thesis, approximately 50-75 pages in length, that evolves out of work they have pursued during their MLA studies. The thesis is undertaken with the prior approval of the MLA program, and under the supervision of a Stanford faculty member. During the process of writing the thesis, students are members of a work-in-progress group, which meets regularly to provide peer critiques, motivation, and advice. Each student presents the penultimate draft of the thesis to a colloquium of MLA faculty and students, in preparation for revising and submitting the final draft to the adviser and to the MLA Program. Additional information can be obtained from the Continuing Studies Program, Building 590, Room 103, Stanford, CA 94305, phone (650) 725-2650, fax (650) 725-4248.

COURSES

102. The Plague: An Introduction to Interdisciplinary Graduate Study—Required course for incoming MLA students.
3 units, Aut (Paulson)

68. Biography and Biographers in Fiction, Memoir, and Elsewhere
3 units, Aut (Zipperstein)

69. Ethical Questions and Controversies in Select Medical Specialties
3 units, Aut (Young)

70. Complex Societies: The Archaeological Origins of Human Inequality
3 units, Win (Rick)

71. Traditional Chinese Poetry and English Romantic Poetry: Reading Landscapes
3 units, Win (Palumbo-Liu)

72. 1855-1857: A Reading of Charles Dickens’ Little Dorrit
3 units, Win (Paulson)

73. Medieval Japan
3 units, Spr (Hare)
74. Evolution and Philosophical thought in the Late 19th and 20th Centuries
3 units, Spr (Phillips)

105. From Plato to Post-Modernism: A History of Literary Criticism—Required course for first-year MLA students.
3 units, Spr (Evans)

75. Chateau Culture of Renaissance France
3 units, Sum (Bertrand)

76. Comparative Political Issues
3 units, Sum (Dorfman)

SUMMER SESSION

Assistant Dean and Director: Roberta Bassett
Program Coordinator: Carolyn Faszholz

Students attending Stanford Summer Session enroll in either the Regular Degree Program or the Summer Visitor Program.

The Regular Degree Program is for students who are candidates for a Stanford degree and who are continuing their academic work in the Summer Quarter. Degree-seeking Stanford students should indicate on Axess (during Summer Quarter) their intention to register for the Summer Quarter. Separate application is not required.

The Summer Visitor Program is for students who are not presently candidates for a Stanford degree. It is open to persons 18 years or older, and high school students who have completed their junior year. High school students may only attend if admitted to Stanford’s Summer Session through the Summer College for High School Students.

Students in the Summer Visitor Program enjoy all the privileges of students in the Regular Degree Program except that work completed cannot apply toward a Stanford degree or credential until the student has been admitted to regular standing. Admission as a summer visitor does not imply later admission to matriculated status. However, should the visitor matriculate at a later date through normal admission procedures, the summer work may, in most cases, be applied toward the requirements for a Stanford degree or credential.

Students who are interested in the Summer Visitor Program may call (650) 723-3109, email: summersession@stanford.edu, or fax their request for a copy of the Stanford University catalogues, Summer Session or Summer College for High School Students, to (650) 725-6080, or write to the Summer Session Office, Building 590, Stanford University, Stanford, CA 94305-3005. These catalogues include all the pertinent information (including fees, housing, activities, course listings) and an application form. All information listed in both catalogues is posted on the World Wide Web and is updated each February. The Summer Session web address is http://summersession.stanford.edu.
Student Services and Programs

STUDENT AFFAIRS

Student Affairs supports the academic mission of the University by providing a climate conducive to living and learning in a diverse community. The organization encompasses a broad range of programs and services for undergraduate and graduate students in the areas of health services, student life, residential education, advising and tutoring, career services, housing and food services, financial services, and registration. It serves the wider community through the Haas Public Service Center and is responsible for the information systems and institutional reporting on students, courses, and classrooms.

The Vice Provost for Student Affairs provides policy direction, administrative support for budget, personnel, facilities, and development, and has oversight of the efficiency and effectiveness of each of the organization's units. The Vice Provost interacts with the President, the Provost, the University Cabinet, schools, department representatives, and students, and is an ex officio member of the Senate of the Academic Council.

DEAN OF STUDENTS

The Office of the Dean of Students seeks to ensure that the University is sensitive and responsive to the needs of students. The office is responsible for several administrative offices and community centers including the Asian American Activities Center; Bechtel International Center; Black Community Services Center; Disability Resource Center; El Centro Chicano; Judicial Affairs; Lesbian, Gay, and Bisexual Community Center; Native American Cultural Center/American Indian Program Office; New Student Orientation; Office of Multicultural Education; Tresidder Memorial Union; the Office of Student Activities, including Greek Affairs; and the Women's Center. The office also provides consultation and coordination with approximately 450 student organizations, student media, activities, publications, and the Associated Students of Stanford University. The office is located in Tresidder Memorial Union, telephone (650) 723-2733. Students are welcome to visit the Dean of Students to discuss ideas, personal issues, or general concerns about student life.

DISABILITY RESOURCE CENTER (DRC)

The Disability Resource Center is the central administrative office that coordinates a variety of services and resources for undergraduate and graduate students with documented disabilities. The students who use the DRC's services have a variety of disabilities, including mobility impairments, learning disabilities, chronic illness, psychological disabilities, and sensory disabilities. The mission of the DRC is to provide disabled students with access to all facets of university life: education, housing, recreation, and extracurricular activities. To initiate services, a student's disability-related needs. Students who are eligible for services are asked to submit professional documentation of their disabilities to the DRC. Services may include, but are not limited to, books on tape, braille, a distraction-free room for taking examinations, extended time on examinations, notetaking, oral or sign language interpretation, and stenocaptioning. The DRC also has available adaptive computer equipment in a work station in Meyer Library. During the academic year, the DRC runs a golf cart service called DisGo Cart for use by students with temporary and permanent mobility impairments. The DRC is located at 123 Meyer Library; office hours are 9 a.m. to 12 noon and 1 to 5 p.m., Monday through Friday. For more information call the DRC at (650) 723-1066 (voice) or 723-1067 (TDD).

INTERNATIONAL CENTER

The Bechtel International Center (I-Center) is a meeting place for students and senior research scholars at Stanford from throughout the world and for internationally oriented U.S. students, faculty, and visitors on the campus. Through a variety of social, cultural, and educational programs, I-Center facilities are utilized to acquaint students and scholars with the life of the University and the community, and to bring them together in activities of mutual interest.

The I-Center emphasizes the international dimensions of the University through its counseling services, through the cultural contributions to campus life by the various nationalities represented, and by bringing to the attention of U.S. students the many opportunities for work, volunteerism, study, and travel abroad.

Responsibilities of the I-Center advisers, working closely with the University's academic departments, include advising foreign students on matters such as immigration, housing, practical training, transactions with foreign governments, study programs, and financial-aid problems; counseling in personal matters relating to academic performance, psychological and cultural adjustment, and proficiency in English; coordinating the international reception and orientation program; encouraging utilization of foreign students as resource people in a variety of academic programs; and evaluating the Stanford experience after the students return home.

TRESIDDER MEMORIAL UNION

Tresidder Memorial Union (TMU) is a center of community activity on the Stanford campus. It houses a variety of food services; meeting rooms for special occasions; a campus information center; branch offices and ATMs for the Stanford Federal Credit Union, and Wells Fargo; ATMs for Bank of America; a fitness center; and a hairstyling shop. Tresidder Express carries groceries, magazines, and sundries. A full range of food services is provided at TMU.

TMU is also the home of the Associated Students of Stanford University (ASSU), and the Office of the Vice-Provost for Student Affairs and the Office of Student Activities/Dean of Students office.

To learn more about activities in Tresidder Union, as well as events on and off campus and employment opportunities, stop by the Information Center on the first floor, or telephone (650) 723-3384.

VOLUNTARY STUDENT ORGANIZATIONS

At its March 1963 meeting, the Board of Trustees adopted the following policy:

"Students are encouraged to study, discuss, debate, and become knowledgeable about contemporary affairs. Expressing opinions or taking positions with respect to these matters is up to the individual students or to volunteer groups of students so constituted that they are authorized to speak for their members. This is not a function of student government at Stanford."

"All students are required to become members of the Associated Students of Stanford University, which represents them with respect to student affairs on the Stanford campus. The student government, under this policy, is not authorized to speak for students on other matters."

"Under such regulations as may be established from time to time by the President of the University, students may form voluntary organizations constituted to speak for their members with respect to matters outside the scope of student government, provided such organizations clearly identify themselves and, in any public statements, make it clear that they do not represent or speak for the University or the Associated Students."

"Any questions concerning the interpretation and application of this policy shall be resolved by the President of the University."

Voluntary student organizations are those organizations: (1) in which membership is not mandatory, (2) in which membership is both open and limited to members of the Stanford community, that is, Stanford students, faculty members, and staff, and their immediate families, and (3) whose purposes and procedures are not inconsistent with the goals and standards
of the University. In order to use University facilities and/or the Stanford name, all voluntary student organizations must register with the University through the Office of Student Activities/Dean of Students Office on the second floor of Tresidder Memorial Union.

As conditions of registration, each voluntary student organization must file the following:

1. A statement of purpose and organizational constitution.
2. A statement about membership eligibility.
3. A statement that, should Stanford facilities be used for the generation or collection of funds, all funds of the organization shall be deposited with the Students’ Organizations Fund (SOF) in the ASSU Office and shall be handled by the Treasurer of the organization in the manner prescribed by the rules and regulations of the fund and of the ASSU. (Sectarian religious organizations in the Stanford enclaves may be exempt from the requirement of membership in the SOF, with the approval of the ASSU Student Financial Manager and Office of Student Activities.)
4. Identification of the authorized representative of the group, who must be a currently registered student, and at least five active members in the organization who are currently registered students.

Each voluntary student organization must renew its registration with the University annually, early in Autumn Quarter, by submitting the name of the new authorized representative or by reconfirming the current representative, and by updating other information.

If a voluntary student organization that is registered with the University seeks to use University facilities for meetings open to more than its own members and to specifically invited guests, such meetings shall be subject to the regulations of the Committee on Public Events. Contact Non-academic Facilities Scheduling, the Registrar’s Office, Old Union, for further information about nonacademic room scheduling.

A voluntary student religious organization may hold open meetings in University facilities only with the approval of the Office of the Dean of the Chapel.

A registered voluntary student organization may advocate publicly a position on a public issue, provided the organization clearly identifies itself, and provided such an organization in any public statement makes clear it does not represent or speak for the University or for the Associated Students.

No student group may use University space or facilities or receive University support for purposes of supporting candidates for public office. In accordance with procedures governing public events, groups supporting candidates may have use of public places such as White Plaza for tables, speeches, and similar activities; may have intermittent use of on-campus meeting rooms; and may request to reserve auditoriums and similar space for public events including speeches by political candidates.

Religious Activities—Religious and ethical concerns are shared by a significant number of Stanford undergraduate and graduate students, many of whom are actively involved in a variety of campus religious organizations.

The University’s commitment to the process by which convictions and values are defined and sharpened is manifest in its chaplaincy staff, and its support of the diverse religious groups on campus. Central in Stanford’s history, from its founding, is multi-faith exploration and dialogue—a vital part of both ethos and education in this institution. For further information about religious life at Stanford, call Memorial Church (650) 723-1762.

JUDICIAL AFFAIRS AND STUDENT CONDUCT

In March 1996, President Gerhard Casper convened the Committee of 15 and requested a review of the student judicial charter. During the following year, the Committee of 15 conducted an extensive review of the existing judicial charter and process and drafted a new charter to take its place. The Student Judicial Charter of 1997 was approved by the Associated Students of Stanford University, the Senate of the Academic Council, and the President of the University during Spring Quarter 1996-97 and Autumn Quarter 1997-98, and became effective in January 1998. Cases of alleged violations of the Honor Code, Fundamental Standard, and other student conduct policies now proceed through an established student judicial process based upon the Student Judicial Charter of 1997.

STUDENT JUDICIAL CHARTER OF 1997

SECTION I: INTRODUCTION

Living and working in a University community dedicated to high standards of academic honesty and personal integrity can be an extraordinary educational experience. At Stanford, students, faculty, and staff have collectively agreed to be committed to the standards set forth in the Fundamental Standard and Honor Code. These eloquent statements have served the University community well since 1896 and 1921, respectively. When it has been alleged that a student has violated the Honor Code or Fundamental Standard, students, faculty, and staff must also share a commitment to the system used to adjudicate the alleged violation. Such allegations are extremely serious matters and must be dealt with in the most fair and even-handed manner possible.

This Charter describes the elements, procedures, and functions of the judicial system that goes into effect when there has been a formal complaint alleging that a Stanford student has violated the Honor Code, Fundamental Standard, or other applicable University student conduct policies. The judicial system described in this Charter is based on three fundamental principles:

To affirm the importance of the Honor Code and Fundamental Standard as critical parts of campus life at Stanford.

To guarantee students a central role in establishing judicial policy and adjudicating cases.

To protect the rights of all individuals involved in judicial affairs, while upholding the highest possible standards of honesty and mutual respect.

The judicial system described here replaces the Legislative and Judicial Charter of 1968 (as amended) and all student judicial procedures described therein. University judicial policy applies to all on-campus activities, even during vacation periods and summer. This University judicial policy does not apply to alleged offenses committed off-campus, except those associated with participation in University activities.

SECTION II: FUNDAMENTAL RIGHTS

This section enumerates the rights guaranteed by the Judicial Charter to all parties.

A. Rights of the Accused—Students accused of misconduct have the following rights:

1. To be considered innocent until found guilty beyond a reasonable doubt.
2. To be informed, in writing, of any formal complaint of alleged misconduct against them.
3. To be informed, in writing, of formal charges filed against them, the evidence upon which the charges are based, the names of the complainants and the names of potential witnesses against them.
4. To be given access to all evidence in the case, both incriminating and exculpatory.
5. To be given the opportunity to choose an open hearing. This choice must be made at least one week before the beginning of the Judicial Panel hearing.
6. To be allowed a reasonable time to prepare a defense prior to Judicial Panel hearings.
7. To be assured that no record of any violation or alleged violation will be placed on their transcript. Where the sanction of an Honor Code violation is modification of a grade, no reference will be made to the cause of the grade change.
8. To be given access to a list of impartial and confidential volunteer Judicial Counselors who may be consulted for advice and guidance during judicial procedures.
9. To appear before the Judicial Panel considering the charges and to respond to the charges in writing. In the event the accused is away from the Stanford campus, the proceedings shall be scheduled in such a way as to allow them a reasonable opportunity to participate.

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10. To have a person of their choice accompany them throughout the investigative and adjudicative process. This individual may assist the accused student during judicial procedures. The Board on Judicial Affairs shall have the power to enact By-laws establishing policies and guidelines specifying the nature of the adviser’s role.

11. To call witnesses on their behalf at Judicial Panel hearings and to cross-examine witnesses against them. The Board on Judicial Affairs shall have the power to specify in its By-laws limited types of evidence that shall be considered admissible without cross-examination. In all other cases, evidence provided by a witness who is unwilling or unable to be cross-examined will be disregarded.

12. To have a timely determination of the charges.

13. To be sent a written statement of the Judicial Panel’s decision.

14. To have the right to appeal an adverse decision (bases for appeal are defined in Section III.H.1).

15. To be assured that their identity and the circumstances of allegations against them will be kept confidential, except in specific circumstances identified in the By-laws of the Board on Judicial Affairs.

16. To refuse to engage in self-incrimination.

17. To not be charged with both a general violation of the Fundamental Standard and a specific Student Conduct Policy for the same alleged misconduct.

18. To not be charged again, after having found not guilty by a Judicial Panel, for the same alleged misconduct.

19. To be offered reasonable protection from retaliation, intimidation, harassment and/or malicious prosecution.

20. To be given, upon request, a verbatim record of their Judicial Panel hearings, excluding Panel deliberations.

21. To have no charges filed more than six months after the alleged misconduct.

22. To be informed, in writing, of their rights.

B. Rights of the Complainant—The rights of a complainant in any case are:

1. To appear at Judicial Panel hearings.

2. To submit a statement in writing, which does not preempt the right of the accused to cross-examine the complainant during Panel Hearings.

3. To know that all cases in which charges have been filed by the Judicial Officer will be considered by a Judicial Panel.

4. To be given access to a list of impartial and confidential volunteer Judicial Counselors who may be consulted for advice and guidance during judicial procedures.

5. To request a Judicial Panel to hear evidence in cases in which no formal charges are filed by the Judicial Officer.

6. To withdraw the complaint at any time and, if so, to be assured of confidentiality and anonymity.

7. To be offered reasonable protection from retaliation, intimidation, or harassment in response to their complaint.

8. To have a person of their choice accompany them throughout the investigative and adjudicative process. This individual may provide advice and counsel, but may not speak on behalf of, or otherwise represent the complainant during judicial procedures.

9. To be assured of the confidentiality of discussions with Judicial Counselors.

10. To be informed of the progress and outcome of the complaint, with the understanding that this information will be kept confidential.

11. To be informed, in writing, of their rights as defined under this charter.

C. Rights of Witnesses—The rights of a witness in any case are:

1. To refuse to engage in self-incrimination.

2. To be offered reasonable protection from retaliation, intimidation and/or harassment.

3. To be informed, in writing, of these rights.

D. Cooperation of All Parties—Both the complainant and the accused student are expected to cooperate fully with an investigation of the facts of a case and with the adjudicative process. Similarly, in keeping with the principles set forth in the Honor Code and Fundamental Standard, all parties with knowledge of facts pertaining to a case of alleged student misconduct are expected to cooperate fully with the investigation of the facts of the case and must appear, if requested, at Judicial Panel hearings. In addition, all parties are expected to be respectful of the confidential nature of any knowledge or information they may have about a judicial case or the other parties involved. No person shall be required to engage in self-incrimination as part of any judicial proceeding.

