Courses and Curricula
Aerospace Studies (Air Force ROTC)
(See Military Officers’ Education Program)

Afro-American Studies
(College of Letters and Science)

Department Office: 3335 Dwinelle Hall, 642-7064
Professor: William M. Banks, III, Ed.D. University of Kentucky.
Counseling psychology, black social institutions
Barbara C. O'Brien, Ph.D. Columbia University. Women
writers, feminist criticism
Reginald Jones, Ph.D. Ohio State University. Black
psychology, special education
Margaret B. Wilkinson, Ph.D. University of California at
Berkeley. Black theater, Lorraine Hansberry

Associate Professors:
Charles Henry, Ph.D. University of Chicago. Black politics,
policy
Percy Hintz, Ph.D. Yale University. Political sociology,
social class
Michel S. Laguerre, Ph.D. University of Illinois. Caribbean
anthropology
Eratane Peters, Ph.D. Princeton University. African-American
studies, Caribbean studies
Shaila Walker, Ph.D. University of Chicago. Anthropology

Assistant Professor:
Earl Lewis, Ph.D. University of Minnesota. Urban American
history, African history

Lecturers:
Roy T. Thomas, M.A. New York University. Afro-American
literature and culture
Gregg Thomson, M.A. Harvard University. Sociology and
psychology

Overview of Curriculum
The curriculum is intended to offer students, both majors and nonmajors, a balanced variety of courses in the humanities and social sciences about major African-American contributions and issues. There are six basic courses. 1A and 1B are freshman composition courses which use Afro-American literature and issues in the teaching of writing. The 4A and 4B courses offer students a general background in African history and culture. 5A and 5B are courses which focus on specific methodological and interdisciplinary approaches to Afro-American life and culture. The humanities portion of the curriculum is divided into two sections: the performing arts (140-149) and the literature and philosophical thought of America and Africa (150-159). In the literature-sections, survey courses, genre courses, and courses on pervasive themes in Afro-American literature are offered. The 160 series of the curriculum is especially devoted to the application of social policy as it affects contemporary black communities. This series is especially important to students preparing for careers in social work, mental health, etc.

In each of the number series, the course ending with 9 (e.g., 159) is designed for Selected Topics. This arrangement allows teachers and students to investigate a specific topic of importance which may not be essential to the curriculum and may not be permanently included in it.

Requirements for Major: Social Science Concentration

I. Lower Division.
A. AAS 4A-4B: Africa: History and Culture.
B. AAS 5A-5B: Black Life and Culture in the United States.

II. Upper Division.
B. Any one of the following comparative courses: (1) AAS 111A: Race, Class and Gender: Comparative Social Change in the United States; (2) AAS 112A and AAS 112B: Political Economic Development in the Third World; (3) AAS 113: Race, Ideology and Economics: A Comparative Approach; AAS 135: Caribbean Cultural History.
C. Any three of the following topical or discipline-oriented courses: (1) AAS 110A-110B: Afro-American Economic History; (2) AAS 121: Black Political Life; (3) AAS 122: Black Family; (4) AAS 123: Black Church; (5) AAS 126: Education and Inequality; (6) AAS 132A: Psychology and Black People; (7) AAS 137: Urban America.

Requirements for Major: Humanities Concentration

I. Lower Division.
A. AAS 4A-4B Africa: History and Culture.
B. AAS 5A and 5B: Black Life and Culture in the United States.

II. Upper Division.
B. Any two of the following: (1) AAS 150A: Survey of Black American Literature 1746-1920; (2) AAS 150B: Survey of Black American Literature 1920-Present; (3) AAS 151: Black American Plays 1855-1965.
C. Any one of the following topical courses: (1) AAS 152A: Black American Essays: The Nature and Tradition; (2) AAS 152B: Black American Poetics: The Nature and Tradition; (3) AAS 152C: Black American Dramatic Literature: Forms and Styles; (4) AAS 152D: Black American Short Stories; (5) AAS 152E: Black American Novels and Narratives.
D. Any three of the following area courses: (1) AAS 154: History of Black People Around the World Through Literature; (2) AAS 155: Literature of the Caribbean; (3) AAS 156: Literature of Black Africa; (4) AAS 157: Afro-American Religion: Historical Perspectives; (5) AAS 144: Religion and Culture in Black America; (6) AAS 131: Caribbean Societies and Cultures; (7) AAS 141: Black Art in the New World; (8) Music 130: Afro-American Music.
E. Majors must complete one of the Afro-American Studies literature courses with a limited or specialized focus, i.e., concentrating on a basic theme, or a study of not more than two authors simultaneously.
F. Majors must complete the senior thesis requirement, AAS 192A-192B.

Honors Program. To be eligible for admission to the honors program, a student must have completed at least two semesters at Berkeley and have attained grades with a GPA of 3.0 or higher in all University work, as well as a 3.30 GPA or higher in the Afro-American Studies major. Students in the program must complete two consecutive semesters of Afro-American Studies H195A-H195B under the supervision of a faculty member, culminating in the completion of a senior honors thesis or equivalent project.

Afro-American Studies Minors
The Afro-American Studies Department offers minors in the same areas of concentration as the majors, Humanities and Social Science Concentrations, for each area of concentration follow.

One lower division Afro-American studies course and five upper division courses are required. Students must select at least three of the upper division courses from within the department. Consistent with Humanities and Social Science requirements, a GPA of 2.0 will be required in all courses applied to the minor program. All courses in the minor must be taken for a letter grade. Students with sound educational reasoning may petition for acceptance of one other Afro-American studies upper division course as part of the minor. Students may also petition to have transfer credits accepted, but transfer students must take the minimum of three upper division courses from this department.

Afro-American Studies Humanities Minor
A. One of the following: AAS 4A, 4B, 5A or 5B
B. Five courses from the following:
   (1) One of the AAS history courses: AAS 116, Colonialism, Slavery and Afro-American Life Before 1865; or AAS 117, Afro-Americans in the Industrial Age, 1865-1970; (2) One of the Survey courses: AAS 150A, 150B, or 151; AAS 150A, Afro-American Literature from 1746-1920; AAS 150B, Afro-American Literature from 1920-present; AAS 151, Survey of Afro-American Plays; (3) One of the genre courses on essay, poetry, dramatic literature, short stories or novels: AAS 152A, 152B, 152C, 152D or 152E; (4) One of the area courses: AAS 154, 155 or 156 (Literature on Black Women, the Caribbean or Africa); (5) One course in the fine arts: AAS 141 (Black Art) or Music 130A or 130B (Afro-American Music).

Afro-American Studies Social Science Minor
One of the following: AAS 4A, 4B, 5A or 5B
Five courses from the following: AAS 131, Caribbean Societies and Cultures; AAS 116, Colonialism, Slavery and Afro-American Life Before 1865; or AAS 117, Afro-Americans in the Industrial Age, 1865-1970; AAS 121, Black Political Life in the U.S.; AAS 132, Black Families in American Society; AAS 133, Afro-American History: Historical Perspectives; AAS 126, Education and Inequality in American Society; AAS 135, Psychology and Black People; AAS 1112A or 1112B, Political and Economic Development in the Third World.

Lower Division Courses
1A. Freshman Composition. (4) Three hours of lecture, plus one hour of discussion per week. Prerequisites: Subject A. Training in expository, argumentative, and other styles of writing. The assignments will focus on themes and issues in Afro-American life and culture.

1B. Freshman Composition. (4) Three hours of lecture, plus one hour of discussion per week. Prerequisites: Subject A and 14. Continued training in expository and argumentative writing, with more emphasis on literary interpretation.

4A. Africa: History and Culture. (3) Three hours of lecture, plus one hour of discussion per week. Emphasis on pre-colonial social, cultural, political, and economic structures; introduction to art, literature, oral traditions, and belief systems.

4B. Africa: History and Culture. (3) Three hours of lecture, plus one hour of discussion per week. Emphasis on colonial, and economic change in 20th century Africa; with further emphasis upon the role of modernization, urbanization, and the emergence of contemporary African states.