SECTION III: JUDICIAL PROCEDURES

This section summarizes the key components of the Judicial System.

A. Board on Judicial Affairs—The Board on Judicial Affairs is a standing committee of students, faculty, and staff that oversees all aspects of judicial affairs.

1. Composition

   a) The Board on Judicial Affairs shall be composed of six student members appointed by the Senate of the Associated Students of Stanford University, six faculty members appointed by the Senate of the Academic Council, and three University administrators appointed by the Provost. The Board shall be drawn from a wide spectrum of the Stanford community and must include both undergraduate and graduate students.

   b) Members of the Board shall be appointed to one- or two-year terms. Members may be appointed to multiple terms.

   c) The Senate of the Associated Students of Stanford University shall determine the date on which the terms of student members of the Board shall begin and end.

2. Powers

   a) The Board shall have the exclusive power to adopt or modify By-laws specifying policies and procedures pertaining to judicial affairs. All such By-laws must be consistent with this Charter.

   b) Whenever the Board adopts or modifies its By-laws, it shall inform the community, and shall forward the text of the changes to the chair of the Senate of the Associated Students of Stanford University, the chair of the Senate of the Academic Council, and the President of the University.

   c) Any By-law adopted or modified by the Board can be overruled by any one of the three following entities: the Senate of the Associated Students of Stanford University, the Senate of the Academic Council, the President of the University.

   d) The Board has the authority to adopt and/or modify the Student Conduct Penalty Code.

   e) Whenever the Board adopts or modifies the Student Conduct Penalty Code, it shall inform the community, and shall forward the text of the changes to the chair of the Senate of the Associated Students of Stanford University, the chair of the Senate of the Academic Council, and the President of the University.

   f) Any adoption or modification of the Student Conduct Penalty Code can be overruled by any one of the three following entities: the Senate of the Associated Students of Stanford University, the Senate of the Academic Council, and the President of the University.

   g) The Board shall have the exclusive power to propose amendments to this Charter, which must be approved as specified in Section IV.

3. Procedures

   a) The Board may conduct official business only in the presence of at least eight members, provided at least two students, two faculty members, and one University administrator are present.

   b) Actions by the Board shall require a majority vote of those present and voting.

   c) The Board shall have the power to adopt rules of procedure to govern its own actions, provided that a two-thirds majority of those present and voting agree.

   d) All members of the Stanford community are invited to propose suggestions about modification of judicial procedures to the Board.

B. Judicial Panel Pool—The Judicial Panel Pool is the body of students, faculty, and staff from which Judicial Panels and Final Appeal
Panels are chosen by the Judicial Adviser. Members of the Judicial Panel Pool are trained each academic year by the Judicial Adviser and can be called upon to serve on either Judicial Panels or Final Appeals Panels, as needed. The Judicial Panel Pool shall consist of both undergraduate and graduate students appointed by the Senate of the Associated Students of Stanford University, faculty appointed by the Senate of the Academic Council, and University staff appointed by the Provost. The Judicial Panel Pool shall consist of at least 30 members.

C. Judicial Panels—Judicial Panels hear all cases when formal charges have been filed by the Judicial Officer.

1. Composition:
   a) A Judicial Panel will be comprised of six members chosen from the Judicial Panel Pool, four of whom will be students and two of whom will be faculty or University administrators.
   b) Judicial Panels will be chaired by a student member.
   c) At least one faculty member must serve on any Judicial Panel considering cases in which a violation of the Honor Code is alleged.
   d) The Judicial Adviser will endeavor to select Panel members who are not acquainted with either the complainant or the accused.
   e) The Judicial Adviser will ensure that no Panel member is biased or has a conflict of interest in a case being considered. Both the complainant and the accused may request the removal of Panel members who they believe are biased or have a conflict of interest.
   f) If a Judicial Panel member discovers that they have a conflict of interest, or a perceived conflict of interest in a case being considered, they may withdraw and be replaced.

2. Powers:
   a) To review all charges of violations of the Fundamental Standard, Honor Code, or other appropriate University policies filed by the Judicial Officer.
   b) To determine whether the alleged violations occurred.
   c) To determine the appropriate sanctions if the Panel finds that the alleged violations did occur.
   d) To hear evidence and argument of the complainant and the accused in cases in which no formal charges have been filed by the Judicial Officer. The Panel has the authority to instruct the Judicial Officer to file appropriate charges in such cases (see sections II-B.5 and III-I.5).

3. Procedures:
   a) A Panel may convene only in the presence of all members.
   b) Determination of guilt requires agreement of five of the six Panel members.

D. Judicial Adviser—The Judicial Adviser is the chief administrator of judicial affairs and is a neutral party in all cases. The primary role of the Judicial Adviser is to advise all parties and to assist with judicial processes.

The specific duties of the Judicial Adviser are to:
1. Serve as a neutral party in all cases.
2. Serve as primary adviser on judicial procedures to all parties.
3. Train the Judicial Panel Pool members.
4. Appoint the members to Judicial Panels from the Panel Pool.
5. Provide general assistance to Judicial Panels upon request.
6. Serve as principal spokesperson for the University on Judicial Affairs.
7. Train the pool of volunteer Judicial Counselors.
8. Provide the accused students and complainants a list of volunteer Judicial Counselors.
9. Provide general oversight of all judicial procedures and act as liaison to the Board on Judicial Affairs.
10. Ensure that all Judicial Panel proceedings are recorded.
11. Inform the accused students of the outcome of Judicial Panel hearings and inform students found guilty of their sanctions and right to appeal.
12. Appoint a Final Appeals Panel and provide general assistance in Final Appeals Panel hearings.

13. Inform the accused students of the outcome of Final Appeals Panel hearings.
14. Inform all parties, in writing, of their rights under this charter.

E. Judicial Officer—The Judicial Officer is the principal investigator in all cases in which a complaint of an alleged violation of the Honor Code, Fundamental Standard, or other University student conduct policy has been filed. The Judicial Officer meets with all knowledgeable parties and gathers incriminating and exculpatory evidence. The Judicial Officer shall decide if there is sufficient evidence to support formal charges against the accused student. If so, the Judicial Officer will present all relevant evidence at the Judicial Panel hearing and, if necessary, at Final Appeals Panel hearings.

The specific duties of the Judicial Officer are to:
1. Receive all reports of alleged student misconduct.
2. Meet with the individual reporting misconduct.
3. Receive the formal complaint.
4. Notify the accused student of complaint and names of complainants.
5. Investigate the complaint and gather incriminating and exculpatory evidence.
6. Determine if there is sufficient evidence of misconduct to file formal charges against a student. The Judicial Officer may refer a case to another office when appropriate.
7. Inform the accused student of charges, the evidence upon which charges are based and the names of potential witnesses at Judicial Panel hearings.
8. Present evidence at Judicial Panel hearings and Final Appeals Panel hearings if necessary.
9. Inform complainants of the outcome of Judicial Panel hearings and, if necessary, Final Appeals Panel hearings.
10. Inform the Board on Judicial Affairs (without divulging the names of the accused) of the essential elements of all cases in which formal complaints did not result in the filing of charges.

F. Judicial Adviser and Judicial Officer—Working jointly, the Judicial Adviser and Judicial Officer will:
1. Meet with, report to, and assist the Board on Judicial Affairs.
2. Be involved with community outreach and education.
3. Summarize and report judicial cases to University community. These summaries shall not reveal the confidential aspects of any case.
4. Preserve all evidence and testimony obtained during investigation of charges for one year following final decision.
5. Ensure enforcement of sanctions in collaboration with the Registrar, the Dean of Students, and other appropriate University personnel.

G. Judicial Counselors—Judicial Counselors are trained, current or former members of a Judicial Panel Pool, or others who agree, on a voluntary basis, to provide confidential assistance to accused students and complainants in cases in which they are not involved as a member of a Judicial Panel.

H. Final Appeals Panel—A Final Appeals Panel is appointed by the Judicial Adviser whenever students found guilty appeal a decision made by a Judicial Panel. They should normally do so within one month of being notified of the outcome of Judicial Panel hearings.

1. The Bases for Appeal are:
   a) Demonstration of a significant procedural error.
   b) The availability of compelling new evidence.
   c) Demonstration of bias on the part of a member of any Judicial Panel involved in the case.
   d) Misconduct on the part of the Judicial Officer or the Judicial Adviser.
   e) Demonstration that any rights of the accused enumerated in this charter have been violated.

2. Composition:
   a) The Final Appeals Panel will be comprised of six members chosen from the Judicial Panel Pool, four of whom will be students and two of whom will be faculty or University administrators.
   b) Final Appeals Panels will be chaired by a student member.
c) At least one faculty member must serve on any Final Appeals Panel, considering cases in which a violation of the Honor Code is alleged.

d) The Judicial Adviser will endeavor to select Panel members who are not acquainted with either the complainant or the accused.

e) The Judicial Adviser will ensure that no Panel member is biased or has a conflict of interest in a case being considered. Both the complainant and the accused may request the removal of Panel members who they believe are biased or have a conflict of interest.

f) If a Judicial Panel member discovers that they have a conflict of interest, or a perceived conflict of interest in a case being considered, they may withdraw and be replaced.

g) No member of the Final Appeals Panel may have served on the Judicial Panel that considered the case being appealed.

3. Powers: The Final Appeals Panel has the following options.

a) To deny the appeal.

b) To return the case to the original Judicial Panel.

c) To convene a new Judicial Panel to rehear the case.

d) To reduce the sanctions.

e) To dismiss the original charges.

4. Procedures:

a) A Final Appeals Panel can convene only in the presence of all members.

b) All decisions of the Panel must be made with the affirmation of four of six members.

1. Procedural Overview—Judicial procedures begin when a Stanford faculty member, student, or staff member files a formal complaint of an alleged violation of the Honor Code, Fundamental Standard, or Student Conduct Policy with the Judicial Officer. The steps outlined below define judicial procedures after a formal complaint has been filed. An available flowchart provides an overview of the sequence of judicial procedures after a complaint has been filed and recommended timelines that should be applicable in a majority of cases.

1. A formal complaint should be made within sixty (60) days of the date of discovery of the evidence upon which it is based.

2. Within one week of receipt of a formal complaint, the Judicial Officer should notify the accused student in writing of the nature of the complaint.

3. As a neutral party, the Judicial Adviser is available to advise both the accused student and the complainant about judicial procedures. The Judicial Adviser will provide a list of impartial and confidential volunteer Judicial Counselors who are available to assist the accused student and the complainant.

4. The Judicial Officer will meet with all knowledgeable parties and gather relevant evidence. After conducting a thorough investigation, the Judicial Officer has three options: (a) to file formal charges against the accused student, (b) to refer the case to another appropriate office, or (c) to refrain from taking any formal action. If charges are filed, the student will be informed of all charges, all incriminating and exculpatory evidence related to the charges, the names of the complainants and the names of potential witnesses against them.

5. In cases in which no charges are filed by the Judicial Officer, the complainant may still request that a Judicial Panel hearing be held in order to hear the evidence against the accused student and exculpatory evidence. The accused will be informed in writing of the hearing and will be allowed to testify and present evidence before the Panel. The Panel can instruct the Judicial Officer to file formal charges. If this occurs, a new Judicial Panel will be convened to hear the case resulting from the charges.

6. All cases in which formal charges have been filed must be heard by a Judicial Panel. The Judicial Adviser shall appoint members of the Judicial Panel from the Judicial Panel Pool within three weeks of charges being filed. At Judicial Panel hearings, the Judicial Officer will present all evidence relevant to the complaint. The Judicial Officer has the responsibility to present evidence which supports the charges as well as any extenuating circumstances or exculpatory evidence uncovered during the investigation. The Judicial Adviser will be present at the hearings to record the proceedings and to answer general questions about judicial procedures.

7. Judicial Panel hearings are usually closed to the public unless the accused student files a request for an open hearing at least one week in advance of the hearing.

8. At Judicial Panel hearings both the accused and the complainant may choose to be accompanied by a friend or adviser. The accused need not appear before the Panel and may choose to respond to the charges in writing. The accused may answer the charges, call witnesses on their behalf, and cross-examine those giving testimony against them.

9. Presentation of evidence and testimony, as well as, questioning of the accused and of witnesses at Judicial Panel hearings shall be conducted in a manner that is courteous to all participants, that is devoid of intimidation and harassment, and that limits discussion to information relevant to the facts and issues of the case.

10. Following the conclusion of the Judicial Panel proceedings, the Panel will meet in a closed session to determine the disposition of the charges. The Panel may request information from the Judicial Adviser regarding rules and procedures. At that time the Panel may (a) dismiss the case for insufficient evidence, (b) find that no violation occurred, or (c) find that a violation did occur. If the Panel finds that a violation did occur, they may also impose appropriate sanctions. Sanctions shall be determined in accordance with precedent and the Student Conduct Penalty Code. Considerations in determining sanctions shall include the nature and seriousness of the offense, extenuating circumstances, and prior violations.

11. The Judicial Adviser will prepare a letter to the accused student which summarizes the findings of the Judicial Panel and, if guilty, the sanctions to be assessed. Letters that include sanctions will be reviewed by the Dean of Students (or a Dean's designee) within one week for general conformance with precedent and the Student Policy Conduct code. If the Dean of Students finds that the sanctions are inappropriate, the Dean may ask the Panel to reconsider the sanctions. If the Panel does reconsider its original sanctions, the reconsidered decision of the Panel is final.

12. If a Judicial Panel recommends expulsion from the University, the case will be automatically reviewed by the Provost. The Provost has the option of supporting the recommendation of expulsion or imposing lesser sanctions.

13. Within one week of the sanctions being affirmed, the student will be informed in writing of the decision of the Judicial Panel. The Judicial Adviser will be available to advise the student about the sanctions.

14. Students found guilty may appeal the decisions of the Judicial Panel. They should normally file an appeal with the Judicial Adviser within one month of receiving the results of the Judicial Panel hearing. The grounds for appeal are cited in Section III-H.1.

15. Final Appeals Panel hearings are usually closed to the public unless the accused student files a request for an open hearing at least one week in advance of that hearing.

SECTION IV AUTHORITY AND AMENDMENT OF THE JUDICIAL CHARTER

A. Authority—Although nothing in this Charter limits or contravenes the authority of the President of Stanford University to promulgate and enforce regulations governing student conduct, the Board on Judicial Affairs, except in extraordinary circumstances, shall have primary responsibility for promulgating judicial policy.

B. Amendment of Charter—The provisions of this Charter are subject to amendment in any and all respects. Amendments shall be enacted by a majority vote of the Board on Judicial Affairs, and shall go into effect immediately upon approval by the Senate of the Associated Students of Stanford University, the Senate of the Academic Council, and the President of the University. No amendment changing the membership of the Board on Judicial Affairs, however, shall go into effect until the time of the next regular selection of members.
When a violation of the Fundamental Standard or the Honor Code is alleged, the University administration pursues the case to completion. Consequently, whenever a member of the University community believes such a violation has occurred, he or she should contact the Judicial Affairs Office, Tresidder Memorial Union, 2nd floor, (650) 725-2485.

THE FUNDAMENTAL STANDARD

Students are expected to observe the Fundamental Standard of student conduct, which was stated by Stanford’s first President, David Starr Jordan, as follows:

“Students are expected to show both within and without the University such respect for order, morality, personal honor, and the rights of others as is demanded of good citizens. Failure to do this will be sufficient cause for removal from the University.”

Actions which have been found to be in violation of the Fundamental Standard include:

A. The Honor Code is an undertaking of the students, individually and collectively:

1) that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
2) that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.

B. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.

C. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Examples of conduct which have been regarded as being in violation of the Honor Code include:

1) Giving or receiving unpermitted aid
2) Unpermitted collaboration
3) Plagiarism
4) Revising and resubmitting a quiz or exam for regrading without the instructor’s knowledge and consent
5) Giving or receiving unpermitted aid
6) Representing as one’s own work the work of another

In recent years, most student disciplinary cases have involved Honor Code violations; of these, the most frequent arise when a student submits another’s work as his or her own, or gives or receives unpermitted aid. The standard penalty for a first offense is a one-quarter suspension from the University and 40 hours of community service. In addition, many faculty members issue a “No Pass” for the course in which the violation occurred. The standard penalty for a multiple violation (for example, cheating more than once in the same course) is a three-quarter suspension and 60 hours of community service.

INTERPRETATIONS AND APPLICATIONS OF THE HONOR CODE

In the Spring of 1977, the Student Conduct Legislative Council authored and adopted the following guidelines to assist students and faculty in understanding their rights and obligations under the University’s Honor Code. The most recent revisions to the original text were adopted in the Spring of 1999 by the Board on Judicial Affairs.

It must be understood that the individual and collective responsibility of the students for upholding the Honor Code was not imposed upon the students by the administration or the faculty but was assumed by the students at their own request starting in 1921. Without such student responsibility, the Honor Code cannot be effectively maintained.