5A. Black Life and Culture in the United States. (4) Three hours of lecture, plus one hour of discussion per week. A study of the genesis, development, and scope
of Black culture, approached through an examination of selected art forms, historical themes, and intellectual currents. (SP) Thomas

58. Black Life and Culture in the United States. (4) Three hours of lecture, plus one hour of discussion per week. Emphasis on the social experience of Afro-Americans, an interdisciplinary approach, designed to help students understand the force and ideas that are influencing the individual and collective Black experience. (F) Banks

20. Introduction to Afro-American Social Institutions. (3) Three hours of lecture per week. Prerequisites: 58 or introductory course in sociology. The sociology of the Afro-American experience will be studied through an analysis of the educational, religious, political, economic, and familial dimensions of Afro-American life. (F)

39. Seminar for Lower Division Students. (2-4) Course may be repeated once for credit with different instructor. One 2- or 3-hour lecture and one hour of conference per week. Prerequisites: Consent of instructor. Seminars in various topics in Afro-American Studies are designed to introduce beginning undergraduates to the methods and approaches of the discipline. Work in the course will typically include class reports and a research paper. (F,SP) Staff

Upper Division Courses

101A. Research Methods for Afro-American Studies. (3) Three hours of lecture per week. An introduction to the various aspects of social science research methods, their application and misapplication, using the study of race relations in the U.S. as a backdrop. A primary, but not exclusive, focus on qualitative methods. Five mini-research projects. (F) Jones

101B. Research Methods for Afro-American Studies. (3) Three hours of lecture per week. Prerequisites: 101A or introductory statistics. Introduction to quantitative research methods, and emphasis on research techniques and procedures. Introduction to punch card data processing using S.P.S.S. computer package program. (SP) Hintzen

110B. Afro-American Economic History. (3) Three hours of lecture per week. Prerequisites: Afro-American history and/or introductory economics are strongly recommended. Emphasis on issues influencing the development of a black economic base in the United States from 1918 to present. (SP) Hintzen

111. Race, Class, and Gender in the United States. (3) Three hours of lecture per week. Prerequisites: Readings and composition requirement. Emphasis on social history and comparative analysis of race, class, and gender relations in American society. Examines both similarities and differences, and highlights gender politics. (F) Thomson

112A. Political and Economic Development in the Third World. (3) Three hours of lecture per week. An examination of the structural and actual manifestations of Third World underdevelopment and the broad spectrum of theoretical positions put forward to explain it. Underdevelopment will be viewed from both the international and national perspectives. (F) Hintzen

112B. Political and Economic Development in the Third World. (3) Three hours of lecture per week. A critical appraisal of the theoretically based policies employed by Third World nations in their attempts at transition to modernized developed socio-political and economic systems and an examination of the international and intranational impediments to Third World development. The focus will be on actual examples that represent the diversity of developing countries. (SP) Hintzen

113. Race, Ideology, and Economics in Africa and Afro-America. (3) Three hours of lecture per week. Prerequisites: Lower division course in economics. Emphasis on the relationship of the rise of racism as a systematic ideology in the eighteenth and nineteenth century colonial and slave economies in Africa and the New World; including quantitative analysis. (F) Hintzen

116. Colonialism, Slavery and Afro-American Life Before 1865. (4) Three hours of lecture and one hour of discussion per week. This course will examine the origins of the Afro-American culture, including political, economic, demographic and cultural factors shaping Afro-American life and culture prior to 1865. (SP) Lewis

117. Afro-Americans in the Industrial Age, 1965-1970. (4) Three hours of lecture and one hour of discussion per week. With emphasis given to the organization of labor after slavery, this course will explore the history of Afro-American culture, institutions, and protest traditions from the Civil War to the Civil Rights Movement. (F) Lewis

118. Afro-American Urban History—A Survey. (4) Three hours of lecture and one hour of discussion per week. This course will examine the roots of Afro-American urban life, the changes which occurred after the Civil War, the reasons for these changes, and the consequences. (SP) Lewis

119. Selected Topics in the Socio-Historical Development of the Black World. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Determined by offering. (F,SP) Staff

121. Black Political Life in the United States. (3) Three hours of lecture per week. Prerequisites: 58 or 201A, History 116 or 117. Analysis of the theoretical and historical development of Afro-Americans' political forms and expression. Examination of local, state and federal political processes and activities, and the role of black political ideology, organizations, and movements. (F) Henry

122. Black Families in American Society. (3) Three hours of lecture per week. Prerequisites: 58 or 201A or introductory course in sociology. Examines the historical roles and functions of families in the development of Black people in America from slavery to the present. (SP) Lewis

123. Afro-American Religion: Historical Perspectives. (3) Three hours of lecture per week. Survey of the religious life of Afro-Americans from the transmigration of African religious beliefs during slavery to the present. Black church topics include: religion in the community, the rise of independent Black denominations, the role of demography, and the church in political and social struggles. (SP) Lewis

125. Law and the Black Community in the United States. (3) Three hours of lecture per week. Prerequisites: 58 or 201A, History 116 or 117. Examination of the legal decisions and processes that have affected or continue to affect the status of Blacks in America. Attention given to the criminal process, including the police, district attorney, trial courts, and Grand Jury. (SP) Laguerre

126. Education and Inequality in American Society. (3) Three hours of lecture per week. Examination of the evolution and function of public schools as an American institution. Focus on the policies and the practices which have affected the education of Black Americans and other racial minorities and the relationship between education and inequality. (F) Laguerre

130. Afro-American Communities and Cultures. (3) Three hours of lecture per week. A comparative analysis of the cultural and social organization of Afro-American communities in the United States, Latin America, and the Caribbean. Topics include: religion in the family system, urban dynamics, ethnic politics, family structures, and ecology of Afro-Caribbean religions. (SP) Laguerre

132. Psychology and Black People: Current Issues. (3) Three hours of lecture per week. Prerequisites: 58 or 101A or upper division course in psychology. Examines psychological research and theory pertaining to Black people. Emphasis on understanding the concerns, methods, and conclusions regarding Afro-Americans offered by American psychology from its origins to the present. (F)

133. Black Children and Youth: Psychological Development. (3) Three hours of lecture per week. Prerequisites: 58 or consent of instructor. Examination of the growth and development of the Black child through adolescence. (F)

135. Caribbean Cultural History. (3) Three hours of lecture per week. An examination of the history and cultural evolution of the French, Dutch, Spanish, and English-speaking Caribbean societies from the slave era to the second world war. Particular attention will be paid to Afro-Caribbean cultural institutions and practices, immigration of Chinese, East Indians, Lebanese, Carry Islanders, and Jews during the Western Hemisphere period, and political history, and the historical and structural evolution of Caribbean cities. ([F) Laguerre

136. Health, Medicine, and Culture. (3) Three hours of lecture per week. Examination of theoretical issues in medical anthropology. Comparative analysis of the evolution of Afro-American medicine and medical traditions. Emphasis on ethno-medicine, ethnopsychiatry, ethnopharmacology, ethnicity, and medical care. (F)

137. Urban Afro-America. (3) One three hour seminar per week. Examination of theoretical issues in urban anthropology. Comparative analysis of the social and political structure of Caribbean urban communities with special emphasis on urban history, social class, urban marginality, urban ethnicity, and urban cultures. (F) Laguerre

138. Black Nationalism. (3) Three hours of lecture per week. Prerequisites: 58 or 201A, History 116 or 117. Examination of the historical and intellectual development. Special attention will be given to the role of Black religion and the attempt to develop Black socialism. (F) Henry

139. Selected Topics of Afro-American Social Organizations and Institutions. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Determined by offering. (F,SP) Staff

141. Black Art in New World. (3) Three hours of lecture per week. Study of the visual art forms of Black people in the Western world with special attention given to African influences. (F)

142A. Third World Cinema. (3) Two 1 1/2-hour lectures, plus two hours of viewing/discussion per week. Prerequisites: Reading and composition requirement. Examination through lectures and a selection of films, the development and achievements of the Third World motion picture artistry. Social, political, and cultural themes are discussed, with particular emphasis given to major works from Asia, Africa, and Latin America. Other newly-developed film sources from abroad are presented for critical assessment. (F)

142B. Black Americans in the World of Cinema. (3) Three hours of lecture, plus two hours of viewing/discussion per week. Prerequisites: Reading and composition requirement. A critical, historical approach to the image of Black Americans in cinema, from 1915 to the present. The early work of Black film producers and directors, and the gradual shift from the boundaries of censorship to contemporary realism comprise the substance of the course. The use and misuse of ethnic characters are explored. Film makers and artists are sometimes present for discussion. (SP)

142C. Scenario and Film Criticism. (3) Three hours of lecture and discussion per week. Prerequisites: Completion of reading and composition requirement, plus 142B or equivalent. The development of scenarios and critical writing for motion pictures, with specific attention directed toward subject-matter concerned with ethnic groups in the United States. The workshop approach is emphasized, with limited enrollment, and seminar discussions of the projects involved.

143A. Performance of Afro-American Literature. (3) New course. Three hours of lecture per week. Prerequisites: 8A or consent of instructor. Introduction to dramatic performance as a way of knowing and understanding the oral dimensions of Afro-American literature. Selections and assignments include poetry, essays, and excerpts from plays.
143B. Performance of Afro-American Drama. (3) New course. Three hours of lecture per week. Prerequisites: 143A, its equivalent, or consent of instructor. Development of talent and skills as a way of knowing and understanding African-American drama. (F) Wilkinson

143C. Black Theatre Workshop. (3) New course. Three hours of lecture per week. Prerequisites: 143A, its equivalent, or consent of instructor. Study and production of a play by an African-American writer. The play will be studied within its social and historical context. Students will be introduced to the various aspects of theater production. (SP) Wilkinson

144. Religion and Culture in Black America. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: An Investigation of the various social and cultural formations of African-American religious life in America. Approached through history, sociology, folklore, music, theology, and literature.

150A. Black American Literature 1745-1859. (3) Three hours of lecture per week. Introduces the early literary creations and thought of Black America through examination of written and oral expressions: poetry, essays, sermons, spirituals, slave narratives, letters, proverbs, folk tales, novels, etc.

150B. Black American Literature 1859 to Present. (3) Three hours of lecture per week. Survey of Black American Literature from the Harlem Renaissance to the present. A close analysis of major writers, themes, and styles.

151A. Black American Plays from 1859 to 1959. (3) New course. Three hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by Black-American writers and the portrayal of the black experience in American theater. Emphasis on predominant themes, structural tendencies, socio-historical context.

151B. Contemporary Black American Plays 1959 to Present. (3) New course. Three hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by Black-American writers and the portrayal of the black experience in American theater. Emphasis on predominant themes, structural tendencies, socio-historical context.

152A. Black American Essays: The Nature and Tradition. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Course will be concerned with the aesthetic and social assumptions that contribute to the various images of the Black women in Western literature and Black American writing. (F)

152B. Contemporary Images of Black Women in Literature. (3) Three hours of lecture and one hour discussion per week. Prerequisites: Reading and composition requirement. Analysis of the cultural and social assumptions that shape the image of the Black woman in contemporary Western Black American writing. (SP) Christian

154. A History of Black People Around the World Through Literature. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. A historical survey of intellectual, social, spiritual, and cultural concerns that delineate a common bond between Black people throughout the world. Selections from stories, novels, epics, essays, etc. (F)

155. Literature of the Caribbean: Significant Themes. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. A survey of literary works produced by West Indian authors. Attention will be given to their aesthetic interests and achievements as well as to their general thematic concerns.

157. Creative Writing. (3) Course may be repeated once for credit. Three hours of lecture per week. Prerequisites: Reading and composition requirement and consent of instructor. Provides intensive study of the craft of writing in relation to the various genres. Course changes frequently by focus upon a specific genre.

159. Special Topics in Black Literature. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Reading and composition requirement, plus those set by instructor. Topic will vary from year to year.

161. Health Status and Health Delivery Systems and the Minority Community. (3) Three hours of lecture per week. Prerequisites: 160 or consent of instructor. Examines the relationship between health delivery systems and the health status of Black Americans. Introduction to federal, state, and local health policy; training programs; health-care organizations.

191A. Black American Plays from 1858 to 1959. (3) Three hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by Black-American writers and the portrayal of the black experience in American theater. Emphasis on predominant themes, structural tendencies, socio-historical context.

191B. Contemporary Black American Plays 1959 to Present. (3) New course. Three hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by Black-American writers and the portrayal of the black experience in American theater. Emphasis on predominant themes, structural tendencies, socio-historical context.

192A-192B. Senior Thesis. (3,3) Three hours tutorial per week. Prerequisites: Senior standing and two-thirds of the courses required in the major. Three units awarded upon completion of thesis. Applications and details at departmental advisor's office. This sequence is required for the major. (F,SP)

195A-H195B. Senior Honors Thesis. (3,3) Prerequisites: Senior standing and 3.0 GPA overall and in major. The Senior Honors Thesis is a primary research and writing project based on an advanced topic undertaken through weekly appointments with a faculty sponsor. Fulfillment of this requirement and grade and units awarded upon completion of thesis. Staff

197. Field Study in Afro-American Life. (1-4) Must be taken on a pass/failed basis. Supervised field work in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. Staff

198. Directed Group Studies for Undergraduates. (1-4) Must be taken on a pass/failed basis. Supervised research on a specific topic. Staff

199. Supervised Independent Study and Research. (1-4) Must be taken on a pass/failed basis. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. Staff

299. Research In Agricultural and Environmental Chemistry. (1-4) Course may be repeated for credit. Approximately four hours of research per week per unit. Prerequisites: Graduate standing and consent of instructor. Research in agricultural and environmental chemistry. Staff

Agricultural and Environmental Chemistry

Office: 148 Morgan Hall, 642-2879
Chair: Isao Kubo, Ph.D.


Associate Professors: George M. Briggs, Ph.D. (Nutritional Sciences) Melvin Calvis, Ph.D. (Emeritus) (Chemistry) Angela C. Little, Ph.D. (Emeritus) (Nutritional Sciences) "Mary C. de Lumen, Ph.D. (Nutritional Sciences) (Nutritional Sciences)

Graduate Adviser: Mr. de Lumen

This program is administered by an interdepartmental group and is open to students who are interested in the application of chemical research to agricultural and environmental problems. For entry into the program, students should have the equivalent of the bachelor's degree in chemistry.

Studies leading to the M.S. and Ph.D. degrees are offered by a group of agricultural and environmental chemists who are engaged in research. Graduate research is directed by a member of the group whose activities most closely coincide with the student's interests. Courses may be taken in the various departments of the College of Natural Resources, the Department of Biochemistry in the College of Letters and Science, and in the College of Chemistry. The following are examples of the fields represented: insecticide and natural products chemistry in the Department of Entomological Sciences; soil chemistry and plant nutrition in the Department of Plant and Soil Biology; food products chemistry in the Department of Forestry and Resource Management; molecular biology of food legumes; food chemistry and technology and animal nutrition in the Department of Nutritional Sciences. In addition to the major field of specialization, predoctoral students must take courses in chemistry, biochemistry, and allied sciences as needed to enable them to pass qualifying examinations in agricultural and environmental chemistry.

Graduate Course

299. Research In Agricultural and Environmental Chemistry. (1-4) Course may be repeated for credit. Approximately four hours of research per week per unit. Prerequisites: Graduate standing and consent of instructor. Research in agricultural and environmental chemistry. (F,SP)
Agricultural and Resource Economics
(College of Natural Resources)

Department Office: 207 Gillmann Hall, 642-3345
Chair Professor Janvry, Ph.D.

Professors:
Irama Adelman, Ph.D. University of California at Berkeley.
International rural economic development
Mark S. Fairlie, Ph.D. Duke University. Forest policy.

Andrew Schmitz, Ph.D. Trade, marketing, welfare
Geoffrey Rausser, Ph.D. University of California at Davis.
Economics of resource policy (Robert Gordon Sproul
Chair in Agricultural and Resource Economics)

Associate Professors:
Brian D. Wright, Ph.D. Harvard University. Agriculture and
 envirommert. The focus of concern includes botfi re
portunify to explore those aspects of economic and
and management of natural resources and the en-
vironment. “These core courses are supplement^'
a sufficientbackground in the natural and physical

George Jude, Ph.D. Iwa State University, Econometrics
Gordon C. Rausser, Ph.D. University of California at Davis.

Associate Professors:
Peter Berck, Ph.D. Massachusetts Institute of Technology.
Natural resources, applied microeconomics
Michael A. Ekerud University. Resource economics, applied microeconomics
Richard B. Norgard, Ph.D. University of Chicago.
Resource, environmental and development economics
Jennifer Goetz, Ph.D. Massachusetts institute of Technology.
Labor, industrial organization.