1. General

a) The Honor Code is agreed to by every student who registers at Stanford University and by every instructor who accepts an appointment.

b) The Honor Code provides a standard of honesty and declares that compliance with that standard is to be expected. It does not contemplate that the standard will be self-enforcing but calls on students, faculty, and administration to encourage compliance and to take reasonable steps to discourage violations. If violations occur, procedures are prescribed by the Student Judicial Charter of 1997. How-ever, the Honor Code depends for its effectiveness primarily on the individual and collective desire of all members of the community to prevent and deter violations rather than on proceedings to impose penalties after violations have occurred.

c) In interpreting and applying the general provisions of the Honor Code, it should be kept in mind that although primary responsibility for making the code effective rests with the students, faculty cooperation is essential since the faculty sets the academic requirements which students are to meet. The faculty should endeavor to avoid academic requirements and procedures which place honorable and conscientious students at a disadvantage. The faculty should also be ready and willing to consult with students and should be responsive to their suggestions in these matters.

d) While an instructor’s failure to observe these guidelines might be viewed an extenuating circumstance in evaluating penalty options for a student’s misconduct, it would not preclude the initiation of an otherwise warranted charge against the student.

2. Specific Interpretations and Applications

a) “Third-Party Responsibility”: a primary responsibility assumed by students is to discourage violations of the Honor Code by others. Various methods are possible. Drawing attention to a suspected violation may stop it. Moral suasion may be effective. Initiating formal procedures is a necessary and obligatory remedy when other methods are inappropriate or have failed. Faculty members have like responsibilities when suspected violations come to their attention.

b) “Proctoring”: proctoring means being present in the examination room during a written examination, with the following exceptions:

1) The prohibition against proctoring should not be construed to prohibit an instructor or teaching assistant from remaining in the examination room for the first few minutes to distribute and explain the examination; or from visiting the examination room briefly to transmit additional information; or from returning at the end of the examination to collect the examination papers.
2. Nor does the prohibition againstproctoring prohibit an instructor or teaching assistant from visiting the examination room in response to specific reports from students that cheating has been observed, to investigate the basis for such reports. The instructor or teaching assistant may also visit the examination room briefly and infrequently in order to answer students' questions.

c) "Unusual and Unreasonable Precautions": in interpreting and applying this provision, consideration should be given to standard procedures that are customary at Stanford and the need for cooperation between students and faculty in making the Honor Code effective. The following situations are cited as examples.

An instructor should not require students to identify themselves before being admitted to an examination room, or require students to submit in advance to being searched for notes or other materials, or maintain surveillance upon students who leave the examination room. Nor should the instructor take deliberate steps to invite dishonesty in order to entrap students. Procedures of this kind would be unusual and unreasonable.

On the other hand, an instructor may require copies of an examination or test to be returned after the examination. When possible, alternate seating should be provided and used for all examinations. To avoid controversy in any rereading or regrading of students' work, the instructor may ask students to take measures by which the original work may be clearly identified. With clear advance notice, an instructor may systematically compare work submitted to current or previous submissions. An instructor who requires students to make up a missed test or examination may administer a different test or examination of equivalent range and difficulty. Such procedures are not to be construed as unusual or unreasonable.

d) "Procedures that Create Temptations to Violate the Honor Code": although students are expected to resist temptations to cheat, the faculty should endeavor to minimize inducements to dishonesty. Examples of undesirable procedures include the following: failure to give clear directions and instructions concerning course requirements and the limits of acceptable collaboration in course work; treating required work casually as if it were unimportant; carelessness or inconsistency in maintaining security of examinations or tests; reusing an examination that is neither kept secure from public exposure nor made available to all students. If take-home examinations are given, they should not be closed-book examinations, nor should there be a specified time limit less than the full period between the distribution of the examination and its due date. Such procedures place honorable and conscientious students in a difficult position and often at a disadvantage, and could be interpreted as mitigating factors by the judicial panel.

e) "Penalty Grading": students are not to be penalized for violations of the Honor Code without adjudication under the procedures specified by the Student Judicial Charter of 1997. An instructor may not, therefore, lower a student's grade or impose any other academic penalty on the grounds of dishonesty. Examples of desirable procedures include the following: failure to give clear directions and instructions concerning course requirements and the limits of acceptable collaboration in course work; treating required work casually as if it were unimportant; carelessness or inconsistency in maintaining security of examinations or tests; reusing an examination that is neither kept secure from public exposure nor made available to all students. If take-home examinations are given, they should not be closed-book examinations, nor should there be a specified time limit less than the full period between the distribution of the examination and its due date. Such procedures place honorable and conscientious students in a difficult position and often at a disadvantage, and could be interpreted as mitigating factors by the judicial panel.

f) "Instructor Discretion": procedures falling under instructor discretion would include exam location, alternate times for exams, and alteration of due dates. Tests will be taken from the classroom only with consent of the instructor.

STANFORD UNIVERSITY'S STUDENT CONDUCT PENALTY CODE AS AMENDED 1999

Stanford University's Student Conduct Penalty Code (as amended 1999) is to be used in conjunction with the Student Judicial Charter of 1997, and is applicable only to the actions of the judicial entities who have determined that a violation of the Honor Code, the Fundamental Standard, or another rule or policy governing student conduct has occurred.

In all cases in which a student is found guilty the student shall be informed by a letter of censure of the penalty or penalties assessed for an offense. The letter shall list all penalties imposed on the student. No information contained in a student's disciplinary record will be released without the written consent of the student.

The Judicial Advisor shall inform any member of the community whose role in implementing the penalty requires that person to be informed of a penalty imposed by the Judicial Panel. The Judicial Advisor shall also inform the complainant of any penalties imposed by the Panel.

Until a student has satisfied all conditions of a penalty, he or she is ineligible to receive any Stanford Degree.

TYPES AND DEFINITIONS OF PENALTIES

After determining a violation has occurred, the Judicial Panel hearing the case shall impose a penalty, or a combination of penalties, in accordance with the nature and seriousness of the offense, the motivation underlying the offense, and precedent in similar cases. This Code provides a list of the available penalties. The order of the penalties in the list does not suggest their frequency or likelihood, or the proper penalty in a particular case.

Only the following penalties may be applied:

A. Formal Warning—The Judicial Panel may give a student a Formal Warning. Should the student later be found guilty of any other offense the Judicial Advisor shall inform the Panel during the penalty phase of deliberations that the student received a Formal Warning for a prior offense.

B. Probation—

1. The Panel may place a student on probation for a specific period of time, during which time a penalty or some part of a penalty is postponed. The time period, terms or conditions, and the reasons for granting probation must be communicated in writing by the Judicial Panel hearing the case.

2. Probationary status will be automatically revoked and the postponed penalties automatically reinstated, effective immediately, if the probationer is found guilty by a Judicial Panel of committing another act of misconduct while on probation, unless that Panel specifically deems the subsequent violation as trivial or irrelevant to the offense for which the probation was granted. Successful completion of probation cancels the postponed penalties.

3. The Judicial Panel determining penalties for a subsequent violation may allow the reinstated penalty to suffice for both violations, or impose additional penalties to the original penalties, or impose independent penalties.

C. Deprivation of Rights and Privileges—Loss of particular student rights and privileges for a specified time, including but not limited to: taking part in intercollegiate activities, including athletic events; serving in positions of trust and responsibility; using University facilities, such as libraries, gymnasiums.

D. Monetary Restitution—

1. A specific amount of money to be paid by a specific date. A student may be assessed a reasonable monetary penalty to defray actual financial losses to the University, individuals, or student organizations attributable to and caused by the offense for which the student was found guilty.

2. The student will be provided documentation of actual financial losses, and the money collected will be used only to reimburse those individuals and/or organizations incurring the loss. No monetary penalties will be assessed to defray costs associated with the investigation and adjudication of the offense by the University.

3. A student who fails to pay as ordered shall be treated as though suspended from the University until full payment is made.

E. Community Service—

1. A specific number of hours to be worked in unpaid University or public service within a specific period of time.

2. Ordinarily, community service should be limited to on-campus facilities or organizations. Off-campus community service may be appropriate in some cases, but must be related to educational, charitable or public service organizations. Written confirmation by the person responsible for supervising the student that he or she worked satisfactorily for the specified number of hours will conclusively establish
CAREER DEVELOPMENT CENTER

The Career Development Center (CDC) is committed to educating the Stanford community about the world of work and helping individuals understand their relationship to it. We encourage both undergraduate and graduate students to consider how their academic course work and other experiences may affect their career decisions. Through a variety of programs and services, the Career Development Center staff helps students and alumni clarify their interests, skills, and values; explore possible career fields; and prepare for the job search in a variety of fields. These programs and services include:

Career counseling
Career interest, skills, and personality inventories
Fall Career Fair
Full-time, part-time, internship, and summer job listings available in binders and on the World Wide Web
Job Connection Day
Liberal Arts Career and Internship Fair
On-Campus Recruiting Program
Reference file service
Resource library, which includes books, periodicals, handouts, and audio/video tapes
Workshops on getting started at the CDC, resume writing, interviewing, and the summer and full-time job search process
Check the CDC web page at http://www.stanford.edu/dept/CDC/ for up-to-date information on programs and events.

COWELL STUDENT HEALTH SERVICE

Student Health Insurance (650-723-2135)—All registered students are required to have health insurance. Cowell offers a comprehensive and affordable University-sponsored insurance plan, Cardinal Care, which is administered and insured by Blue Cross of California. Health insurance policies for spouses, domestic partners, children of students, and visiting scholars are available. Voluntary dental insurance is also offered.

HAAS CENTER FOR PUBLIC SERVICE

The Haas Center for Public Service serves as a focal point for students, faculty, and staff interested in public and community service. The Haas Center maintains and coordinates volunteer, internship, and community research opportunities for undergraduate and graduate students in the San Francisco Bay Area, nationally and internationally. Through the “study-service connections” initiative, the staff assists students and faculty seeking to integrate service-based learning with academic study and administers a Public Service Scholars honors research program.

The Haas Center is the campus base for Stanford in Washington, an academic program that combines seminars, tutorials, and internships in the nation’s capital. The center also houses student organizations including the Stanford Volunteer Network, Stanford in Government, the East Palo Alto/Stanford Summer Academy (EPASSA), and the You Can Make a Difference Conference. It administers numerous fellowship programs which provide financial support to students undertaking public and community service work during the summer and post-graduation.
Deputized Patrol Officers: uniformed officers patrol the campus and Community Service Officers: CSOs enforce parking regulations. The general divisions:
cases of sexual harassment, see the "Non-Academic Regulations" section of the University's code. Services include the shipping of purchases, gift certificates, and repair service needs; telephone: 1-800-533-2670.

The Track House Sports Shop at the corner of Campus Drive and Galvez Street sells sports apparel and equipment. Tresidder Express in Tresidder Union offers snack foods, beverages, newspapers, health and beauty aids, and grocery items. The Stanford Bookstore Palo Alto at 135 University Avenue, Palo Alto carries medical, technical, and business books. The University Shop in the Stanford Shopping Center, and the University Shop at 250 University Avenue, Palo Alto, sell Stanford apparel and souvenirs.

OMBUDSPERSON

The original charge for an ombudsperson at Stanford described the purpose of the office in this way: "The Ombudsperson's task is to protect the interests and rights of members of the Stanford community from injustices or abuses of discretion, from gross inefficiency, from unnecessary delay and complication in the administration of University rules and regulations, and from inconsistency, unfairness, unresponsiveness, and prejudice in the individual's experience with University activities. The Ombudsperson's office exists to receive, examine, and channel the complaints and grievances of members of the Stanford community, and to secure expeditious and impartial redress."

Any troublesome matter in the University community may be discussed in confidence with the University ombudsperson. Services of the office are available to students, staff, and faculty.

Although possessing no decision-making authority, the Ombudsperson has wide powers of inquiry. The Ombudsperson will refer matters to the proper person or office expeditiously and, where appropriate, as necessary.

POLICE SERVICES

The Stanford Department of Public Safety, (650) 723-9633, is located at the corner of Campus Drive and Serra Street. It is composed of several divisions:

Deputized Patrol Officers: uniformed officers patrol the campus and respond to calls. They are fully empowered by Santa Clara County and have authority to stop vehicles, make arrests, and enforce all laws.

Plain-clothes detectives follow up on cases as necessary.

Community Service Officers: CSOs enforce parking regulations. The citations they issue for parking violations are payable to Santa Clara County and go to warrant if not paid. The night CSOs check on building security and provide a uniformed presence.

The Special Services Unit: SSU is a campus resource center providing crime prevention and safety awareness programs to the Stanford community. Its free services include pamphlets, videos, and presentations about bicycle safety, earthquake preparedness (earthquake information, 723-0569), personal safety, and property protection. Call 723-0806 to reach the SSU.

For police, fire, or ambulance response at any time, dial 9-1-1, a free call from all pay phones. From University phones (723-, 725-, 497-, or 498- prefix), dial 9-911. Blue Emergency Phone Towers are now in place across campus for emergency assistance.

For additional safety information, see the Stanford Safety and Security Almanac, which is available from the Special Services Unit of the Stanford Department of Public Safety (723-0806).

STANFORD EVENTS

Stanford Events is responsible for the production of all official University ceremonies, including New Student Orientation Convocation, Founders' Day, Commencement, and other ceremonies or events as designated by the President's Office. Stanford Events also communicates University policies that govern events to campus organizations that request to host an event on or off campus. In addition, the Visitor Information Center, Stanford Ticket Office, and the Lively Arts at Stanford function within Stanford Events.

Organizations that may request use of University facilities for public events include academic departments, administrative offices, official organizations of the Association Students of Stanford University (ASSU), and voluntary student organizations registered with the Office of Student Activities (OSA). Voluntary student organizations sponsoring events must have the approval of the ASSU student financial manager and the OSA before their requests are presented to the Registrar's Office for scheduling.

Copies of the Public Events Policy Manual, which sets forth University policies and procedures for events, are available from Stanford Events, 527 Lomita Mall, Stanford, CA 94305-2250, or at http://www.stanford.edu/dept/Events.

Stanford Ticket Office—The Stanford Ticket Office provides ticketing services including printing, sales, and box office staffing to Stanford University events, except athletics. The Ticket Office handles sales for Stanford Lively Arts, the Department of Music, and various campus organizations. BASS sales are also available through the Ticket Office for events in the greater Bay Area.

The Ticket Office is centrally located in the Tresidder Student Union and may be reached by phone at (650) 725-ARTS.

Stanford Lively Arts—Stanford Lively Arts presents a full season of professional, world-class music, dance, and theater performances from around the globe. Venues include Memorial Auditorium, Dinkelspiel Auditorium, Memorial Church, and Proctor Amphitheater. For more information about Stanford Lively Arts and coming performances, telephone (650) 725-ARTS, or visit the Lively Arts web site at http://livelyarts.stanford.edu.

CONFERENCE SERVICES

A "conference" is any student or adult group that is not a part of a regular or summer academic session for registered students, whether convening for only part of a day (including a luncheon), overnight, or for several days.

Arrangements for conferences are the responsibility of the Manager of Conferences. Summer Conference Services (650-723-3126) coordinates conferences from June 23 through September 15. Non-academic Facilities Scheduling in the Registrar's Office, (650) 723-6755, coordinates conferences September 16 through June 22. Policies concerning
conferences are the responsibility of the President’s and Provost’s Offices.

Outside organizations wishing to meet at Stanford must have the sponsorship of a University department. Conferences initiated by organizations within or outside the University must be closely related to the academic program of the University. The sponsoring department submits its proposal to the Manager of Conferences for review in terms of available facilities and for approval of the President’s Office.

Arrangements for campus housing and/or meeting room facilities are made with the Manager of Conferences.

Housing and dining service accommodations in campus residences usually are available on the Sunday following Commencement until August 31. Assistance with arrangements for tables, chairs, audiovisual aids, signs, and other equipment may be made with Summer Conference Services.

AWARDS AND HONORS

FACULTY AND STAFF

KENNETH M. CUTHBERTSON AWARD

The Kenneth M. Cuthbertson Award was established in 1981 for recognition of exceptional service to Stanford University. It was established by members of the faculty who wish to remain anonymous. All members of the Stanford community are eligible for the award; the sole criterion is the quality of the contribution that the recipients have made to the University. The award provides a way of honoring members of the staff and faculty for their efforts on behalf of the University.

Ordinarily, one award is made each year. The award was first presented in 1981 to the person for whom it is named. Kenneth M. Cuthbertson was one of the early architects of Stanford’s long-term financial planning and fundraising program. His service to Stanford has set an enduring standard for those who will come after him. The award is made annually at the University Commencement Ceremony.

LLOYD W. DINKELSPIEL AWARDS

The Lloyd W. Dinkelspiel Awards recognize distinctive and exceptional contributions to undergraduate education at Stanford University. The two principal awards are made to the faculty or staff members adjudged to have made the most distinctive contribution to the development and enrichment of undergraduate education in its broadest sense. Two awards are also made to graduating seniors who combine academic achievement with effective contributions to undergraduate student life. Preference is given to service in the School of Humanities and Sciences in the area of liberal education. The awards are made from an endowment fund established in memory of Lloyd W. Dinkelspiel, a Stanford alumnus and trustee. The awards are made annually at the University Commencement Ceremony.

WALTER J. GORES AWARDS

The Walter J. Gores Faculty Achievement Awards for excellence in teaching were established by bequest of Walter J. Gores, Stanford Alumnus of the Class of 1917 and a professor at the University of Michigan for 30 years. Teaching is understood in its broadest sense and includes, in particular, lecturing, leading discussions, tutoring, and advising at the undergraduate or professional levels. Any member of the teaching staff of the University is eligible for an award, including all faculty of professorial rank, instructors, lecturers, teaching fellows, and teaching and course assistants. Ordinarily, awards are made to a senior faculty member (associate or full professor) or senior lecturer; a junior faculty member or member of the teaching staff; and a teaching assistant (graduate or undergraduate student). The awards are made annually at the University Commencement Ceremony.