Bian D. Wright, Ph.D. Harvard University. Agriculture and

Political Economy of Natural Resources
The object of the PERN major is to offer an op-
portunity to explore those aspects of economic and
political institutions which affect the development
and management of natural resources and the en-
vironment. The focus of concern includes both re-
newable resources such as food, forests and water,
and resources in fixed supply such as land and
minerals. The distinctive feature of the major is that
it adopts a problem-solving approach to these issues.
The core requirement for the major is micro-economic
theory, and the economics of resources and the
environment. These core courses are supplemented
by other courses that apply the methods of social
science to resource problems.
The major is structured to ensure that students obtain
a sufficient background in the natural and physical
sciences and sufficient training in basic mathematics,
statistics, and communication skills in order to ap-
proach resource-related issues in an effective and
practical manner. Students who graduate from the
major should be prepared to undertake a career in
policy analysis, or who are engaged in the planning
or management of natural resources, or to enter a
graduate school for further study in some program
such as economics, law, public policy, or resource
administration.

Lower division breadth requirements stipulate at least
10 semester units in natural sciences and humanities
(including one course in principles of economics,
one course in political science or history, and one
course in either the humanities or a foreign language
in reading and composition; two semester courses in
calculus; and at least 10 semester units in natural
sciences (including one lab science course and one
course in physical science).

Upper division work must include PERN 100 and
PERN 101; one semester course emphasizing writ-
ing and composition skills; two semester courses in
quantitative methods (one course in statistics and
PERN 115 or 118; or two courses in statistics); and at least 24 semester units selected in consultation with an adviser, to form an area of
interest in natural resource analysis and policy. All
students must include in their program at least four
upper division courses in PERN numbered less than
192. Such courses may be used to fulfill other major
requirements. In addition, each course used to fulfill
an upper division requirement must be passed with a
grade of C- or better.

Graduate Programs
The Department of Agricultural and Resource Eco-
nomics, one of several departments of graduate
instruction and research in the College of Natural
Resources, offers programs leading to the M.S. and
Ph.D. degrees. An applicant should hold a degree
(not necessarily in agricultural economics) compa-
rable to a bachelor's degree at the University of
California and have demonstrated strong scholarship potential.
The agricultural and resource economics program is relatively flexible; however, each program stresses
economic theory, quantitative methods, and two
elective fields defined in consultation with the grad-
uate adviser. The elective fields include marketing and trade, agriculture in develop-
ment, agricultural policy, and natural resource
economics. The first year of course work in the Ph.D. program is normally devoted to economic and quanti-
itative methods, after which the student writes de-
partmental preliminary examinations in each of these
areas. Although there are no specific course re-
quirements, courses in such areas as marketing and
consumer theory, models of perfect and imperfect com-
sumer, theory of cost production, theory of the firm,

Consumer Theory, models of perfect and imperfect com-
petition. Applications include the demand for and supply
of energy and food, the structure of the U.S. energy
industry. (F) Wright

101. Economics of Resources and the Environment. (4)
Two 1-hour lectures and one hour of discussion per
week. Prerequisites: Math 16A-16B, POLECNR 100A or
Economics 100A 101A. Theory underlying the
optimal allocation of renewable and exhaustible
resources. Resource development and environmental transformation, intertemporal allocation, pollution control, and long-run scarcity. (SP)

*102. Government and Resources. (4) Two 1-hour
lectures and one hour of discussion section per
week. Prerequisites: 100 or Economics 100A or Eco-

115. Modeling and Management of Biological Re-

118. Linear Economic Models of Natural Resource

141. Economics of the Food Systems. (4) Two 1-
hour lectures and one hour of discussion per
week. Prerequisites: 100 or Economics 100A or 101A.
Introduction to agricultural markets and the U.S. food mar-
ket systems. Agricultural production and demand.
Price support, marketing orders, and other government poli-
cies. Microeconomic theory including labelling, food safety,
and food stamps. (F) Goetz

142. Advanced Topics in Agricultural Economics. (2)
One two hour lecture per week. Prerequisites: 141 or
consent of instructor. Advanced topics chosen from
industry structure, tariff and quota policies, welfare anal-
alysis of trade, agricultural anti-trust, futures markets.
(SP)

151. Agriculture in Economic Development. (4) Two
1-hour lectures and one hour of discussion per week.
Prerequisites: 100 or Economics 100A or Economics
101A or equivalent. Advanced recommended. Economic
and the impact of development on agriculture; food,
population and resources; the transformation of tradi-
tional agriculture; policy issues in rural development. (F)

152. Advanced Topics in International Trade. (3)
Two hours of lecture and one hour of discussion per week.
Prerequisites: 100 or Economics 100A. Design and
analysis of sector-specific economic policy in open eco-

161. Land and Water Economics. (4) Two 1-hour
lectures and one hour of discussion per week.
Prerequisites: 100 or Economics 100A. Design and
analysis of public policies affecting water and land
resources in the U.S. and their interrelationships.
Location theory, market behavior, water resources
management, and water quality control. (F) Fisher

162. Advanced Topics in Environmental and Re-

185. Senior Theses. (4) Course may be repeated for
credit. Individual meetings with faculty sponsor.
Prerequisites: Senior standing in PERN and consent of

Agricultural and Resource Economics / 87
241. Agricultural Policy. (3) Two 1 1/2-hour lectures per week. Prerequisites: Consent of instructor. Economic processes which have contributed to the transformation of U.S. agriculture and which have contributed to low resource returns from commodity surpluses, and structural changes in the food and agricultural economic systems and impact of various policies on large and small farmers, consumers, the rural community, and the environment. California agricultural problems and policy. (F) Wright

242. Quantitative Policy Analysis. (3) Two 1 1/2-hour lectures per week. Prerequisites: 211 or consent of instructor. Design of economic policy models. Econometric forecasting theory and practice. Economic aspects of welfare measurement. Policy optimization using programming and control-theoretic techniques. Subjective information in forecasting and policy formulation. (SP) Rausser

249. Agricultural, Food, and Resource Policy Workshop. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Meetings to be arranged. Prerequisites: Consent of instructor. Group study of selected topics or topics in public economy of natural resources. (F,SP) Staff

197. Field Study in Political Economy of Natural Resources. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent study. Prerequisites: Consent of instructor. Study of the field organization related to specific aspects of political economy of natural resources. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

239. Markets and Trade Workshop. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One two-hour seminar per week. Prerequisites: Consent of instructor. Presentation and discussion of ongoing research by faculty, staff, and students. (F,SP) Staff

231. International Markets and Trade. (3) Two 1 1/2-hour lectures per week. Prerequisites: Economics 201A-201B or equivalent or consent of instructor. Review of theories of comparative advantage, international organization, and nature of underdevelopment. Industrail organization: monopoly, competition, vertical integration, price discrimination, and economics of information with applications to food retailing, cooperatives, fishing, and energy. (SP) Zilberman

211. Econometrics: Statistical Foundations and Single Equation Estimation. (4) Two 2-hour lectures and one hour of discussion per week. Prerequisites: Economics 201A or equivalent or consent of instructor. Basic concepts of micro and welfare economics: partial and general equilibrium. Industrial organization: monopolistic competition, vertical integration, price discrimination, and economics of information with applications to food retailing, cooperatives, fishing, and energy. (SP) Zilberman

202. Production, Industrial Organization, and Regulation in Agriculture. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: Economics 201A or equivalent or consent of instructor. Characteristic functions, transformations of random variables, sample and asymptotic normality of estimators. Regression; hypothesis testing in the general linear model; multiple-linearity; heteroscedasticity; autocorrelation and non-identifiable parameters; mis-specification; errors in variables; random coefficient models; variance-covariance models; nonlinear regression; and qualitative models. (F) Challiant

212. Econometrics: Multiple Equation Estimation. (4) Two 2-hour lectures and one hour of discussion per week. Prerequisites: 211. The general linear structural model and structural design; multiequation regression; seemingly unrelated regression; simultaneous estimation techniques; recursive models; nonlinear simultaneous equation estimation; estimation of markets in disequilibrium; and other treatments of qualitative variables in simultaneous equation models. (SP) Judge

231. International Markets and Trade. (3) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: 212 and Econometrics 201B. Review of theories of comparative advantage. Theory and practice of international commercial policy. Customs union trade under uncertainty. Empirical models of trade, market structure considerations in international trade. (F) Karp

239. Markets and Trade Workshop. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One two-hour seminar per week. Prerequisites: Consent of instructor. Presentation and discussion of ongoing research by faculty, staff, and students. (F,SP) Staff

241. Agricultural Policy. (3) Two 1 1/2-hour lectures per week. Prerequisites: Consent of instructor. Economic processes which have contributed to the transformation of U.S. agriculture and which have contributed to low resource returns from commodity surpluses, and structural changes in the food and agricultural economic systems and impact of various policies on large and small farmers, consumers, the rural community, and the environment. California agricultural problems and policy. (F) Wright

242. Quantitative Policy Analysis. (3) Two 1 1/2-hour lectures per week. Prerequisites: 211 or consent of instructor. Design of economic policy models. Econometric forecasting theory and practice. Economic aspects of welfare measurement. Policy optimization using programming and control-theoretic techniques. Subjective information in forecasting and policy formulation. (SP) Rausser

249. Agricultural, Food, and Resource Policy Workshop. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Meetings to be arranged. Prerequisites: Consent of instructor. Group study of selected topics or topics in public economy of natural resources. (F,SP) Staff

197. Field Study in Political Economy of Natural Resources. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent study. Prerequisites: Consent of instructor. Study of the field organization related to specific aspects of political economy of natural resources. Regular individual meetings with faculty sponsor and written reports required. (F,SP)
The program is interdisciplinary in nature, administered by a faculty group drawn from several departments, and Ph.D. degrees are offered. Fields of emphasis include Near Eastern history, art and archaeology, Greek history, Roman history, classical art and archaeology, epigraphy, ancient law, and art. Degrees for Ph.D. are awarded on a combination of three of these fields or similar fields, one as a major subject, two as minor subjects. The program is open to students with the B.A. in a combined area who have completed at least one year of undergraduate study in the fields of study. To be eligible for the Ph.D. degree, candidates must pass examinations in two modern languages and when advanced to candidacy, the student must achieve a grade of C- or higher in every lower division course required in the major. No single course can be used to satisfy more than one requirement. Undergraduate students, both majors and non-majors, seeking information or advice about their programs or about courses should inquire at 213 Krober Hall.

The Anthropology Library, 230 Krober Hall, is part of the campus library system. It contains 60,600 bound volumes and receives 1,030 current serial titles. The library is open to all members of the University but serves primarily the faculty and students of the Anthropology Department. Many specialized materials remain in the Main Library or are duplicated there or in other branches. The Anthropology Library also houses the reading room and facilities for reading microfilm.

The department maintains a laboratory for quantitative analysis in all branches of the discipline. The laboratory is centered on a sophisticated minicomputer system used in teaching as well as in undergraduate and graduate research. It functions both independently and as a link to campus Computer Services. Courses 193 and Lab, 190A and Lab, and 190B and Lab use these facilities intensively. Package programs for statistical analysis, mapping, and computer graphics are available for use by students and faculty of the department.

The Major

The lower division component of the major in anthropology consists of Anthropology 1, 2, and 3, and Linguistics 5 (or its equivalent). At the time students apply for admission to the major, they are required to have already completed three of the following lower division courses: Anthropology 193 and two of the following: Anthropology 106, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117; Anthropology 106, 108, 111, 113, 115, 117.

In addition to the lower division requirements described above, the major requires that the student complete the following upper division work: one upper division course in each of the following three fields (not to include courses designated as fulfilling the area or methodology requirements): Physical Anthropology (courses numbered 100, 101, 103, 105, 108, 110, 111, 116, 117); Archaeology (courses numbered 120, 121, 122, 123, 128, 129).

On leave, spring
"Recalled to active service
Recipient of Distinguished Teaching Award

*On leave, spring
**Recalled to active service
†Recipient of Distinguished Teaching Award
Program is oriented toward the doctorate, and only the HI 95A-1958 series of courses.

The dissertation is based on the results of original field, laboratory, or library research, which normally requires a minimum of one year. The writing of the dissertation under supervision of a three-person dissertation committee. The degree is the same and bears the name of both campuses.

**Preparation for Graduate Study**

Admission to graduate studies at Berkeley does not presuppose an A.B. in anthropology. The graduate program is oriented toward the doctorate, and only candidates for the Ph.D. will be accepted. The M.A. degree is awarded in the course of study leading to the doctorate.

Because of the number of students who wish advanced training, only a small percentage of applicants can be accepted. Applications are considered only once each year for fall admission. The deadline for application is January 10.

**Graduate Programs**

**Anthropology Ph.D. Program**

The program for the Ph.D. degree normally takes six years and is divided into three steps, as follows:

**Step I.** This segment normally takes one year, during which students begin to narrow down their interests to particular topical and geographical fields of specialization.

**Step II.** During this period, which normally lasts from one to three years, the student select a three to five courses from field in their specialization, satisfy their language requirement, and prepare for the Ph.D. oral qualifying examination. With the successful passing of this examination, students are advanced to candidacy for the Ph.D. degree.

**Step III.** Students undertake research for the Ph.D. dissertation under supervision of a three-person committee in charge of research and dissertation. The dissertation is based on the results of original field, laboratory, or library research, which normally requires a minimum of one year. The writing of the dissertation customarily requires an additional year. On completion of the research and approval of the dissertation by the committee, the student is awarded the Ph.D. degree.

For further information, please address correspondence to the Graduate Advisor, Department of Anthropology, University of California at Berkeley; Berkeley, CA 94720.

**Medical Anthropology Ph.D. Program**

**General Information.** The Department of Anthropology of the University of California at Berkeley, and the Graduate Program in Anthropology at the University of California in San Francisco, currently offer a joint Ph.D. in medical anthropology. Students may apply to enter the program through either the Berkeley or the San Francisco campus, but not to both. The point of entry determines the student's home base during the program. Financial aid, primary advising, and other routine services are provided by the department through which the student enters the program. All students, however, benefit by taking required course work on both campuses and by the participation of the faculty on both sides of the program and its dissertation committees. The degree is the same and bears the name of both campuses.

**Medical Anthropology.** Medical anthropology entails the exploration of humans as simultaneously physical and symbolic beings in both contemporary and evolutionary contexts. As such, medical anthropology participates in anthropology as a whole, encompassing theory and practice from socio-cultural, psychological, biological, bio-cultural, symbolic, and linguistic anthropology. It is concerned with questions of both theoretical and applied significance, and with research that is of relevance to the social sciences and well as to medicine and the biological sciences. Courses in bio-evolutionary dimensions of disease are accompanied by seminars that explore pain, suffering, madness, and other human affinities as a social language speaking to the critically sensitive or ontologically significant social relations. Anthropological epidemiology asks the question, "Who gets sick with what ailments?" (differential risks, forms of medical knowledge, and medical systems, what arrangements, cultural features, and bi techno-environmental forces account for these risks). Medical anthropology interprets individuals as actively constructing their medical realities and not simply adjusting to or coping with them.

Given the broad definition of medical anthropology, the joint graduate program at Berkeley-UCSF is extremely flexible, allowing for the individual needs and interests of each student. During the first year of training, students are required to take core courses in both sociocultural and biological aspects of medical anthropology, taught at both campuses. After the first year and successful completion of the preliminary qualifying examination, medical anthropology students develop a more specialized and individually tailored program under the supervision and guidance of their advisor.

For students entering the Berkeley campus with the B.A., the joint training program is estimated to take between five and six years, as follows: three years of course work, one to two years of doctoral research, and one to two years of doctoral preparation. For a complete listing of faculty, consult the Medical Anthropology brochure available from the Department of Anthropology.

Anthropology students also benefit from the faculty, courses, and resources of many departments and the School of Public Health at Berkeley, and the School of Medicine and Nursing at UCSF.

**Application.** Applications are considered once each year for the fall semester. The application period opens in early September and the deadline for receipt of both graduate and Dean of Students Application is December 15. The minimum requirement for application is a bachelor's degree at Berkeley or the equivalent.

**Courses and Seminars**

Courses and seminars are listed below.

**Courses**

1. **Introduction to Physical Anthropology.** (4) Three hours of lecture and one hour of section per week. An introduction to human evolution. Physical and behavioral adaptations of humans and their prehistoric and living relations. 73 seminar hours and one hour of section per week. Pre-requisites: 3 or 11A-11B. The structure and dynamics of human culture and social institutions.