ALLAN COX MEDAL FOR FACULTY EXCELLENCE FOSTERING UNDERGRADUATE RESEARCH

The Allan Cox Medal for Faculty Excellence Fostering Undergraduate Research is awarded annually to a faculty member who has established a record of excellence directing undergraduate research over a number of years. It may also go to a faculty member who has done an especially outstanding job with just one or two undergraduates who demonstrated superior work. The medal was established in memory of the former professor of Geophysics and Dean of the School of Earth Sciences, a strong supporter of faculty-student research collaboration.

HERBERT HOOVER MEDAL FOR DISTINGUISHED SERVICE

David Starr Jordan’s firm belief that every academic degree should represent work actually done in or under the direction of the institution granting it has meant that, since its founding, Stanford has awarded no honorary degrees. As a means of recognizing extraordinary individuals who deserve special acknowledgment, the Stanford Alumni Association in 1962 voted to establish the Herbert Hoover Medal for Distinguished Service. The name pays tribute to the former President’s example of service to his University, to his country, and to the cause of world humanitarianism. Indeed, Mr. Hoover was the first award recipient. The gold medal is presented following selection by an anonymous committee appointed by the Chair of the Board of Directors of the Alumni Association. There have been 11 honorees.

STUDENT

BOOTHE PRIZE FOR EXCELLENCE IN WRITING

Awarded during the freshman year, the Boothe Prize recognizes excellence in writing. Students are selected for this honor on the basis of essays written for courses fulfilling the Introduction to the Humanities requirement or in Writing and Critical Thinking. The prize is named for Mr. and Mrs. D. Power Boothe, Jr., whose gifts to the University reflect their interest in the humanities.

PRESIDENT’S AWARD FOR ACADEMIC EXCELLENCE IN THE FRESHMAN YEAR

The President’s Award honors students who have exceptionally distinguished academic records that exemplify a strong program of study in the freshman year. Students eligible for the award normally have completed Writing and Critical Thinking and the Introduction to the Humanities requirement during their first year at Stanford.

DEANS’ AWARD FOR ACADEMIC ACHIEVEMENT

The deans of Earth Sciences, Engineering, and Humanities and Sciences recognize from five to ten undergraduate students each year for their academic endeavors. Honorees are cited for noteworthy accomplishments which represent more than a high grade point average or success in course work. Faculty nominate students who have exceptional tangible achievements in classes or independent research, national academic competitions, a presentation or publication for a regional or national audience, or exceptional performance in the creative arts.

FIRESTONE MEDAL FOR EXCELLENCE IN RESEARCH

The Firestone Medal is awarded to seniors in recognition of excellence in undergraduate research. Departments in the School of Humanities and Sciences nominate students who have completed outstanding honors projects in the social, physical, and natural sciences.

ROBERT M. GOLDEN MEDAL FOR EXCELLENCE IN THE HUMANITIES AND CREATIVE ARTS

The Golden Medal recognizes outstanding achievement in the humanities and the creative arts. Seniors receive these medals upon nomination by their major department.
Hoefer Prize for Excellence in Undergraduate Writing

The Hoefer Prize recognizes students and faculty for their work in courses that meet the University Writing Requirement for writing in the major. Prizes are awarded in each of the five areas of the undergraduate curriculum: humanities, social sciences, natural sciences, engineering, and earth sciences.

Frederick E. Terman Engineering Scholaristic Award

The School of Engineering annually presents the Terman Award to seniors for outstanding academic achievement. The awardees share their award with a high school teacher of their nomination.

Phi Beta Kappa

Phi Beta Kappa is a nationwide society honoring students for the excellence and breadth of their undergraduate scholarly accomplishments. Membership in the Stanford Chapter (Beta of California) is open to undergraduates of all majors. To be elected to Phi Beta Kappa at Stanford, a student must achieve academic distinction in the major as well as in courses across a broad range of fields.

Approximately a tenth of the members of a graduating class are elected to Phi Beta Kappa. Of this number, about one fifth are chosen in their junior year, the remainder in their senior year.

The chapter’s election guidelines (revised July, 1997) define “breadth” of study as excellence beyond the major field. To be considered for election, a student must have taken, by the time elections are held in early in the Spring Quarter, at least three courses in each of the following three major domains of knowledge: Humanities; Science, Engineering, and Math; and Social Sciences. To be considered for election, transfer students must have taken at least two courses at Stanford in two of these major domains and must have completed a minimum of 75 units of academic work at Stanford by the end of Winter Quarter.

Examples of courses that will satisfy the Phi Beta Kappa breadth criterion include those listed in the Stanford Bulletin Appendix for the undergraduate General Education Requirements (GER) in Areas 2 to 4. Courses taken for GER Area 1 are not considered as satisfying the PBK breadth criterion.

A grade of ‘+’ or ‘CR’ is not considered a sign of distinction. Minimally satisfying the “breadth” criterion is not considered a sign of distinction.

The academic records of all students are automatically reviewed, so no special action is required for students wishing to be considered for membership. Anonymity in the election process is ensured by removal of the students’ names from their academic records before consideration. Students who desire that their records not be made available for consideration by the Stanford chapter of Phi Beta Kappa should inform the Registrar, room 133, Old Union.

Exchange Programs and Cross-Enrollment Agreements

Stanford has exchange programs and cross-enrollment agreements with a number of other colleges and universities. The purpose of these programs and agreements is to offer Stanford students courses and training that are not available in the Stanford curriculum.

Exchange Programs Undergraduate

Stanford has exchange programs with four colleges and universities that allow students to exchange schools for a quarter/semester or for a year, depending on the school. These programs are best suited to students in their junior year, when the major area of study has been determined. Stanford students register for zero units at Stanford during the quarter(s) in which they are attending another college or university and pay the regular Stanford tuition. Courses taken at the other institution are treated as transfer credit back to Stanford. Students should contact the Transfer Credit Evaluator in the Academic Standing Office to determine whether the courses taken through an exchange program may qualify for credit toward a Stanford degree. Only the number of units accepted in transfer, not the course titles or the grades received, are recorded on the Stanford transcript.

Exchange programs are currently available at three historically black institutions: Howard University in Washington D.C.; Morehouse College in Atlanta, GA; and Spelman College in Atlanta, GA. The exchange program at Dartmouth College in Hanover, NH, focuses on Native American Studies. Further information is available at the Undergraduate Advising Center.

Graduate

The Exchange Scholar Program is open to doctoral students in the fields of humanities, social sciences, and sciences who have completed one full year of study at one of the participating institutions. These students may apply to study at Stanford for a maximum of one academic year to take advantage of particular educational opportunities not available on the home campus. The participating institutions are Brown University, University of Chicago, Columbia University, Cornell University, Harvard University, Massachusetts Institute of Technology, Princeton University, University of Pennsylvania, and Yale University. Further information on the program may be obtained from the Degree Progress Office, Old Union, or from the graduate dean’s office at participating institutions. Some institutions may place restrictions on specific departments.

Stanford also has separate exchange programs with the University of California, Berkeley and the University of California, San Francisco. Further information may be obtained at the Registrar’s Office.

Cross-Enrollment Agreements for ROTC

Stanford has cross-enrollment agreements for the Reserve Officers’ Training Corps (ROTC) with the Navy and the Marine Corps ROTC program at the University of California at Berkeley, the Army ROTC program at Santa Clara University, and the Air Force ROTC program at San Jose State University. The purpose of these agreements is to allow Stanford students to engage in military training while working on their degrees from Stanford. Courses taken in ROTC programs are offered by and through UC Berkeley, Santa Clara, and San Jose State. The courses do not qualify to be used towards the 12 unit requirement for full-time registration status or satisfactory academic progress requirements for Stanford undergraduates. Certain ROTC courses may be eligible to be used as transfer credit if they qualify under Stanford’s transfer credit practices.

Normally, students who participate in ROTC training complete a four-year course of instruction at the respective institution that consists of two years of basic courses during the freshmen and sophomore years, and an advanced course of instruction during the junior and senior years. Students who accept ROTC scholarships are generally subject to a service obligation, depending on the regulation of the particular service.

Stanford students who are enrolled in ROTC programs under the cross-enrollment agreements are eligible to compete for scholarships to include full tuition and a monthly stipend (Navy and Air Force), or other varying amounts (Army). Students normally compete for national scholarships as high school seniors, although current Stanford students may be eligible to enroll in ROTC on a non-scholarship basis. Non-scholarship ROTC students are eligible to compete for scholarships, and individual services may offer additional scholarship programs to current qualifying undergraduate and graduate students. Interested students should contact the appropriate military professor at the host institution to obtain information on these programs and to initiate application procedures (see below).
Students who satisfactorily complete an ROTC program and are awarded a Stanford degree qualify for a commission as a Second Lieutenant in the U.S. Army, an Ensign in the U.S. Navy, a Second Lieutenant in the U.S. Marines, or a Second Lieutenant in the U.S. Air Force.

For questions concerning the ROTC programs, Stanford students should consult one of the following: Naval ROTC, 152 Hearst Gym, UC-Berkeley, Berkeley CA 94720-3640, telephone (800) 430-3014; Army ROTC, Department of Military Science, Santa Clara University, Santa Clara, CA 95053, telephone (800) 227-7682; Air Force ROTC, San Jose State University, San Jose, CA 95192-0051, telephone (800) 924-2960.

**COURSES**

**AIR FORCE ROTC**

The following are offered by San Jose State University:

- **Introduction to the Air Force Today**—Freshman year.
- **The Air Force Way**—Sophomore year.
- **Field Training**—Sophomore year.
- **Air Force Leadership and Management**—Junior year.
- **National Security Affairs/Preparation for Active Duty**—Senior year.

**Leadership Laboratory**—Mandatory and complements the list above. During freshman and sophomore years, includes the study of Air Force customs and courtesies, drill and ceremonies, and military commands. During junior and senior year, it consists of advanced leadership experiences involving the planning and controlling of military activities of the cadet corps, the preparation and presentation of briefings, and other oral and written communications.

**ARMY ROTC**

The following are offered by Santa Clara University:

- **Fundamentals of Leadership and Management**—Basic course. First and second year are designed for beginning students who want to qualify for entry into the Advanced Course in a normal progression. Introduces key terms needed to address the leadership challenges and problem-solving methods used in the Advanced Course. Communication skills are taught, practiced, and mastered, ensuring that students entering the Advanced Course are prepared to take charge of groups and organize the activities of the group in problem-solving exercises and labs. Associated extracurricular activities are: the leadership reaction course; a physically orienteering.

- **The following are offered for the Army ROTC Basic Course:**
  - **Basic Leadership Development and Communicative Skills**—Freshman year.
  - **History of the U.S. Army Military Profession**—Freshman year.
  - **Applied Leadership Development**—Freshman year.
  - **Organizational Leadership Theory**—Sophomore year.
  - **Team Development**—Sophomore year.
  - **Troop Leading Procedures/U.S. Army**—Sophomore year.
  - **Advanced Leadership and Management**—Advanced sophomores.

This sequence is open to students who have completed the Basic Course or earned placement credit for it. Placement credit can be achieved through prior military training or completion of the six-week summer course known as Camp Challenge at Fort Knox, KY. Students who want to qualify for the Advanced Course, via Camp Challenge, should plan to attend the camp as early as the summer before their junior year at Stanford. Students must complete the Advanced Course in the sequence prescribed by the Department of Military Science at Santa Clara University.

The following are offered for the Army ROTC Advanced Course:

- **Leading Small Organizations I**—Junior year.
- **Leading Small Organizations II**—Junior year.
- **Advanced Tactics**—Junior year.

**NAVAL ROTC**

The Department of Naval Science at UC Berkeley offers programs of instruction for men and women leading to active duty reserve commissions in the U.S. Navy or U.S. Marine Corps. Navy option students enrolled in either the four- or two-year program normally complete the following courses during their junior and senior years.

- **NS1. Introduction to Naval Science**—Freshman year.
- **NS2. Sea Power and Maritime Affairs**—Freshman year.
- **NS3. Leadership and Management**—Sophomore year.
- **NA10. Ship Systems**—Sophomore year.

Navy option students enrolled in either the four- or two-year program normally complete the following courses during their junior and senior years.

- **NS12A. Navigation and Naval Operations I**—Junior year.
- **NS12B. Navigation and Naval Operations II**—Senior year.

- **NS401. Naval Ship Systems**—Senior year.
- **NS412. Leadership and Ethics**—Senior year.

In addition to the above courses, Navy option ROTC students are required to participate in weekly professional development laboratories (drill) at UC Berkeley and complete a number of other courses at Stanford including one year of calculus, physics, and English, and one quarter of computer science, leadership and management, and military history or national security policy.

In lieu of NS401, NA10, and NS12B, Marine option students may participate in Marine Seminars and complete MA154, History of Littoral Warfare and MA20, Evolution of American Warfare (or a designated equivalent course). Marine option students also participate in the weekly professional development laboratories.
Nonacademic Regulations

STATEMENT OF NONDISCRIMINATORY POLICY

Stanford University admits students of either sex and any race, color, religion, sexual orientation, or national and ethnic origin to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. It does not discriminate against students on the basis of sex, race, age, color, disability, religion, sexual orientation, or national and ethnic origin in the administration of its educational policies, admissions policies, scholarships, loan programs, athletic and other University-administered programs.

AMERICANS WITH DISABILITIES ACT/REHABILITATION ACT GRIEVANCE PROCEDURE

POLICY

Stanford University, in compliance with state and federal laws and regulations including the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973 (Section 504), does not discriminate on the basis of disability in the administration of its education-related programs and activities and has an institutional commitment to provide equal educational opportunities for disabled students who are otherwise qualified.

Students who believe they have been subjected to discrimination on the basis of disability, or have been denied access to services or accommodations required by law, have the right to use this grievance procedure.

APPLICABILITY

The grievance procedure set forth below is applicable to undergraduate and graduate students of the University. In general, it is designed to address disputes concerning the following:
1. Disagreements regarding a requested service, accommodation, or modification of a University practice or requirement
2. Inaccessibility of a program or activity
3. Harassment or discrimination on the basis of disability
4. Violation of privacy in the context of disability

For disputes regarding certain specific academic accommodations or modification of academic requirements (such as reduction in the number of academic course units taken quarterly or yearly, requests for substitution of courses, or issues relating to academic standing), the alternate procedure set forth in Section V (C) of the Stanford University Policy and Procedure for Student Requests for Services and Accommodations should be followed. For questions regarding which procedure is applicable, contact one of the Compliance Officers at the Office of Campus Relations.

These two sets of procedures supplant the Statement on Student Academic Grievance Procedures (set forth in the Stanford Bulletin) for disability-related grievances.

COMPLIANCE OFFICERS

Stanford University's Compliance Officers are responsible for administering this grievance procedure as well as ensuring compliance with applicable laws. The designated Compliance Officers are: Rosa Gonzalez (ADA/Section 504 Compliance Officer) and Sally Dickson (Director of the Office of Campus Relations). They have offices in Building 310 in the Main Quad and may be reached by calling (650) 723-3484, TTY 723-1216, fax 725-3326.

INFORMAL RESOLUTION/SECOND REVIEW

1. Prior to initiating the formal complaint procedure set forth below, and as a prerequisite to it, the student shall contact a Compliance Officer for assistance in resolving the matter informally within seven calendar days of the determination communicated by the DRC (if there was such a determination).

If the Compliance Officer is not successful within quickly achieving a satisfactory resolution (that is, generally within seven calendar days), the Compliance Officer will take the steps described in subparagraph "2" below.

2. Second Review Panel: in accordance with the informal resolution procedures outlined in Section VII of the Stanford University Policy and Procedure for Student Requests for Services and Accommodations, the Compliance Officer will convene an ad-hoc second review panel to review the issues raised. The panel will consist of the following (or their designees): the Compliance Officer reviewing the request, the Director of the DRC, the Dean of Students, and (depending upon the issues) other academic or administrative personnel as may be appropriate. This panel will review the request, investigate, and attempt to resolve the issues within seven calendar days of the request for or initiation of a second review. No formal report need be issued by the panel, but the panel will document the outcome of its review in a letter to the student. If the student is not satisfied with the panel's disposition of the matter, the student may file a formal complaint in accordance with the procedure described below.

FORMAL COMPLAINT

If the procedure set forth above for informal resolution does not yield a successful resolution, then the student may file a formal complaint in the following manner:

1. When to File Complaint: complaints shall be filed within ten calendar days of the end of the informal resolution process described above.
2. What to File: a complaint must be in writing and include the following:
   a) The grievant's name, address, email address, and phone number
   b) A full description of the problem
   c) A statement of the remedy requested
   d) A copy of the letter from the Second Review Panel setting forth the outcome of the informal grievance procedure described above
3. Where to File Complaint: the complaint shall be filed with the Compliance Officer at the Office of Campus Relations, Building 310 (mail code 2040; fax 650-725-3326).
4. Notice of Receipt: upon receipt of the complaint, the Compliance Officer reviews the complaint for timeliness and appropriateness for this grievance procedure, and provides the grievant with written notice acknowledging its receipt.