2. **Introduction to Anthropology.** (4) Three hours of lecture and one hour of section per week. Pre-requisites: 3 or 11A-11B. Lightfoot

3. **Introduction to Social and Cultural Anthropology.** (4) Three hours of lecture and one hour of section per week. Pre-requisites: Consent of instructor. Limited to freshmen. Special topics in anthropology with an emphasis on integrated and interdisciplinary problems.

4. **Proseminar in Social Anthropology.** (1) One 2-hour seminar plus 7+ hours reading/writing. Pre-requisites: Consent of instructor; junior or senior status. Topics in social anthropology such as the origins of human culture, domestication of plants and animals, learning patterns, urbanism, and methods of archaeological interpretation.

5. **Seminar in Archaeology.** (3) One 2-hour seminar plus 7+ hours of reading/writing. Pre-requisites: Consent of instructor; junior or senior status. Topics in social and cultural anthropology such as the structure and dynamics of human cultures, institutions, and societies.

6. **Seminar in Special Topics in Anthropology.** (3) Course may be repeated for credit. One 2-hour seminar plus 7+ hours reading/writing. Pre-requisites: Consent of instructor; senior status. Special topics in anthropology with an emphasis on integrated and interdisciplinary problems.

7. **Proseminar in Physical Anthropology.** (3) One hour of lecture, one hour of seminar, and one hour of section per week. Pre-requisites: 1 or 11A-11B. Physical and behavioral adaptations of humans and their prehistoric and living relations.

8. **Proseminar in Anthropology.** (3) Course may be repeated for credit. One hour of lecture, one hour of seminar, and one hour of section per week. Pre-requisites: 1 or 11A-11B. The structure and dynamics of human culture and social institutions.
102L Physical Anthropology Laboratory. (1-3) Three or more hours of laboratory per week. Prerequisites: Consent of Instructor. Limited to freshmen and sophomores. Individual research by lower division students. (FSP)

Staff

Upper Division Courses

Physical Anthropology

100. Human Paleoanthropology. (5) Three hours of lecture and two hours of laboratory per week. Prerequisites: Consent of Instructor. Topics in paleoanthropological theory and method. Must be taken on a pass/no-pass basis. Seminar meets alternate weeks. Recommended prerequisites: Freshmen or sophomores only. This seminar is designed for lower division students who are considering anthropology as a major. It introduces students to the major fields of anthropology (cultural, physical, archaeological, linguistics, medical) through structured meetings with anthropology faculty at Berkeley and occasional distinguished visitors to the Anthropology Department who will discuss their research interests and their own interpretation of the anthropological imagination. Small group meetings will be immediately followed by the departmental seminar series which the students will attend with their faculty sponsor. Some background reading will be recommended. (SP)

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no-pass basis only. Three to twelve hours of independent study per week. Prerequisites: Consent of Instructor. Limited to freshmen and sophomores.

101. Human Variation in an Evolutionary Perspective. (4) Three hours of lecture and one hour of discussion per section per week. Prerequisites: Consent of Instructor. Topics in human variation in both a racial and non-racial context, basic genetics (both molecular and population level), and the historical nature of the human species. (SP) 5

102L Physical Anthropological Laboratory. (1-3, Options: 1-11A-11B, 2-201 or 101, 3-106) Descriptive and analytical techniques anthropological fieldwork and analysis of human skeletal remains including original group pertains to the interpretation of the anthropological imagination. Small group meetings will be immediately followed by the departmental seminar series which the students will attend with their faculty sponsor. Some background reading will be recommended. (SP)

103. Introduction to Human Osteology. (6) Six hours of lecture per week. Recommended prerequisites: Consent of Instructor. Topics in human variation in both a racial and non-racial context, basic genetics (both molecular and population level), and the historical nature of the human species. (SP)

104L Advanced Human Osteology Laboratory. (1-4) Three to six hours of laboratory per week. Prerequisites: 101 or 11A-11B. Origin and relationships of the various forms of mankind. (SP) 5

105. Primate Evolution. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 1 or 11A-11B. A consideration of the major groups of primates with an emphasis on the evolution of behavior. (F) 5

106. Primate Social Behavior. (4) Three hours of lecture plus one hour of discussion per week. Recommended prerequisites: 1 or Zoology 14. Humans, apes, and selected monkeys are the primates of concern and among this array patterns and degrees of social behavior vary greatly. Lectures present a general introduction to behavior and its ecological context, the interaction of biology and behavior from an evolutionary perspective, and an exposition of the roots of modern human behavior. (F) 5

107L Primate Social Behavior Laboratory. (1-4) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: 1 or 11A-11B. The student will be required to prepare a written laboratory report in the form of a paper for publication. A laboratory manual will be provided and this will include an introduction to computer analysis of behavior. Additional units for credit may be arranged for computer analysis of data. (SP) 5

108. Problems in Primate Behavior and Ecology. (4) Three hours of lecture per week. Special problems in primate behavior and ecology, such as ecological adaptation, sociocultural, and the biological bases of behavior. (F) 5

109. Dietary Anthropology of Humans and Non-Human Primates. (4) Three hours of lecture per week. This course focuses on the dietary behavior of human and non-human primates, seeking insights into factors underlying patterns of food selection, diet and its breadth, food avoidance and unusual behaviors with respect to food. Gut anatomy, nutritional requirements and energetics are also considered. (SP) 5

110. Theory and Method in Physical Anthropology. (4) Three hours of lecture per week. Prerequisites: 111-111A-111B. A unitary view of past history and current trends in the field of Physical Anthropology, emphasizing schools of thought, important figures and major areas of research. (F) 5

111. Evolution of Human Behavior. (4) Three 1-hour lectures per week. This course will ask to what extent human behavior in its various individual, group, social and cultural dimensions can be understood using the relatively small number of basic principles provided by evolutionary theory. Issues in interpretation include a delineation of those (gene structure and function), mutation, adaptation through natural selection, then consider how these apply to human social, organizational features in general and the various primates in particular, and then deal with specific aspects of the human condition and how they came to be that way.

112. Medical Anthropology. (4) A study of the relationship of humans and their environments in the form of a paper for publication. A laboratory manual will be provided and this will include an introduction to computer analysis of behavior. Additional units for credit may be arranged for computer analysis of data. (SP) 5

113. Introduction to Medical Anthropology. (4) Three hours of lecture and one hour of discussion or laboratory per week. Prerequisites: Consent of Instructor. Cultural, psychological, and biological aspects of the definitions, causes, symptoms, and treatment of illness. Comparative study of medical systems, practitioners, and patients. (F) 5

114. Environmental Effects on Human Health and Disease. (4) Three hours of lecture and one hour of discussion or laboratory per week. Prerequisites: Consent of Instructor. Cultural, psychological, and biological aspects of the definitions, causes, symptoms, and treatment of illness. Comparative study of medical systems, practitioners, and patients. (F) 5

115. Nutrition and Genes in Medical Anthropology. (4) Three hours of lecture and one hour of discussion or laboratory per week. Prerequisites: Consent of Instructor. Comparative study of the interaction of diet, genetics, and evolutionary selection in human populations. (SP)

116. Socio-Psychological Aspects of Medical Anthropology. (4) Three hours of lecture and one hour of discussion or laboratory per week. Prerequisites: Consent of Instructor. Comparative study of mental illness and societal gendered diseases: psychiatric treatment, practitioners, and institutions. (SP)

120. Culture Growth. (4) Three hours of lecture per week. Archaeological theory and cultural process illustrated by the origin and development of civilization in the old world and the new. (SP)

121. Historical Archaeology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 120. Archaeology of the period since 17th century. Topics include architecture, domestic artifacts, mortuary art, foodways, and trash disposal. Euro-American, Afro-American, and Native-American examples are considered. (SP) 5

122. New World Cultures. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 2. A variety of courses that consider the peoples and past cultures of the New World, as known from ethnohistory, archaeology, art history, ethnography, and other sources. No specific sequence to courses; students may take any or all of the following in any sequence. (FSP) 5

122A. Archaeology of North America. Formerly 122. Prehistory of Native Americans; prehistoric culture areas; relations with historic Indians. (SP)

122B. Ancient Civilization of Mexico and Central America. Formerly 125. A study of the pre-Columbian history of the peoples and past cultures and societies of the New World civilization. (SP) 5

122C. People of the Americas. Formerly 126. A study of the pre-Columbian history of the peoples and past cultures and societies of the New World civilization. (SP) 5

122D. The World of the Ancient Maya. Formerly 124. A comprehensive study of the development of the peoples and past cultures and societies of the New World civilization. (SP) 5

122E. Stone Age Archaeology. Overview of Stone Age cultures and development. Selected topics or geographic areas of paleoarchaeology.

123. Prehistory of North America. Prehistoric and pre-Columbian, pre-Columbian, and Archaic American, and Native-American culture and its antecedents; a survey from the earliest times to the present. (SP)

123A. Prehistory of California. Prehistoric and pre-Columbian, pre-Columbian, and Archaic American, and Native-American culture and its antecedents; a survey from the earliest times to the present. (SP)

123B. Archaeology of Africa. Formerly 126. Prehistoric and pre-Columbian, pre-Columbian, and Archaic American, and Native-American culture and its antecedents; a survey from the earliest times to the present. (SP)

123C. Archaeology of Europe. Formerly 127. Selected topics and research problems in the archaeology of Pleistocene and post-Pleistocene Europe. (SP) 5

123D. Archaeology of Eurasia. Formerly 127. Prehistoric and pre-Columbian, pre-Columbian, and Archaic American, and Native-American culture and its antecedents; a survey from the earliest times to the present. (SP)

124. Special Topics in Archaeology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 2. Current topics in methods and theory of archaeological research, varying with instructor. 5

125. Prehistoric Art. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 2 or 3. Draws on study of art in non-Western societies and on archaeology to explore a range of prehistoric arts in cultural contexts; e.g., rock art, Ice Age arts, prehistoric ceramics. Uses illustrative material from the Museum of Cultural Anthropology. (F)

126. Archaeology of North America. Formerly 126. Prehistoric and pre-Columbian, pre-Columbian, and Archaic American, and Native-American culture and its antecedents; a survey from the earliest times to the present. (SP)

129. Prehistoric Art. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 2 or 3. Draws on study of art in non-Western societies and on archaeology to explore a range of prehistoric arts in cultural contexts; e.g., rock art, Ice Age arts, prehistoric ceramics. Uses illustrative material from the Lowie Museum of Anthropology. (SP)

130. Invention and Technology. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. Concepts, history, and impact of fundamental inventions and their illustrative material from the Lowie Museum of Anthropology. (SP)

131. Science in Archaeology. (4) Three hours of lecture and one 3-hour lab per week. Prerequisites: 2. A survey of the application of principles and techniques deriving
of lecture per week. Prerequisites: 2 or consent of Instructor. Laboratory in analyzing the materials of prehistory (e.g., stone tools, ceramics, and/or metals). (F)  

132. Analysis of Archaeological Materials. (4) Formerly 128L. Course may be repeated for credit. Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 2 or consent of Instructor. Laboratory in analyzing the materials of prehistory (e.g., stone tools, ceramics, and/or metals). (F) Lighthart

133. Field Course in Archaeological Method. (4) One hour of lecture and six hours of field work per week. Prerequisites: 2 or consent of Instructor. Practical experience in the field study of archaeological sites and materials. Coverage may include reconnaissance, mapping, recording, and excavation. (SP) Staff

134. Analysis of the Archaeological Record. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: 2 or consent of Instructor. Guidance in the preparation of excavated materials for publication, including sampling and analysis strategy, drawing, photography, and write-up. (SP) Staff

136. History and Theory of Archaeology. (4) Three hours of lecture per week. Prerequisites: 2. A critical review of the historical background and philosophical premises of past and present anthropological theory with respect to its concepts of time and change. (SP) Conkey, Tringham

Social and Cultural Anthropology

137. Energy, Culture, and Social Organization. (4) New course. Three hours of lecture per week. This course will consider the human dimensions of particular energy consumption patterns. It will examine the influences of culture and social organization on energy use, energy policy, and quality of life issues in both the domestic and international setting. Specific treatments will be given to mind-sets, ideas of progress, cultural visions in time perspectives and resource use, equity issues, and the role of power holders in energy-related questions. Other topics will include processes of social/cultural change and views about change, particular worldviews, and the role of the physical and engineering scientists, and questions of ethics. The lectures will be organized around four topics: Noticing Assumptions, Cultural Comparisons, Analysis of Ideas and Social Structure, and Analysis as it Relates to Action. (SP) Staff

138. Ethnographic Film. (4) New course. Three hours of lecture and two hours of discussion and film laboratory. Prerequisites: 3 or equivalent. An overview of ethnographic film on a variety of cultures which focuses on assumptions and basic techniques involved in the audiovisual recording of field data. Written and visual ethnographies will be contrasted, and students will cooperatively produce an ethnographic film. (SP) Staff

139. Controlling Processes. (4) Three hours of lecture per week. Prerequisites: Nader. But those who have not one social science course will be more familiar with the subject matter. This course will discuss key theoretical concepts related to power and control and examine indirect mechanisms and processes by which direct control becomes hidden, voluntary, and unconscious in industrialized societies. Readings will cover language, law, politics, religion, medicine, sex-and gender. (SP) Nader

140. The Nature of Culture: An Introduction to Cultural Anthropology. (4) Three hours of lecture per week. Advanced level introduction to cultural anthropology for nonmajors. Not open to students who have taken 3 or 11A-11B. (SP) Staff

141. Comparative Society. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 3, 11A-11B, or 140 or consent of Instructor. Theories of social structure, functional interrelationships of social institutions. Primary emphasis on non-Western societies. (F) Nader

142. Kinship and Social Structure. (4) Three hours of lecture per week. Prerequisites: 141. Comparative studies of kinship and family types throughout the world; techniques of kinship and structural analysis. (F) Staff

143. Plural Societies. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B. A critical examination of the theories of plural societies with anthropographic examples from various parts of the world. (F) Staff

144. Social and Cultural Change. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of instructor. Theories of social and cultural change: prehistory, diffusion, acculturation, pattern dynamics, social evolution, modernization, postmodernism, social and political movements, innovation, social-functional-functional approach to change. Illustrative materials from anthropological sources. (SP) Ogbu

145. Urban Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of instructor. A consideration of anthropological concepts and methods for the urbanization processes in towns and cities. (F) Ogbu

146. Comparative Peasant Society. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of instructor. Analysis of peasant society as a social type contrasted with primitive and industrial society. (F) Ogbu

147. Gender, Culture and Sexuality. (4) Three hours of lecture plus one hour of discussion section per week. Prerequisites: 3 or consent of instructor. Exploring the meanings of gender in both evolutionary and anthropological perspectives in an effort to understand the interplay of biology and culture in the production of sex roles and sexuality. Themes to be addressed include: science and its impact on the question of universal male dominance; cultural constructions of gender and sexuality; health, mental health as affected by gender and sexuality; gender play (gender reversals, gender crossing), and the economy of sex roles, production and reproduction. (SP) Anderson

148. Human Ecological Relationships. (4) Three hours of lecture per week. Survey of theories, methods, and applications of the ecological perspective to cultural and biological attributes of human populations. (F) Anderson

149. Culture and Personality. (4) Three hours of lecture per week and one hour discussion section. Prerequisites: 3 or 11A-11B or consent of instructor. Relationships of cultural, social, and personality factors in human behavior; personalization in representative societies; techniques for studying culture-personality relations. (SP) DeVos

150. Social Problems in Changing Cultures. (4) Three hours of lecture and one hour of required section per week. Prerequisites: 3 or 11A-11B or background courses in the social sciences or consent of instructor. Cross-cultural approach to conflict in society, culture. (F) Graburn

151. Anthropology of Tourism. (4) Three hours of lecture per week. (1) Variations in tourist motivations and behavior and (2) the political, economic, and cultural impact of tourism on host cultures and communities. (F) Graburn

152. Art and Culture. (4) Three hours of lecture per week. Graphic and plastic arts and their relations to culture in non-literate societies; illustrative material from the Lowie Museum of Anthropology. (F) Anderson

153. Education and Culture. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Anthropological approaches to the study of education in traditional and modern culture. (SP) Ogbu

154. Social Inequality. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or Sociology 1, or consent of instructor. Comparative examination of theories and systems of social inequality by reference to societies ranging from band to state, from foraging to industrial, from egalitarian to stratified, with attention to inequality defined by kinship, gender, age, servitude, class, caste, race, ethnicity, colonial status, etc. (SP) Nader