5. Investigation: the Compliance Officer or his or her designee (hereafter collectively referred to as the "grievance officer") shall promptly initiate an investigation. In undertaking the investigation, the grievance officer may interview, consult with and/or request a written response to the issues raised in the grievance from any individual the grievance officer believes to have relevant information, including faculty, staff, and students.
6. Representation: the grievant and the party against whom the grievance is directed shall have the right to have a representative. The party shall indicate whether he or she is to be assisted by a representative and, if so, the name of that representative. For purposes of this procedure, an attorney is not an appropriate representative.
7. Findings and Notification: upon completion of the investigation, the grievance officer will prepare and transmit to the student, and to the party against whom the grievance is directed, a final report containing a summary of the investigation, written findings, and a proposed disposition. This transmission will be expected within 45 calendar days of the filing of the formal complaint. The deadline may be extended by the Compliance Officer for good cause. The final report shall also be provided, where appropriate, to any University officer whose
authority will be needed to carry out the proposed disposition or to
determine whether any personnel action is appropriate.
8. Final Disposition: the disposition proposed by the grievance officer
shall be put into effect promptly. The grievant or any party against
whom the grievance or the proposed disposition is directed may ap-
peal. The appeal to the Provost (as set forth below) will not suspend
the implementation of the disposition proposed by the grievance of-
fer, except in those circumstances where the Provost decides that
good cause exists making the suspension of implementation appro-
priate.

URGENT MATTERS
Whenever the application of any of the time deadlines or procedures
set forth in this grievance procedure creates a problem due to the nature
of the complaint, the urgency of the matter, or the proximity of the up-
coming event, the Compliance Officer will, at the request of the griev-
ant, determine whether an appropriate expedited procedure can be fash-
ioned.

REMEDIES
Possible remedies under this grievance procedure include corrective
steps, actions to reverse the effects of discrimination or to end harass-
ment, and measures to provide a reasonable accommodation or proper ongo-
ing treatment. As stated above, a copy of the grievance officer’s report
may, where appropriate, be sent to University officer(s) to determine
whether any personnel action should be pursued.

APPEAL
Within ten calendar days of the issuance of the final report, the griev-
ant or the party against whom the grievance is directed may appeal to the
Provost the grievance officer’s determination.

An appeal is taken by filing a written request for review with one of the
Compliance Officers at the Office of Campus Relations, Building 170,
Room 114 (mail code 2040; fax 650-725-3326).

The written request for review must specify the particular substan-
tive and/or procedural basis for the appeal, and must be made on grounds
other than general dissatisfaction with the proposed disposition. Further-
more, the appeal must be directed only to issues raised in the formal com-
plaint as filed or to procedural errors in the conduct of the grievance pro-
cedure itself, and not to new issues.

The Compliance Officer shall forward the appeal to the Provost, and
also provide copies to the other party or parties. The review by the Prov-
est or his or her designee normally shall be limited to the following con-
considerations:
1. Were the proper facts and criteria brought to bear on the decision or,
   conversely, were improper or extraneous criteria brought to bear on
   the decision?
2. Were there any procedural irregularities that substantially affected the
   outcome?
3. Given the proper facts, criteria, and procedure, was the decision a
   reasonable one?

A copy of the Provost’s written decision will be expected within 30
calendar days of the filing of the appeal and shall be sent to the parties,
the Compliance Officer and, if appropriate, to the University officer
whose authority will be needed to carry out the disposition. The deadline
may be extended by the Provost for good cause. The decision of the Prov-
est on the appeal is final.

TITLE IX OF THE EDUCATION AMENDMENTS OF 1972

It is the policy of Stanford University to comply with Title IX of the
Education Amendments of 1972 and its regulations, which prohibit dis-
crimination on the basis of sex. Sally Dickson, Director of the Office of
Multicultural Development, has been appointed to coordinate the Uni-
versity’s efforts to comply with the law. Anyone who believes that, in
some respect, Stanford is not in compliance with Title IX and its regula-
tions should contact Ms. Dickson at (650) 723-3484.

OWNERSHIP AND USE OF STANFORD NAME

Stanford registered marks, as well as other names, seals, logos and other
symbols and marks that are representative of Stanford, may be used
solely with permission of Stanford. Items offered for sale to the public
bearing Stanford’s names and marks must be licensed.

1. Names and Marks Policy
   a) Legal Protection: the name “Stanford,” certain seals of Stanford
      University and the Block S symbol all are registered with the
      U.S. Patent and Trademark Office. Additional registrations
      have been made with the California Secretary of State. These
      and any other Stanford registered marks, as well as other names,
      seals, logos, and other symbols and marks that are representative
      of Stanford or its entities (hereinafter referred to as “names
      and marks”), whether or not registered, are the property of
      Stanford University. Such names and marks may be used solely
      with permission of Stanford, and their unauthorized use is in
      violation of this policy and is likely to be in violation of
      California, federal, or other law.
   b) Appropriate Use: the names and marks covered by this policy
      should be used only on materials that have been produced, or
      in connection with activities that are being engaged in, by faculty,
      students, staff, agents, or volunteers as part of their legitimate
      Stanford-sponsored or Stanford-sanctioned activities*. As
      already indicated, this is true not only in instances where the
      names or marks are registered, but in all instances where the
      impression may be created that the objects or activities in
      connection with which the names or marks are used are
      authorized by Stanford University. This policy restricts the
      use of the Stanford name or seal on business cards, and the
      use of the name or seal on letterhead for communications that
      are outside of an individual’s Stanford-sponsored activities or
      functions.
   c) Approval for Use: the President has delegated authority as
      follows for approving use of Stanford’s names and marks:
      To the Provost: for use in connection with educational and research
      activities;
      To the Chief Financial Officer: for use in connection with business
      activities; and
      To the Dean of the School of Medicine: for use in connection with
      medical activities.
   d) Sellers’ Responsibility: University departments, student groups,
      or entities having academic or business relationships with the
      University (such as Stanford Alumni Association, ASSU, and
      Stanford Bookstore, Inc.), or faculty/staff/students selling items
      bearing Stanford names and marks for fund raising or other
      purposes must acquire such items from a licensed supplier or
      be licensed if they are self-producing the items or using a non-
      licensed supplier.
   e) Design Review: OTL reviews the quality of the product bearing
      the names or marks and the design incorporating the names or
      marks prior to licensing.
   f) Artwork: camera-ready artwork of Stanford names and marks
      is provided with the License Agreement.
   g) Fees: there is a royalty fee, normally seven and one-half percent
      (7 1/2%) of the wholesale value of items sold. Net proceeds
      from the licensing program are designated for undergraduate
      student financial aid.
f) Give-Away Items: use of Stanford names or marks on items not sold to the public (such as give-away items or for charity events) requires permission and may be subject to a use fee.

3. Further Information

a) Approval Questions: questions as to the proper office for approval of use of Stanford's name and marks may be directed to the Office of the Director of University Communications.
b) Licencing Program: further information on the use of the registration symbols in conjunction with the registered marks, the use of the names and marks on clothing and other merchandise, license application forms, and sample license agreements may be obtained from the Office of Technology Licensing.

4. Related Policies: the following policies are related to the policy on ownership and Use of Stanford Name:

- Academic and Business Relationships with Third Parties (Guide Memo 14)
- Partisan Political Activities (Guide Memo 15.1)

* Where appropriate, registered marks may be shown with the symbol, designating their status as federally registered trademarks.

COPYING PRINTED MATERIAL FOR TEACHING AND RESEARCH

Federal copyright law governs copying intellectual property such as books and articles, including the making of copies for teaching and research. It is each faculty member's responsibility to be aware of and abide by the law, and the Provost’s Office periodically issues memoranda reminding faculty and staff members of their responsibilities in this area.

The memoranda, in addition, list those publishers with whom Stanford has an experimental photocopying license that permits Stanford faculty, staff, and students to make as many copies as they need of excerpts of any length (but not an entire book or issue of a periodical) in connection with the educational, research, or administrative functions of the University. For the most current information on this subject, faculty members should consult their department chair or the Provost’s Office.

DOMESTIC PARTNERS

In October 1990, Stanford University adopted a domestic partners policy. This policy, which implements the University's nondiscrimination policy, makes services that have historically been available to married students available on an equal basis to students with same-sex or opposite-sex domestic partners. These services include access to student housing, a courtesy card that provides access to University facilities, and the ability to purchase medical care at Cowell Health Service. A domestic partnership is defined as an established long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

SEXUAL HARASSMENT

What follows is a summary of the University's Sexual Harassment Policy, which is published in its complete form in the Administrative Guide Memo 23.2.

POLICY

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation, or exploitation. It is expected that students, faculty, and staff will treat one another with respect.

All students, faculty, and staff are subject to this policy. Individuals who violate this policy are subject to discipline up to and including discharge, expulsion, or other appropriate sanction.

Reports of sexual harassment are taken seriously and will be dealt with promptly. The specific action taken in any particular case depends on the nature and gravity of the conduct reported, and may include intervention, mediation, investigation, and the initiation of grievance and disciplinary processes as discussed more fully below. Where sexual harassment is found to have occurred, the University will act to stop the harassment, act to prevent its recurrence, and discipline those responsible.

The University recognizes that confidentiality is important. Sexual harassment advisers and others responsible to implement this policy will respect the confidentiality and privacy of individuals reporting or accused of sexual harassment to the extent reasonably possible. Examples of situations where confidentiality cannot be maintained include circumstances when the University is required by law to disclose information (such as in response to legal process) and when disclosure is required by the University's outweighing interest in protecting the rights of others.

Reprisals against an individual who in good faith reports or provides information in an investigation about behavior that may violate this policy are against the law and will not be tolerated. Intentionally providing false information, however, is grounds for discipline.

Stanford is committed to the principles of free inquiry and free expression. Vigorous discussion and debate are fundamental to the University, and this policy is not intended to stifle teaching methods or freedom of expression generally, nor will it be permitted to do so. Sexual harassment, however, is neither legally protected expression nor the proper exercise of academic freedom; it compromises the integrity of the University, its tradition of intellectual freedom and the trust placed in its members.

WHAT IS SEXUAL HARASSMENT?

Unwelcome sexual advances, requests for sexual favors, and other visual, verbal, or physical conduct of a sexual nature constitute sexual harassment when:

1. It is implicitly or explicitly suggested that submission to or rejection of the conduct will be a factor in academic or employment decisions or evaluations, or permission to participate in a University activity; or
2. The conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance, or creating an intimidating or hostile academic, work, or student living environment.

Determining what constitutes sexual harassment depends upon the specific facts and the context in which the conduct occurs. Sexual harassment may take many forms—subtle and indirect, or blatant and overt. For example:

- It may be conduct toward an individual of the opposite sex or the same sex.
- It may occur between peers or between individuals in a hierarchical relationship.
- It may be aimed at coercing an individual to participate in an unwanted sexual relationship or it may have the effect of causing an individual to change behavior or work performance.
- It may consist of repeated actions or may even arise from a single incident if sufficiently egregious.

The University’s Policy on Sexual Assault (see Stanford Administrative Guide Memo 23.3) may also apply when sexual harassment involves physical contact.

WHAT TO DO ABOUT SEXUAL HARASSMENT

The following are the primary methods for dealing with sexual harassment at Stanford. They are not required to be followed in any specific order. However, early informal methods are often effective in correcting questionable behavior.

CONSULTATION

Consultation about sexual harassment is available from the Sexual Harassment Advisers (including residence deans), human resources personnel, counselors at Counseling and Psychological Services (CAPS) or the Help Center, chaplains at Memorial Church, ombudspersons, and others. A list of Sexual Harassment Advisers is available in the brochure, Understanding Stanford's Sexual Harassment Policy. The brochure can be obtained from the Sexual Harassment Policy Office, Building 310, Main Quad, Room 201, Stanford, CA 94305, (650) 723-1583. The information contained in the brochure, including an up-to-date list of Sexual Harassment Advisers, is available on-line at http://www.stanford.edu/
THIRD PARTY INTERVENTION

Depending on the circumstances, third party intervention in the workplace, student residence, or academic setting may be attempted. Third party interveners may be the Sexual Harassment Advisers, human resources professionals, the ombudspersons, other faculty or staff, or sometimes mediators unrelated to the University.

When third party intervention is used, typically the third party will meet privately with each of the persons involved, try to clarify their perceptions, and attempt to develop a mutually acceptable understanding that can insure that the parties are comfortable with their future interactions. Other processes, such as a mediated discussion among the parties or with a supervisor, may also be explored in appropriate cases.

Possible outcomes of third party intervention include explicit agreements about future conduct, changes in workplace assignments, substitution of one class for another, or other relief, where appropriate.

FORMAL GRIEVANCE AND DISCIPLINARY PROCESSES

Grievance or disciplinary processes may be pursued as applicable. The applicable grievance procedure depends on the circumstances and the status of the person bringing the charge and the person against whom the charge is brought. Generally, the process consists of the grievant's submission of a written statement, an investigation by a University representative, followed by a decision and, in some cases, the possibility of one or more appeals, usually to Stanford administrative officers at higher levels. The relevant procedure (see below) should be read carefully, since the procedures vary considerably.

If the identified grievance officer has a conflict of interest, an alternate will be arranged, and the Sexual Harassment Policy Office can help assure that this occurs.

In most cases, grievances must be brought within a specified time after the action complained of. While informal resolution efforts will not automatically extend the time limits for filing a grievance, in appropriate circumstances the complainant and the other relevant parties may mutually agree in writing to extend the time for filing a grievance.

The following are the established grievance procedures. They are available through Stanford’s website; copies may also be obtained from the Sexual Harassment Policy Office.

Academic Staff Grievance Procedure (see Research Policy Handbook)
Collective Bargaining Agreements for unit members
Faculty Grievance Procedure (see Faculty Handbook)
Staff Dispute Resolution, including student employees (see Stanford Administrative Guide Memo 22.10)

Student Academic Grievance Procedure (see Stanford University Bulletin, Information and Regulations Governing Student Conduct and Procedures for their Enforcement)

Student Nonacademic Grievance Procedure (for additional information, consult the Director of the Office of Campus Relations)

In appropriate cases, disciplinary procedures may be initiated. The applicable disciplinary procedure depends on the status of the individual whose conduct is in question. For example, faculty are subject to the Statement on Faculty Discipline and students to the Fundamental Standard.

PROCEDURAL MATTERS

INVESTIGATIONS

If significant facts are contested, an investigation may be undertaken. The investigation will be conducted in a way that respects, to the extent possible, the privacy of all of the persons involved. In appropriate cases, professional investigators may be asked to assist in the investigation. The results of the investigation may be used in the third party intervention process or in a grievance or disciplinary action.

RECORD KEEPING

The Sexual Harassment Policy Office will track reports of sexual harassment for statistical purposes and report at least annually to the University President concerning their number, nature, and disposition.

In the other instances (third party intervention, grievances, and disciplinary actions), the Sexual Harassment Policy Office may keep confidential records of reports of sexual harassment and the actions taken in response to those reports, and use them to identify individuals or departments likely to benefit from training so that training priorities can be established. No records will be retained in cases where the individual accused was not informed that there was a complaint.

COSTS

California law provides, in part, “an employer shall indemnify its employee for all that the employee necessarily expends or loses in direct consequence of the discharge of his or her duties as such . . . .” The issue of indemnification obviously turns on the facts and circumstances of each situation. On the other hand, individuals who violate this policy and/or their schools, institutes, or other units may be required to contribute to any costs and expenses incurred as a result of behavior that is wrongful and/or contrary to the discharge of an employee’s duties.

RESOURCES FOR DEALING WITH SEXUAL HARASSMENT

Persons who have concerns about sexual harassment should contact any Sexual Harassment Adviser listed in the brochure, or the Sexual Harassment Policy Office. Reports should be made as soon as possible: the earlier the report, the easier it is to investigate and take appropriate remedial action. When reports are long delayed, the University will try to act to the extent it is reasonable to do so, but it may be impossible to achieve a satisfactory result after much time has passed.

Likewise, anyone who receives a report or a grievance involving sexual harassment should promptly consult with a Sexual Harassment Adviser.

There are a number of individuals specially trained and charged with specific responsibilities in the area of sexual harassment. In brief:

Sexual Harassment Advisers—Sexual Harassment Advisers serve as resources to individuals who wish to discuss issues of sexual harassment, whether because they have been harassed or because they want information about the University’s policy and procedures. There is usually at least one adviser assigned to each of the schools at the University and to each large work unit; the residence deans also have been appointed as Sexual Harassment Advisers.

Director of the Sexual Harassment Policy Office—He/she is responsible for the implementation of this policy; provides advice to individuals when requested; supervises the other advisers; encourages and assists prevention education for students, faculty, and staff; keeps records show-
ing the disposition of complaints; and generally coordinates matters arising under this policy. Because education and awareness are the best ways to prevent sexual harassment, developing awareness, education and training programs, and publishing informational material are among the most important functions of the Sexual Harassment Policy Office.

As indicated earlier, individuals with concerns about sexual harassment may also discuss their concerns informally with psychological counselors (for example, through CAPS or the HELP Center), chaplains (through the Memorial Chapel), or University or Medical School ombudspersons.

EXTERNAL REPORTING

Sexual harassment is prohibited by state and federal law. In addition to the internal resources described above, individuals may pursue complaints directly with the government agencies that deal with unlawful harassment and discrimination claims, for example, the U.S. Equal Employment Opportunity Commission (EEOC), the Office for Civil Rights (OCR) of the U.S. Department of Education, and the State of California Department of Fair Employment and Housing (DFEH). These agencies are listed in the Government section of the telephone book.

NOTE ON CONSENSUAL RELATIONSHIPS

There are special risks in any sexual or romantic relationship between individuals in inherently unequal positions (such as teacher and student, supervisor and employee, or student resident and the individual who supervises the day-to-day student living environment). Parties in such a relationship assume those risks. Such relationships may undermine the real or perceived integrity of the supervision and evaluation provided, and the trust inherent particularly in the student–faculty relationship. They may, moreover, be less consensual than the individual whose position confers power believes. The relationship is likely to be perceived in different ways by each of the parties to it, especially in retrospect.

Moreover, such relationships may harm or injure others in the academic or work environment. Relationships in which one party is in a position to review the work or influence the career of the other may provide grounds for complaint when that relationship gives undue access or advantage, restricts opportunities, or creates a hostile environment for others. Furthermore, circumstances may change, and conduct that was previously welcome may become unwelcome. Even when both parties have consented at the outset to a romantic involvement, this past consent does not remove grounds for a charge based upon subsequent unwelcome conduct.

POLICY REVIEW AND EVALUATION

This policy went into effect on October 6, 1993, and was amended on November 30, 1995. It is subject to periodic review, and any comments or suggestions should be forwarded to the Sexual Harassment Policy Office.

POLICY REFERENCE

Stanford’s Sexual Harassment policy is published in its entirety as Administrative Guide Memo 23.2. The Administrative Guide is a public document available for review with local personnel administrators, at any Personnel Office, at the reference desk in Green Library, and on-line in Portfolio in the Office category.

RESOURCES

A brochure containing the policy, a list of current sexual harassment advisers, confidential resources, and other helpful information is available on-line at http://www.stanford.edu/group/SexHarass/, and in printed form from the Sexual Harassment Policy Office at (650) 723-1583, Building 310, Main Quad, room 201, MC: 2100. Copies of the University policy on sexual assault, which complements this sexual harassment policy, as well as all other documents mentioned in this section, are also available at the Sexual Harassment Policy Office.

All faculty, staff, and students who have questions regarding this policy and its enforcement can consult with a Sexual Harassment Adviser or can be directed to the local Personnel Officer or Regional Human Relations Manager. Faculty members should contact their dean or department chair, and students should contact the Vice Provost and Dean of Student Affairs.

Sexual Harassment Policy Office—

Laraine Zappert, Director, Clinical Associate Professor, Psychiatry and Behavioral Sciences telephone (650) 327-8259, 723-1583; e-mail: Harass@leland.stanford.edu

Virginia Pollard, Assistant Director; telephone 723-1583; e-mail: vpollard@leland

POLICY ON SEXUAL ASSAULT

What follows is a summary of the University’s Policy on Sexual Assault which is published in complete form in the Administrative Guide Memo 23.3.

Background—Stanford University’s policy and procedures on sexual harassment are published in Administrative Guide Memo 23.2 and are republished annually in the Stanford Bulletin and elsewhere. This statement supplements them, providing Stanford University’s policy and procedures specifically concerning sexual assault. This statement has been enacted by Stanford University in accordance with California State Law, Assembly Bill 3098, Postsecondary Education: Student Safety, July, 1990.

Definition—For the purposes of this statement by the University, “sexual assault” includes, but is not limited to, rape, forced sodomy, forced oral copulation, rape by a foreign object, sexual battery, or threat of sexual assault.

Policy—Sexual assault by force or coercion, including deliberate coercion through the use of drugs or alcohol, is absolutely unacceptable at Stanford University. Any member of the Stanford community who commits sexual assault at or on the grounds of the University, or at any of the University’s off-campus facilities or activities, or at the facilities or activities of any affiliated student organization, will face maximal institutional sanctions, in addition to any prosecutions external authorities may undertake. Stanford University is committed to providing information on services, resources, and treatment available to victims of sexual assault.

Notification—With the consent of the victim, charges of sexual assault received by University offices or personnel shall be communicated promptly to the Department of Public Safety, 711 Serra Street, telephone (9)-911 for emergency response or (650) 723-9633 during normal business hours, or, in the case of a student, to the sexual assault response team at Counseling and Psychological Services (CAPS) at Cowell Student Health Center, 606 Campus Drive, telephone 723-3785.

Legal Reporting Requirements—Health care professionals are expected to fulfill legally mandated reporting requirements.

Emergency Services Available to Victims—Victims of sexual assault are urged to seek immediate attention from emergency police, medical, and counseling services. On the Stanford campus and in the immediate vicinity, the following provide 24-hour response and will arrange for police assistance, medical assistance, emotional support services, and advocacy and support:

“911” Emergency Network: dial 9-911 from University phones or 911 from outside phones.

Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, telephone (408) 299-5311.

Mid-Peninsula Rape Crisis Center, 4161 Alma Street, Palo Alto, telephone (650) 493-RAPE.

Sexual Assault Response Team (CSART), for students, at the Cowell Student Health Center, telephone (650) 723-3785.

Stanford University Hospital, 300 Pasteur Drive, Stanford, telephone (650) 723-5111.

Non-Emergency Resources—Additional resources for students are available at Cowell Student Health Center (650-723-3785), including short-term counseling, referral to long-term therapy, follow-up pregnancy testing, and testing and treatment for sexually transmitted diseases.
behalf of the University in the political arena, they must do so in accord-

Some threshold of time or money spent on lobbying that triggers reg-

istration and reporting requirements. Regardless of thresholds, how-

ever, no University employee—other than the following individuals,
on matters under their jurisdiction—may lobby on behalf of the Uni-

versity without specific authorization:

POLITICAL ACTIVITIES

Stanford University, as a charitable entity, is subject to federal, state,

and local laws and regulations regarding political activities—campaign

activities, lobbying, and the giving of gifts to public officials.

While all members of the University community are naturally free to

express their political opinions and engage in political activities to what-

ever extent they wish, it is very important that they do so only in their

individual capacities and avoid even the appearance that they are speak-

ing or acting for the University in political matters.

In the limited circumstances where individuals must speak or act on

behalf of the University in the political arena, they must do so in accord-

dance with the provisions of this Guide Memo.

1. Summary of Legal Requirements and Restrictions

a) Campaign Activities: contributions of money, goods, or services
to candidates for political office and in support of or opposition to
ballot measures are subject to a wide variety of political laws. Depending on the jurisdiction and the campaign, political contributions may be prohibited or limited and, in nearly all cases, are subject to a complicated series of rules. Because of the University’s tax-exempt status, the University is legally prohibited from endorsing candidates for political office or making any contribution of money, goods, or services to candidates. It is important, therefore, that no person inadvertently cause the University to make such a contribution.

b) Lobbying: lobbying can generally be described as any attempt to
influence the action of any legislative body (for example, Congress, state legislatures, county boards, city councils, and their staffs) or any federal, state, or local government agency. Laws regulating lobbying exist at the federal, state, and local levels but can differ widely in scope, depending on the jurisdic-
tion. Some laws, for example, only regulate lobbying of the legislative branch. Others, however, also cover lobbying of administrative agencies and offices in the executive branch (for example, lobbying for federally-funded grants). To one degree or another, however, most lobbying laws require registration and reporting by individuals engaged in attempts to influence governmental action.

Tax-exempt organizations are permitted to lobby, and the University engages in lobbying on a limited number of issues, mostly those affecting education, research, and related activities. There is usually

Ongoing Case Management Procedures—Both informal procedures and formal grievance procedures for case management of sexual assault charges are given in the University’s policy on Sexual Harassment appearing as Administrative Guide Memo 23.2 and published annually in the Stanford Bulletin. Victims are to be kept informed by those responsi-
ble for those procedures of the status of any disciplinary proceedings and the results of any disciplinary action or appeal, providing that the victim agrees in advance, in writing, to treat this information as confi-
dential. The offices of the Dean of Students are available to help student victims deal with academic difficulties that may arise because of the victimization and its impact.

Information Requests and Confidentiality—The University offices responding to charges of sexual assault have established protocols for protecting confidentiality and for handling inquiries from the press, concerned students, and parents.

Information about Options—The University offices responding to charges of sexual assault will inform victims, at a minimum, of the options of: criminal prosecution, civil prosecution, the disciplinary process, responding to charges of sexual assault have established protocols for victimization and its impact.

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4) No person supporting candidates for public office or engaging in other political activities may use University space or facilities or receive University support, except in the limited ways described in section 3A, below.

5) No person may use for lobbying activities federally-funded contracts or grant money received by the University.

Even the foregoing activities that are only restricted, rather than prohibited, may be subject to limitations imposed by law. Therefore, any person engaging in the activity, or contemplating doing so, should consult with the Director of Government and Community Relations.

b) Guidelines for Avoiding Prohibited Partisan Political Activities: the following guidelines should assist in preventing the involvement or apparent involvement of the University in political activities in support of or opposition to any candidate for elective public office, that is, partisan political activities. Except in the limited circumstances set forth in section 3A, below:

1) Use of Name and Seal: neither the name nor seal of the University or of any of its schools, departments, or institutions should be used on letters or other materials intended for partisan political purposes.

2) Use of Address and Telephones: no University office should be used as a return mailing address for partisan political mailings, and telephone service that is paid by the University, likewise, should not be used for partisan political purposes. (Obviously, a student's dormitory room and telephone service that are personal to the student may be used for these purposes.)

3) Use of Title: the University title of a faculty or staff member or other person should be used only for identification and should be accompanied by a statement that the person is speaking as an individual and not as a representative of the University.

4) Use of Services and Equipment: University services, such as Interdepartmental Mail; equipment, such as duplicating machines, computers, and telephones; and supplies should not be used for partisan political purposes.

5) Use of Personnel: no University employee may, as part of his or her job, be requested to perform tasks in any way related to partisan political purposes.

3. Permissible Activities

a) In General: as noted above, the federal, state, and local laws which limit the partisan political activities that can take place in University facilities and with University support in no way inhibit the expression of personal political views by any individual in the University community. Nor do they forbid faculty, students, or staff from joining with others in support of candidates for office or in furtherance of political causes. There is no restriction on discussion of political issues or teaching of political techniques. Academic endeavors which address public policy issues are in no way affected.

Because the University encourages freedom of expression, political activities which do not reasonably imply University involvement or identification may be undertaken so long as regular University procedures are followed for use of facilities. Examples of permissible activities are:

1) Use of areas, such as White Plaza, for tables, speeches, and similar activities.

2) Use of auditoriums for speeches by political candidates, but subject to rules of the Internal Revenue Service, the Federal Election Commission, and the California Fair Political Practices Commission, and other applicable laws. Arrangements must be made with University Events and Services. (See also Guide Memo 82.1, Public Events, for more information.)

To reiterate, because tax and political compliance laws impose restrictions, and even prohibitions, on certain political activities and on the use of buildings and equipment at a non-profit institution such as the University, any such activities must be in compliance with these legal requirements. Individuals taking political positions for themselves or groups with which they are associated, but not as representatives of the University, should clearly indicate, by words and actions, that their positions are not those of the University and are not being taken in an official capacity on behalf of the University.

b) Limited University Political Activities: limited activities relating to specific federal, state, or local legislation or ballot initiatives are permissible where (1) the subject matter is directly related to core interests of the University's activities; (2) the President has determined that the University should take a position; and (3) the individuals who speak or write on the University's behalf are specifically authorized to do so.

4. Responsibility for Interpretation: the Director of Government and Community Relations, in consultation with the General Counsel, is the administrative officer responsible for interpretation and application of the above guidelines. Questions on whether planned student activities are consistent with the University's obligations should be directed to the Dean of Students, who will consult with the Director of Government and Community Relations and/or the General Counsel. All other questions on whether planned activities are consistent with the University's obligations should be addressed directly to the Director of Government and Community Relations or the General Counsel.

CAMPUS DISRUPTION

What follows is a summary of the University's policy on campus disruption, which is published in its complete form in the Administrative Guide.

Because the rights of free speech and peaceful assembly are fundamental to the democratic process, Stanford firmly supports the rights of all members of the University community to express their views or to protest against actions and opinions with which they disagree.

All members of the University also share a concurrent obligation to maintain on the campus an atmosphere conducive to scholarly pursuits, to preserve the dignity and seriousness of University ceremonies and public exercises, and to respect the rights of all individuals.

The following regulations are intended to reconcile these objectives.

It is a violation of University policy for a member of the faculty, staff, or student body to (1) prevent or disrupt the effective carrying out of a University function or approved activity, such as lectures, meetings, interviews, ceremonies, the conduct of University business in a University office, and public events; (2) obstruct the legitimate movement of any person about the campus or in any University building or facility.

Members of the faculty, staff, and student body have an obligation to leave a University building or facility when asked to do so in the furtherance of the above regulations by a member of the University community acting in an official role and identifying himself or herself as such; members of the faculty, staff, or student body also have an obligation to identify themselves, when requested to do so by such a member of the University community who has reasonable grounds to believe that the person(s) has violated section (1) or (2) of this policy and who has so informed the person(s).

The policy has been applied to the following actions: refusal to leave a building which has been declared closed; obstructing the passage into or out of buildings by sitting in front of doorways; preventing University employees from entering their workplace; preventing members of a class from hearing a lecture or taking an examination, or preventing the instructor from giving a lecture, by means of shouts, interruptions, or chants; preventing others from hearing a scheduled speaker by means of shouts, interruptions, or chants; refusing to leave a closed meeting when unauthorized to attend; and intruding upon or refusing to leave a private interview.

It should be understood that while the above are examples of extraordinary disruptive behavior, the application of the policy also takes situational factors into consideration. Thus, for example, conduct appropriate at a political rally might constitute a violation of the Policy on Campus Disruption if it occurred within a classroom.

There is no "ordinary" penalty which attaches to violations of the Policy on Campus Disruption. In the past, infractions have led to penal-
The University, as an educational institution, approaches student conduct in its student conduct Program at Cowell Student Health Service. The goal of this Policy is to reduce the abuse and illegal use of alcohol and other drugs, and the human and material costs associated with it. The University, as an educational institution, approaches student conduct from a perspective that places emphasis on individual responsibility and development. Education about and prevention of alcohol and other drug-related problems will continue to be the primary emphasis and goal. However, the University expects students, as individuals and as members of groups, to conduct themselves in accordance with this and all other University policies governing student conduct.

* Controlled substances are those defined in 21 U.S.C. 812; they include, but are not limited to, such substances as marijuana, heroin, cocaine, and amphetamines.

POLICY

It is the policy of the University to maintain a drug-free workplace and campus. The unlawful manufacture, distribution, dispensation, possession, and/or use of controlled substances or the unlawful possession, use, or distribution of alcohol is prohibited on the Stanford campus, in the workplace, or as part of any of the University’s activities. The workplace and campus are presumed to include all Stanford premises where the activities of the University are conducted. Violation of this policy may result in disciplinary sanctions up to and including termination of employment or expulsion of students. Violations may also be referred to the appropriate authorities for prosecution. This policy will be reviewed at least biennially.

The University will continue to comply with all applicable state and federal laws, including the Americans with Disabilities Act.

SOME APPLICATIONS

No University funds or funds collected by the University may be used in a way which violates the policy. In student residences, house funds (funds collected by the University) may not be used to buy alcohol that is then served to persons under the age of 21. Therefore, because the majority of freshmen are under 21, house funds for all-freshman residences should not be used to buy alcohol. In other residences, the decision to use student-collected or house funds to buy alcohol should be made thoughtfully, fairly, lawfully, and in a way that respects the views of the students.

Party planners are responsible for planning and carrying out events in compliance with this Policy. At least one house or organization officer must assume responsibility for an event’s compliance with the Policy, and their names must be made available to Stanford’s Department of Public Safety and the University upon request.

CONSEQUENCES OF VIOLATION

Educational and rehabilitative measures will be the preferred response to infractions of the Policy unaccompanied by more egregious misconduct. Penalties are calibrated according to the severity of the violation. Misbehavior associated with drug or alcohol use and abuse may result in one or more of the following University consequences:

- Individuals who violate the University Residence Agreement may lose their University student housing privileges.
- Individuals who violate the University’s terms and conditions for student organization recognition as defined in the Student Organization Handbook may be subject to expulsion from the student organization.
- Student groups which violate the Policy may face suspension of social privileges, as well as the loss of University recognition, meeting space, and housing or other related privileges.
- Individual students who violate the Fundamental Standard may be subject to the University’s student judicial process.

“Students should understand that inebriation is never an excuse for misconduct, that the careless or willful reduction, through the use of alcohol or other intoxicants, of their own ability to think clearly, exercise good judgment, and respond to rational intervention may invoke more stringent penalties than otherwise might be levied.

Penalties will be imposed according to the facts and circumstances of each case. They can be imposed singly or in combination by the Office of Residential Education/Graduate Residences, the Office of Student Activities, the Dean of Students Office, and the Office of Judicial Affairs.

CIVIL LIABILITY

While the law regarding civil liability is complex, it is important to know that under some circumstances party hosts, sponsors, bartenders, or others might be held legally liable for the consequences of serving alcohol to underage drinkers or to obviously intoxicated persons. Social
hosts or party planners could be sued and found personally responsible for damages to the injured party(ies) including:

Specific damages. These are damages which are measurable. For example, when bodily injury results in medical expenses or lost wages.

General damages. These are damages which cannot be specifically measured in terms of dollar amount. For example pain and suffering resulting from bodily injury.

Punitive damages. These are damages which are intended to serve as an example to others and to discourage behavior which is deemed highly undesirable to society.

CRIMINAL LIABILITY

Stanford University is not a sanctuary from the enforcement of state and local laws. Students and others on campus who violate the law may be and have been arrested and prosecuted. Primary responsibility for law enforcement, including that related to alcohol, rests with law enforcement agencies, primarily the Stanford Police Department. Uniformed officers who patrol the campus and respond to calls are deputized by the Sheriff of Santa Clara County and are fully empowered and authorized to stop vehicles, make arrests, and enforce all laws. Laws are subject to change; consequently, the following information is illustrative but must not be relied on as a complete and current citing of relevant laws. More information is available at the Stanford Department of Public Safety, 711 Serra Street.

Generally, as of January, 1997, it is a criminal offense:

1. To provide any alcoholic beverage to a person under 21 (California Business and Professions Code 25638).
2. To provide any alcoholic beverage to an obviously intoxicated person (California Business and Professions Code 25602).
3. For any person under age 21 to purchase alcohol (California Business and Professions Code 25628).
4. To be under the influence of alcohol or another drug in a public place and unable to exercise care for one's own safety or that of others (California Penal Code 647(f)).
5. For persons under 21 to possess alcohol in any public place or any place open to the public (for example, public places in student residences) (Business and Professions Code 25662).
6. To operate a motor vehicle while under the influence of alcohol or any other drug. Presumed to be driving under the influence (DUI) with a blood alcohol level (BAL) of 0.08% or higher. Can be shown to be DUI with a BAL of 0.05% or higher (California Vehicle Code 23152).
7. For people under the age of 21 to drive with a BAL of 0.01% or greater (California Vehicle Code 23136 and 23137).
8. For people under the age of 21 to drive with a BAL of 0.05% or greater (California Vehicle Code 23140).
9. To operate a motor vehicle while under the influence of alcohol or any drug and cause injury to another (California Vehicle Code 23153).
10. To ride a bicycle while under the influence of alcohol, drugs, or both (California Vehicle Code 21200.5).
11. To have an open container of alcohol in a motor vehicle; and, for persons under 21 to drive a vehicle carrying alcohol or to possess alcohol while in a motor vehicle (California Vehicle Code 23223, 23221).
12. To have in one's possession, or to use, false evidence of age and identity to purchase alcohol (California Business and Professions Code 25661).
13. To manufacture a fraudulent driver's license or identification (California Penal Code 470).
14. To possess an open container of alcohol in a public place or any place open to the public. Applies in Palo Alto jurisdiction (Business and Professions Code 25620).
15. To be in possession of an unregistered keg. All kegs sold must be registered at the time of purchase. Identification tags must be placed on all kegs in order to allow kegs to be traced if the contents are used in violation of the law (Business and Professions Code 25659.5).
16. Rape. To have sex with a person who is unable to provide informed consent, for example, under the influence of alcohol or another drug or unconscious (passed out) (California Penal Code 261).
17. To unlawfully possess certain controlled substances, including Rohypnol, amphetamines, certain hallucinogens, depressants, and designer drugs (California Health and Safety Code 11377).
18. To illegally manufacture, sell, distribute, or possess controlled substances (those listed in Schedules I through V of the Controlled Substances Act) (21 SC 812; 21 SC 828, 841, 844, 845, 845A).
20. To transport, sell, or distribute marijuana to a minor or to use a minor to transport, sell, or distribute marijuana (California Health and Safety 11361).

WHERE TO GET HELP

In the event of a life threatening emergencies call 9-911 from on-campus and 911 from off-campus.

Campus Resources—(Area Code 650). Counseling and Psychological Services, 24 hours (723-3785); The Alcohol and Other Drug Abuse Prevention Program (723-3429); Stanford Alcohol and Drug Treatment Center (723-6682); Cowell Student Health Center's Medical Advice Line, 24 hours (723-4841); Campus Ministries (723-3114); The Bridge, 24-hour Peer Counseling (723-3392).

The Alcohol and Other Drug Abuse Prevention Program at Cowell: provides information and referral, educational trainings and workshops, and non-clinical consultations for groups and individuals. The program utilizes a harm reduction approach to prevent problems associated with the use of alcohol, tobacco, and other drugs (723-3429).

The Office of Student Activities at Tresidder Memorial Union: provides workshops and training, publications, and party planning consultations. Web site: http://www-leland.stanford.edu/dept/OSA/party/ (723-2733).

Community Resources—The National Council for Alcoholism and Drug Dependency, 24-hour hotline (408) 292-9945, Alcoholics Anonymous (650) 573-6811 or (408) 297-3555, Alanon (650) 873-2356 or (408) 379-1 051, Cocaine Anonymous (800) 234-0420 or (408) 374-8009, Narcotics Anonymous (650) 572-3257 or (408) 298-4200.

SMOKE-FREE ENVIRONMENT

What follows is a summary of the University's policy on a smoke-free environment, which is published in its complete form in the Administrative Guide.

Policy—It is the policy of Stanford University that smoking of tobacco products in enclosed buildings and facilities and during indoor or outdoor events (and the selling of tobacco products) on the campus is prohibited. Subject to renegotiations, the University will comply with any current lease agreement permitting the sale of tobacco products on the campus.

Applicability—This policy applies to all academic and administrative units of Stanford University, including SLAC, and all Residence Halls. This policy does not supersede more restrictive policies which may be in force in compliance with federal, state, or local laws or ordinances. The policy was effective in the Residence Halls and other campus student housing locations at the beginning of the 1994-1995 academic year.

Guidelines—Smoking is prohibited in classrooms and offices, all enclosed buildings and facilities, in covered walkways, in University vehicles, during indoor and outdoor athletic events, and during other University sponsored or designated indoor or outdoor events.

Ashtrays will not be provided in any enclosed University building or facility. Tobacco products will not be sold at the University. "Smoking Prohibited" signs will be posted.

Smoking is permitted in outdoor areas, except during organized events. Outdoor smoking areas should be located far enough away from doorways, open windows, covered walkways, and ventilation systems to prevent smoke from entering enclosed buildings and facilities. To
accommodate faculty, staff, and students who smoke. Vice Presidents, Vice Provosts, and Deans may designate certain areas of existing courtyards and patios as smoking areas in which case ashtrays must be provided. Costs associated with providing designated smoking areas and ashtrays will be absorbed by the specific academic or administrative unit(s).

Enforcement—This policy relies on the consideration and cooperation of smokers and non-smokers. It is the responsibility of all members of the University community to observe and follow this policy and its guidelines.

Smoking cessation programs are available for faculty and staff through the Center for Research in Disease Prevention, and the Health Improvement Program (HIP). Students may contact the Health Promotion Program (HPP) through the Student Health Center for smoking cessation information or programs.

Faculty, staff, and students repeatedly violating this policy may be subject to appropriate action to correct any violation(s) and prevent future occurrences.

Implementation and Distribution—Copies of this policy will be disseminated by the Vice President for Faculty and Staff Services, and the Vice Provost for Student Affairs to all faculty, staff, and students and to all new members of the University community.

UNIVERSITY STATEMENT ON PRIVACY

Stanford University has an interest in ensuring that the privacy of its students, faculty, and staff is respected, and that no activities interfere with education, research, or residential life.

The University is private property; however, some areas of the campus typically are open to visitors. These areas include White Plaza, public eating areas (such as those at Tresidder Union), outdoor touring areas, and locations to which the public has been invited by advertised notice (such as for public educational, cultural, or athletic events). Even in these locations, visitors must not interfere with the privacy of students, faculty, and staff, or with educational, research, and residential activities. The University may revoke at any time permission to be present in these, or any other areas. Visitors should not be in academic or residential areas unless they have been invited for appropriate business or social purposes by the responsible faculty member, student, or staff member.

No commercial activity, including taking photos or similar audio or visual recordings that are sold to others or otherwise used for commercial purposes, may occur on the campus without the University’s permission. Requests for permission should be submitted to the Director of University Communications or, as appropriate, the Dean of Students, the Department of Athletics, or the Office of Public Events. Recognized student groups and official units of the University will be granted such permission so long as they do not violate privacy or property interests of others; so long as any sale of their products is predominantly on campus to students, faculty, and staff; and so long as they comply with applicable University policies and procedures.

Violators of this policy may be subject to criminal and/or civil liability, as well as University disciplinary action.

COMPUTER AND NETWORK USAGE POLICY

POLICY STATEMENT

Users of Stanford network and computer resources have a responsibility not to abuse the network and resources and to respect the rights of others. This policy provides guidelines for the appropriate and inappropriate use of information technologies.

POLICY PURPOSE

The purpose of the Computer and Network Usage Policy is to ensure an information infrastructure that promotes the basic missions of the University in teaching, learning and research. Computers and networks are powerful enabling technologies for accessing and distributing the information and knowledge developed at the University and elsewhere.

As such, they are strategic technologies for the current and future needs of the University. Because these technologies give individuals the ability to access and copy information from remote sources, users must be mindful of the rights of others to their privacy, intellectual property and other rights. This Usage Policy codifies what is considered appropriate usage of computers and networks with respect to the rights of others. With the privileges to use the information resources of the University come specific responsibilities outlined in this Policy.

SUMMARY

Users of University information resources must respect software copyrights and licenses, respect the integrity of computer-based information resources, refrain from seeking to gain unauthorized access, and respect the rights of other computer users. This policy covers appropriate use of computers, networks, and information contained therein.

1. POLICY SCOPE AND APPLICABILITY
a) Applicability: this policy is applicable to all University students, faculty and staff and to others granted use of Stanford University information resources. This policy refers to all University information resources whether individually controlled or shared, stand-alone or networked. It applies to all computer and computer communication facilities owned, leased, operated, or contracted by the University. This includes word processing equipment, personal computers, workstations, mainframes, minicomputers, and associated peripherals and software, regardless of whether used for administration, research, teaching or other purposes.

b) Locally Defined and External Conditions of Use: individual units within the University may define "conditions of use" for information resources under their control. These statements must be consistent with this overall policy but may provide additional detail, guidelines and/or restrictions. Where such "conditions of use" exist, enforcement mechanisms defined therein shall apply. These individual units are responsible for publicizing both the regulations they establish and their policies concerning the authorized and appropriate use of the equipment for which they are responsible. Where use of external networks is involved, policies governing such use also are applicable and must be adhered to.

c) Legal Process: the University does not exist in isolation from other communities and jurisdictions and their laws. Under some circumstances, as a result of investigations, subpoena or lawsuits, the University may be required by law to provide electronic or other records or other information related to those records or relating to use of information resources.

2. POLICIES: a user of University information resources who is found to have purposely or recklessly violated any of the following policies will be subject to disciplinary action up to and including discharge, dismissal, expulsion, and/or legal action.

a) Copyrights and Licenses: computer users must respect copyrights and licenses to software and other on-line information.

1) Copying: all software protected by copyright must not be copied except as specifically stipulated by the owner of the copyright or otherwise permitted by copyright law. Protected software may not be copied into, from, or by any University facility or system, except pursuant to a valid license or as otherwise permitted by copyright law.

2) Number of Simultaneous Users: the number and distribution of copies must be handled in such a way that the number of simultaneous users in a department does not exceed the number of original copies purchased by that department, unless otherwise stipulated in the purchase contract.

3) Copyrights: in addition to software, all other copyrighted information (text, images, icons, programs, etc.) retrieved from computer or network resources must be used in conformance with applicable copyright and other law. Copied material must be properly attributed. Plagiarism of computer information is sub-

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b) Integrity of Information Resources: computer users must respect the integrity of computer-based information resources.

1) Modification or Removal of Equipment: computer users must not attempt to modify or remove computer equipment, software, or peripherals that are owned by others without proper authorization.

2) Encroaching on Others' Access and Use: computer users must not encroach on others' access and use of the University's computers. This includes but is not limited to: the sending of chain-letters or excessive messages, either locally or off-campus; printing excess copies of documents, files, data, or programs; running grossly inefficient programs when efficient alternatives are known by the user to be available; unauthorized modification of system facilities, operating systems, or disk partitions; attempting to crash or tie up a University computer or network; and damaging or vandalizing University computing facilities, equipment, software or computer files.

3) Unauthorized or Destructive Programs: computer users must not intentionally develop or use programs which disrupt other computer users or which access private or restricted portions of the system and/or damage the software or hardware components of the system. Computer users must ensure that they do not use programs or utilities which interfere with other computer users or which modify normally protected or restricted portions of the system or user accounts. Computer users must not use network links for any use other than permitted in network guidelines. The use of any unauthorized or destructive program may result in legal civil action for damages or other punitive action by any injured party, including the University, as well as criminal action.

4) Academic Pursuits: the University recognizes the value of research on game development, computer security, and the investigation of self-replicating code (e.g., computer viruses and worms). The University may restrict such activities in order to protect University and individual computing environments, but in doing so will take account of legitimate academic pursuits.

c) Unauthorized Access: Computer users must refrain from seeking to gain unauthorized access to information resources or enabling unauthorized access.

1) Abuse of Computing Privileges: users of University information resources must not access computers, computer software, computer data or information, or networks without proper authorization, or intentionally enable others to do so, regardless of whether the computer, software, data, information, or network in question is owned by the University. For example, abuse of the networks to which the University belongs or the computer at other sites connected to those networks will be treated as an abuse of University computing privileges.

2) Reporting Problems: any defects discovered in system accounting or system security must be reported to the appropriate system administrator so that steps can be taken to investigate and solve the problem.

3) Password Protection: a computer user who has been authorized to use a password-protected account may be subject to both civil and criminal liability if the user discloses the password or otherwise makes the account available to others without permission of the system administrator.

d) Usage: computer users must respect the rights of other computer users. Most University systems provide mechanisms for the protection of private information from examination by others. Attempts to circumvent these mechanisms in order to gain unauthorized access to the system or to another person's information are a violation of University policy and may violate applicable law. Authorized system administrators may access computer users' files at any time for maintenance purposes. System administrators will report suspected unlawful or improper activities to the proper authorities.

1) Unlawful Messages: use of electronic communication facilities (such as mail or talk, or systems with similar functions) to send fraudulent, harassing, obscene, threatening, or other messages that are a violation of applicable federal, state or other law or University policy is prohibited.

2) Mailing Lists: users must respect the purpose and charters of computer mailing lists (including local or network news groups and bulletin-boards). The user of an electronic mailing list is responsible for determining the purpose of the list before sending messages to or receiving messages from the list. Subscribers to an electronic mailing list will be viewed as having solicited any material delivered by the list as long as that material is consistent with the list's purpose. Persons sending to a mailing list any materials which are not consistent with the list's purpose will be viewed as having sent unsolicited material.

3) Advertisements: in general, the University's electronic communication facilities should not be used to transmit commercial or personal advertisements, solicitations or promotions (see Commercial Use, below). Some public bulletin boards have been designated for selling items by members of the Stanford community, and may be used appropriately, according to the stated purpose of the list(s).

4) Information Belonging to Others: users must not intentionally seek or provide information on, obtain copies of, or modify data files, programs, or passwords belonging to other users, without the permission of those other users.

e) Political, Personal and Commercial Use: the University is a non-profit, tax-exempt organization and, as such, is subject to specific federal, state and local laws regarding sources of income, political activities, use of property and similar matters. It also is a contractor with government and other entities and thus must assure proper use of property under its control and allocation of overhead and similar costs.

1) Political Use: University information resources must not be used for partisan political activities where prohibited by federal, state or other applicable laws, and may be used for other political activities only when in compliance with federal, state and other laws and in compliance with applicable University policies.

2) Personal Use: University information resources should not be used for personal activities not related to appropriate University functions, except in a purely incidental manner.

3) Commercial Use: University information resources should not be used for commercial purposes, except in a purely incidental manner or except as permitted under other written policies of the University or with the written approval of a University officer having the authority to give such approval. Any such commercial use should be properly related to University activities, take into account proper cost allocations for government and other overhead determinations and provide for appropriate reimbursement to the University for taxes and other costs the University may incur by reason of the commercial use. Users also are reminded that the "EDU" domain on the Internet has rules restricting or prohibiting commercial use, and thus activities not appropriately within the EDU domain and which otherwise are permissible within the University computing resources should use one or more other domains, as appropriate.

3. System Administrator Responsibilities: while the University Trustees are the legal "owners" or "operators" of all computers and networks purchased or leased with University funds, oversight of any particular system is delegated to the head of a specific subdivision of the University governance structure, such as a Dean, Department Chair, Administrative Department head, or Principal Investigator. For University-owned or leased equipment, that person is the responsible administrator in the sense of the policies in this Guide memo.

The responsible administrator may designate another person to manage the system. This designate is the "system administrator". The system administrator has additional responsibilities to the University as a whole for the system(s) under his/her oversight, regardless of
the policies of his/her department or group, and the responsible administrator has the ultimate responsibility for the actions of the system administrator.

4. **Computer Security Officer Responsibilities:** the University’s Computer Security Officer or the person designated by the University’s Chief Information Officer shall be the primary contact for the interpretation, enforcement and monitoring of this policy and the resolution of problems concerning it. Any issues concerning law shall be referred to the Legal Office for advice.

a) **Policy Interpretation:** the Computer Security Officer shall be responsible for interpretation of this policy, resolution of problems and conflicts with local policies, and special situations.

b) **Policy Enforcement:** where violations of this policy come to his or her attention, the Computer Security Officer is authorized to work with the appropriate administrative units to obtain compliance with this policy.

c) **Inspection and Monitoring:** only the University’s Computer Security Officer or designate can authorize the inspection of private data or monitoring of messages (including electronic mail) when there is reasonable cause to suspect improper use of computer or network resources.

5. **Consequences of Misuse of Computing Privileges**

a) **Cooperation Expected:** users, when requested, are expected to cooperate with system administrators in any investigation of system abuse. Users are encouraged to report suspected abuse, especially any damage to or problems with their files. Failure to cooperate may be grounds for cancellation of access privileges, or other disciplinary actions.

b) **Corrective Action:** if system administrators have persuasive evidence of misuse of computing resources, and if that evidence points to the computing activities or the computer files of an individual, they should pursue one or more of the following steps, as appropriate to protect other users, networks and the computer system.

Provide notification of the investigation to the University’s Computer Security Officer or designate, as well as the user’s instructor, department or division chair, or supervisor.

Temporarily suspend or restrict the user’s computing privileges during the investigation. A student may appeal such a suspension or restriction and petition for reinstatement of computing privileges through the Dean of Students. A staff member may appeal through applicable dispute resolution procedures. Faculty members may appeal through the Dean of their School.

With authorization from the University’s Computer Security Officer or designate, inspect the user’s files, diskettes, tapes, and/or other computer-accessible storage media.

Refer the matter for possible disciplinary action to the appropriate University unit, i.e., the Dean of Students Office for students, the supervisor for staff, and the Dean of the relevant School for faculty or other teaching or research personnel.

c) **Student Honor Code and Fundamental Standard:** Unless specifically authorized by a class instructor, all of the following uses of a computer are examples of possible violations of the Honor Code:

- Copying a computer file that contains another student’s assignment and submitting it for credit;
- Copying a computer file that contains another student’s assignment and using it as a model for one’s own work;
- Collaborating on an assignment, sharing the computer files and submitting the shared file, or a modification thereof, as one’s individual work.

In addition, student misuse of a computer, network or system may violate the Fundamental Standard. Examples would be, but are not limited to: theft or other abuse of computer time, including unauthorized entry into a file, to use, read, or change the contents; unauthorized use of another person’s identification or password; use of computing facilities to send abusive messages; or use of computing facilities to interfere with the work of another student or the work of a faculty or staff member.

For cases involving a student, referring the case to the Judicial Affairs Office is the recommended course of action. This ensures that similar offenses may be considered for similar punishments, from quarter to quarter, year to year, and instructor to instructor. It also allows the detection of repeat offenders.

6. **Cognizant Office:** Chief Information Officer

7. **Related Policies**

a) **Student Discipline:** see Student Life/Codes of Conduct/Fundamental Standard/Honor Code

b) **Staff Discipline:** see Guide Memo 22.15, Corrective Action

c) **Faculty Discipline:** see the Statement on Faculty Discipline

d) **Patents and Copyrights:** see Research Policy Handbook 5.1 and 5.2

e) **Partisan Political Activities:** see Guide Memo 15.1

f) **Ownership of Documents:** see Research Policy Handbook 5.2 and Guide Memo 15.6

g) **Incidental Personal Use:** see Research Policy Handbook 4.1 and Guide Memo 15.2
UNIVERSITY PUBLICATIONS

Many of the publications listed below, including this bulletin, may be viewed on the World Wide Web at www.stanford.edu.

Admissions Information and Applications can be obtained from the Office of Undergraduate Admissions, and Graduate Admissions in the Registrar's Office (Old Union).

Financial Aid Information For undergraduate and graduate students is available from the Financial Aid Office (Old Union).

Library guides, facts, maps, and borrowing regulations are available at service desks of all Stanford libraries (address request to Green Library).

Maps and Visitors' Guides can be obtained at the Visitors' Information Office in Memorial Court, at the Stanford Bookstore, or by writing to the Guide and Visitors Service at the Office of Public Affairs (Building 170).

Minority Students, undergraduate and graduate, and their opportunities and experiences at Stanford are addressed in special publications directed to Alaska Natives, American Indians, Blacks, Chicanos, Mexican/Americans, and Puerto Ricans. The Office of Undergraduate Admissions and the recruitment officers of each of the respective schools will respond to requests for the appropriate publication.

Stanford University Bulletins may be obtained as follows: the Stanford Bulletin may be purchased from the Bookstore or by sending a $7.45 check or money order ($11.30 if domestic first class mail is desired) to the Registrar's Mailroom (California residents add $.60 sales tax).

Summer Session Catalogue or Summer Session for High School Student Catalogue may be obtained from the Summer Session Office. Individual schools and departments may be contacted directly for more specific information.

Students from other countries contact the Graduate Admissions, the Registrar's Office for Information for International Applicants; Bechtel International Center also provides helpful information to the international community.

The Time Schedule (course listings and registration information) is published quarterly and may be obtained at the Information Window in the Office of the Registrar (Old Union) and in Portfolio on the web.

Other publications of interest:

Access Stanford, a guide for the physically limited, available at the Office of the Dean of Student Affairs (Old Union) and the Disability Resource Center (Meyer Library).


ASSU: Constitution and By-Laws, inquire at Associated Students of Stanford University (Tresidder Union).

ASSU Course Guide, summaries of student evaluations of approximately 200 undergraduate courses, available at the ASSU Office (Tresidder Union).

Charter of the Senate of the Academic Council of Stanford University, available at the Academic Secretary's Office.

Committee and Senate Handbook, available at Academic Secretary's Office.

Conference Planning at Stanford, available at the Conference Office (Encina Commons).


Graduate Student Handbook, an introduction to offices and people who serve graduate students, available at the Office of the Dean of Graduate Research and Policy.

Handbook for Academic Council Faculty, Medical Center Line Faculty, Academic Staff-Teaching and Other Teaching Staff, available from the Provost's Office, Faculty Affairs section (Bldg. 170).

Human Resources and Development Course Catalogue, published twice-yearly by Stanford's Human Resources Services Office.

Information for Prospective Applicants, an introduction to graduate study and graduate programs at Stanford, available at Graduate Admissions, the Registrar's Office, Old Union.

Life Off the Farm, a guide to off-campus goods, services, and activities, available at the Office of Residential Education (Old Union) and the Stanford Bookstore.

The Lively Arts at Stanford, season brochure of concerts and other performances, available at University Events (Press Bldg.).

Rosters of the Senate, Advisory Board, and Various Committees, available at the Academic Secretary's Office.

Stanford Daily, the student newspaper, available at many pickup sites on campus and by request to the Daily office (Storke Bldg.).

Stanford Directory, on sale at Stanford Bookstore and Stores.

Stanford from the Beginning, a history, available at the Visitors' Information Office in Memorial Court (write Guide and Visitors Service, Bldg. 170), and the Stanford Bookstore.

Stanford Map, on sale at the Stanford Bookstore.

Stanford Memorial Church, a guide and history, available at the Visitors' Information Office in Memorial Court (write Guide and Visitors Service, Bldg. 170) and the Stanford Bookstore.

The Stanford Observer, a newspaper for alumni, parents of students, and the University's other friends, available from News Service (Press Bldg.).

Stanford Report, the weekly faculty/staff newspaper (includes events calendar and employment opportunities), available from News Service (Press Bldg.).

Stanford Today, a detailed description of undergraduate opportunities, available from the Office of Undergraduate Admissions (Old Union). Teach at Stanford: An Introductory Handbook for Faculty, Academic Staff Teaching, and Teaching Assistants, available at the Center for Teaching and Learning (Sweet Hall).

Training Opportunities for the Stanford Community, available at the Forstythe Hall information desk.

Books about Stanford that are out of print or hard to find are available to scholars from the University Archives, Green Library. The Stanford University Archives manuscript and archival collections now number more than six million items. These are of related interest.

Allen, P. C., Stanford: From the Foothills to the Bay, 1980

Clark, G. T., Leland Stanford, 1931

Elliott, O. L., Stanford University: The First Twenty-Five Years, 1937

Mirrieeles, E. R., Stanford: The Story of a University, 1959


Nagel, G. W., Jane Stanford: Her Life and Letters, 1975

Stockholm, G., Stanford Memorial Church, 1980


Tutorow, N. E., Leland Stanford: Man of Many Careers, 1971
Appendix

COURSES CERTIFIED FOR 1999-2000 AS FULFILLING THE UNDERGRADUATE GENERAL EDUCATION REQUIREMENTS

Information regarding the General Education Requirements may be found in the "Undergraduate Degrees" section of this bulletin.

The following courses have been certified as fulfilling the General Education Requirements in 1999-2000. Certain sequences must be completed in their entirety for General Education Requirement fulfillment, and those sequences are noted below.

Courses offered overseas during 1999-2000 which satisfy the General Education Requirements are listed at the end of this section.

GENERAL EDUCATION REQUIREMENTS, 1999-2000

AREA 1

All freshmen entering in Autumn Quarter 1997 and thereafter must satisfy the Area 1 Requirement by completing three courses from among the following options:

INTRODUCTION TO THE HUMANITIES

(Offered Autumn)

Introduction to the Humanities 1; Great Works I
Introduction to the Humanities 12; Word and the World
Introduction to the Humanities 14; The Good Life
Introduction to the Humanities 16; Freedom and Eros in Philosophy and Art
Introduction to the Humanities 17; Themes and Variations
Introduction to the Humanities 18; Narrative: Telling it the Way it Is?
Introduction to the Humanities 19; The Self, the Sacred, and the Human Good

(Offered Winter and Spring)

Introduction to the Humanities 2, 3; Great Works: The Hereafter, the Here-and-Now (2 must be taken in conjunction with 3)
Introduction to the Humanities 8A, 9A; Myth and Modernity (8A must be taken in conjunction with 9A)
Introduction to the Humanities 20A, 20B; The Humanities: Breaking Boundaries (20A must be taken in conjunction with 20B)
Introduction to the Humanities 21A, 21B; The Literature of Transformation (21A must be taken in conjunction with 21B)
Introduction to the Humanities 23A, 23B; Reason, Passion, and Reality (23A must be taken in conjunction with 23B)
Introduction to the Humanities 24A, 24B; Ten Days that Shook the World (24A must be taken in conjunction with 24B)
Introduction to the Humanities 26A, 26B; Democratic Society in Europe and America (26A must be taken in conjunction with 26B)
Introduction to the Humanities 27A, 27B; Encounters and Identities (27A must be taken in conjunction with 27B)
Introduction to the Humanities 28A, 28B; Poetic Justice: Order and Imagination in Russia (28A must be taken in conjunction with 28B)
Introduction to the Humanities 30A, 30B; Transculturations (30A must be taken in conjunction with 30B)
SLE 91, 92, 93; Program in Structured Liberal Education (entire sequence must be completed and thereby also satisfies Area 3a)

AREA 2: NATURAL SCIENCES, APPLIED SCIENCE AND TECHNOLOGY, AND MATHEMATICS

Science, Mathematics, and Engineering 1A, B, C; Earth Resources and the Sustainability of Life (if entire sequence is completed, satisfies Area 2)
Science, Mathematics, and Engineering 2A, B, C; The Heart: Principles of Life Systems (if entire sequence is completed, satisfies Area 2)
Area 6 under the 1991 DR System

Physics 61; Advanced Freshman Physics
Physics 63; Advanced Freshman Physics
Physics 65; Advanced Freshman Physics
Physics 70; Modern Physics
Physics 100; Introduction to Observational and Laboratory Astronomy
Psychology 20; Brain and Behavior

Area 2B: APPLIED SCIENCE AND TECHNOLOGY

Area 6 under the 1991 DR System

Computer Science 99D; SIS: The Science of Art
Computer Science 105; Introduction to Computers
Computer Science 106A; Programming Methodology
Computer Science 106B; Programming Abstractions
Computer Science 106X; Programming Methodology and Abstractions
Computer Science 109; Introduction to Computer Science
Engineering 14; Applied Mechanics: Statics and Deformables
Engineering 15; Dynamics
Engineering 20; Introduction to Chemical Engineering
Engineering 25; Biotechnology
Engineering 30; Thermodynamics
Engineering 40; Introductory Electronics
Engineering 50; Introductory Science of Materials
Engineering 62; Introduction to Optimization
Engineering-Economic Systems and Operations Research 152; Introduction to Decision Analysis
Geological and Environmental Sciences 130; Environmental Earth Sciences I
Geophysics 40; The Earth from Space
Linguistics 35; Computers and Human Language
Linguistics 138; Introduction to Computational Linguistics
Petroleum Engineering 103; Energy Resources
Petroleum Engineering 104; The Coming Energy Revolution
Petroleum Engineering 109Q; SIS: What Determines the Price of Oil
Petroleum Engineering 110Q; SIS: Soap Bubbles, Rain Drops, and Ink Jets

Area 4C: MATHEMATICS

Area 4 under the 1991 DR System

Economics 50; Economic Analysis I
Economics 80 (same as Statistics 190); Introduction to Statistical Methods for Social Scientists
Mathematics 19; Calculus
Mathematics 20; Calculus
Mathematics 21; Calculus
Mathematics 41; Single Variable Calculus
Mathematics 42; Single Variable Calculus
Mathematics 51; Linear Equations and Differential Calculus
Mathematics 51H; Honors Calculus
Mathematics 103; Matrix Theory and its Applications
Philosophy 57; Logic, Reasoning, and Argumentation
Philosophy 159; Basic Concepts in Mathematical Logic
Political Science 95A; Introduction to Political Data Analysis I
Political Science 95B; Introduction to Political Data Analysis II
Political Science 95C; Introduction to Political Data Analysis III
Psychology 10 (same as Statistics 60); Introduction to Statistical Methods
Sociology 181B; Sociological Methods I: Statistics
Statistics 40N; SIS: Chance, Experiments, and Interface
Statistics 41N; SIS: News and Numbers—Interpreting Information
Statistics 42N; SIS: Monte Carlo Methods
Statistics 43N; SIS: Data Analysis and Flow Cytometry
Statistics 50N; SIS: Mathematics and Sports
Statistics 60; Introduction to Statistical Methods: Precalculus
Statistics 110; Statistical Methods in Engineering and the Physical Sciences
Statistics 116; Theory of Probability
Statistics 190; Introduction to Statistical Methods: Postcalculus

Area 3: HUMANITIES AND SOCIAL SCIENCES

Area 3A: HUMANITIES

Area 7 under the 1991 DR System is indicated by (7)
Area 8 under the 1991 DR system is indicated by (8)
American Studies 114; Visions of the 1960s (7) or (8)
American Studies 151; Transformation of American Thought and Culture (8)
American Studies 200; Perspectives on American Identity (8)
American Studies 214; The American 1960s: Thought, Protest, and Culture (8)
Art and Art History 1; Introduction to the Visual Arts (7)
Art and Art History 2; Ideas and Forms in Asian Art (7)
Art and Art History 3; Introduction to the History of Architecture (7)
Art and Art History 100A/200A (same as Classics 100A); Archaic Greek Art (7)
Art and Art History 100B/200B (same as Classics 100B); Ancient Art II: Classical and Hellenistic Greek Art (7)
Art and Art History 100C/200C (same as Classics 100C); Roman Art (7)
Art and Art History 105; Sites and Images of Power in 12th-Century Europe (7)
Art and Art History 110D; The Venetian Renaissance (7)
Art and Art History 122; Art under Hitler and Stalin (7)
Art and Art History 123A; Object after Minimalism (7)
Art and Art History 123B; The Feminist Legacy in Contemporary Art (7)
Art and Art History 134; The History of Photography (7)
Art and Art History 140/240; Introduction to Film Study (7)
Art and Art History 143; The Hollywood Musical (7)
Art and Art History 146; Cyborgs and Synthetic Humans (7)
Art and Art History 181; Theories of Architecture (7)
Asian Languages 73; Chinese Language, Culture, and Society (7)
Asian Languages 91; Traditional East Asian Civilization: China (7)
Asian Languages 92; Traditional East Asian Civilization: Japan (7)
Asian Languages 95; The Japanese Language in Culture and Society (7)
Asian Languages 131; Chinese Poetry in Translation (7)
Asian Languages 132; Chinese Fiction and Drama in Translation (7)
Asian Languages 135; Classic Japanese Drama (7)
Asian Languages 138; Modern Japanese Literature in Translation (7)
Asian Languages 141; Chinese Mythology and Lyric Imagination (7) or (8)
Asian Languages 187/287; Romance, Desire, and Sexuality in Modern Japanese Literature (7)
Classics 12; Greek Tragedy (7)
Classics 18; Greek Mythology (8)
Classics 30Q; SIS: Literature and Culture of Modern Greece (7)
Classics 169; Introduction to Socrates, Plato, and Aristotle (8)
Comparative Literature 20N; SIS: Worlds (No Longer) Apart (7)
Comparative Literature 25N (same as Spanish and Portuguese 125N); SIS: Latin American Nobel Prize Winners (7)
Comparative Literature 30N; SIS: Opera and Literature (7)
Comparative Literature 70N; SIS: Bible and World Culture (7) or (8)
Comparative Literature 80N; SIS: The Science Wars (7)
Comparative Literature 84Q; SIS: Shakespeare, Playing, Gender (7)
Comparative Literature 103; Egyptian East/Egyptian West (7) or (8)
Comparative Literature 115Q; SIS: Thinking in the Present (7)
Comparative Literature 113; Voice and Literature in Russia and America (7)
Comparative Literature 134E; Exoticism in Literature and the Arts (7)
Comparative Literature 167; Comedy (7)
Comparative Literature 199; Senior Seminar on Literary Theory (7)
Drama 12N; SIS: Antigone—From Ancient Democracy to Contemporary Dissent (7) or (8)
Drama 14N; SIS: Contemporary German Drama (7)
Drama 15N; SIS: The Shakespearean Era (7)
Drama 17N; SIS: Re-Viewing Valdez in Year 2000 (7)
Drama 19N; SIS: The Arts and Civic Dialogue (7)
Drama 65; American Musical Theater (7)
Drama 161; Performance and Politics (7)
Drama 162; Performance and the Actor (7)
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<td>English 12/112</td>
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<td>SIS: Eros and Other Problems in Modern American Poetry (7)</td>
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<td>Literature and Society: Introduction to Frenchophone Literature from Africa and the Caribbean (7)</td>
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