155. Economic Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B. An economic behavior in non-industrial societies; its social and cultural setting, modern changes, and economic development. (SP) Nader

156A. Politics and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B. Anthropological concepts relevant to the comparative analysis of political philosophy and sociocultural change. Particular attention will be given to the interrelations of culture and politics. (F) Shack

156B. Culture and Power. (4) Three hours of lecture per week. The course examines how representations are situated within fields of power and, in turn, how political considerations are translated into ethical forms. Topics include: philosophy and history of social science, power/knowledge, the social difference and power, social science and ethics. (F) Rabinow

157. Law and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of Instructor. Comparative survey of the ethnohistory of law; methods and concepts relevant to the comparative analysis of the forms and functions of law. (F) Rabinow

158. Religion and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of instructor. A consideration of the interplay between religious beliefs and institutions and other aspects of culture. (F) Rabinow

159. Ethnic Interaction: Contemporary Issues. (4) Three hours of lecture and one hour required section per week. This interdisciplinary course will discuss comparative topics in ethnic groups, ethnicity and ethnic identity. The approaches considered are those of recent Sociology, Political Science, Comparative Anthropology and Comparative Psychology. The course considers various ethnic conflicts and readings required cover both literature and social science. (SP) DeVos

Folklore

160. Forms of Folklore. (4) Three hours of lecture per week. Prerequisites: Upper Division. A wide survey of the major and minor forms of folklore with special emphasis upon proverbs, riddles, superstitions, games, songs, and narratives. (F) Dundes

161. Narrative Folklore. (4) Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of Instructor. The study of folktales, myths, legends, and other forms of verbal art; methods and theories of folklore. (SP) Dundes

162. Topics in Folklore. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 3 or 11A-11B or consent of Instructor. Special topics in folklore or ethno-musicology. (F) Staff

Qualitative Computer Analysis

163. Computer-Assisted Elicitation and Analysis of Ethnographic Texts. (5) New course. Three hours of lecture, three hours of lab plus nine hours of reading/writing/research per week. Introduction to theory and practice in eliciting, archiving and analyzing ethnographic field data. Data collection by ethnographic interviews, questionnaires, event analysis, and small group observation. Application to isolated face-to-face groups and complex societies. Computer-assisted techniques for qualitative analysis with UNIX on Sun Workstations. (F) Gumperz

Linguistic Anthropology

164. Man's View of Nature. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. Comparative study of man's conceptual organization of his universe, especially views of the biological environment. Implications of folk classification in pre-literate societies for general principles of language, thought, and culture. (SP) Berlin

165. Language in Culture. (4) Three 1-hour lectures per week. Prerequisites: Linguistics 5 or equivalent. Introduction to linguistics for social scientists. Language in human evolution, linguistics change, culture, cognition, meaning and interpretation. Literacy and culture. Communication and learning in complex societies. (SP) Berlin

166. Language in Society. (4) Three 1-hour lectures per week. Prerequisites: Linguistics 5. A cross-cultural study in linguistics or linguistic anthropology. Social and linguistic aspects of normal behavior, speech communities, language and social stratification, language, nation, and state. (SP) Gumperz

Theory and Method

167. Advanced Survey of Social and Cultural Anthropology. (4) Three 1-hour lectures per week. Pre-
Area Studies

170. China. (4) Three hours of lecture per week. Chinese culture and society with an emphasis on the village level.


172. United States Culture and Society. (4) Three hours of lecture per week. Anthropological theory and research on American culture and society.


174. Indians of California. (4) Three hours of lecture per week. Survey of the cultures of the native peoples of California. Tribal divisions, arts, customs, archaeology. (F) Lightfoot, Simmons

175. Native Peoples of South America. (4) Three hours of lecture per week. Archaeology, ethnology, and ethnography.

176. Contemporary Latin America. (4) Course may be repeated for credit. Three hours of lecture per week. Emphasis on Iberian-Indian assimilation, African influence, and mixed folkways.

177. Mexico and Central America. (4) Three hours of lecture per week. Ethnology of Indian and Mestizo culture with special emphasis on comparative organization, belief systems, law, economics, kinship, language, and communication.


179. Afro-American Ethnography. (4) Three hours of lecture per week. A comparative survey of Afro-American peoples in the Caribbean, North, Central, and South America; considered in both historical and contemporary perspective.

180. European Society. (4) Three hours of lecture per week. Representative groups in historical and modern perspective. Rural-urban relationships and the dynamics of change. (F) Stoddard

181. The Near East. (4) Three hours of lecture per week. Cultures of the contemporary Near East, with special emphasis upon Arab populations.

182. Circumpolar Peoples. (4) Three hours of lecture per week. Arctic and sub-arctic peoples of Europe, Asia, and North America; traditional cultures and present status in national societies.

183. Sub-Saharan Africa. (4) Three hours of lecture per week. Cultures and social institutions of sub-Saharan Africa. (SP) Shack

184. South Asia. (4) Three hours of lecture per week. Cultural traditions, social organization, and social change, with an emphasis on India and Pakistan.

185. Mainland Southeast Asia. (4) Three hours of lecture per week. Peoples and cultures of mainland Southeast Asia with emphasis on Burma, Thailand, and Vietnam. (SP) Phillips

186. Insular Southeast Asia. (4) Three hours of lecture per week. Peoples and cultures of insular Southeast Asia with an emphasis on Indonesia, Malaysia, and the Philippines. (SP) Anderson

187. Topics in Area Studies. (4) Course may be repeated for credit. Three hours of lecture per week. Special topics in cultural areas not otherwise covered.

188. Peoples and Cultures of the Himalayas. (4) Three 1-hour lectures per week. This course will deal with ethnography, ecology and change among the peoples and cultures of the Himalayan regions of India, Pakistan, Bhutan, and less centrally, Afghanistan and China (Tibet).

Application of Quantitative and Computer Methods to Anthropology

Note: See also 163, above.

190A. Quantitative Methods in Anthropology I. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 183 or equivalent recommended. Techniques of quantitative analysis appropriate to anthropology and other social and behavioral sciences. Emphasis on practical work in handling large data sets, statistical analysis, and computer usage. (F) Staff

190B. Quantitative Methods in Anthropology II. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 190A or equivalent. Techniques of quantitative analysis appropriate to Anthropology and other social and behavioral sciences. Emphasis on practical work in handling large data sets, statistical analysis, and computer usage. (SP) Staff

193. Practical Computer Use and Laboratory. (5) Must be taken on a pass/no pass basis. One hour of lecture and a minimum of three hours of laboratory per week. Setting data for computer analysis; data entry; editing data; sorting and categorizing data; word-processing; exploratory data analysis. Must be taken concurrently with laboratory. (F,SP) Staff

General Topics

191A. Recent Developments in Anthropology. (4) Course may be repeated for credit. Three hours of lecture per week. Special topics. (SP) Staff

192. Research Design. (4) Course may be repeated for credit. Three hours of lecture per week. Research design for ethnographic field work.

194. Anthropological Demography. (4) Students who have taken 194 may not receive credit for 194. Three hours of lecture per week. Population theory and methods applied to anthropological data and problems. Mathusian and Boserupian theories of population change. Nonhuman primates, paleodemography, hunters-gatherers, historical and modern peasant populations. Emphasis on social-cultural factors in fertility, mortality, nuptiality. (F) Hammel

H195A-H195B. Senior Honors. (4-6) Credit and grade to be awarded upon completion of the sequence. Three hours of tutorial per week. Prerequisites: Open only to honors students. Systematic readings in history and modern theory, collection and analysis of research materials, and the preparation of an honors thesis. Group or individual tutorials. (F,SP) Staff

196. Undergraduate Seminar. (4) Course may be repeated for credit. Two hours of seminar and two hours of consultation per week. Prerequisites: Consent of instructor. Seminar for the advanced study of the subject matter of a previously given upper division course, emphasizing reading and discussion. (F) Ogbu

197. Field work. (3-12) Course may be repeated for credit. Must be taken on a pass/no pass basis. Three to nine hours of tutorial per week. Prerequisites: Consent of instructor. Field experience sponsored by a faculty member; written reports required. (F,SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. One to four hours of tutorial per week. Prerequisites: Consent of instructor. Supervised independent study and research. (F,SP) Staff

Graduate Courses and Seminars

200. Human Evolution. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Howell

201. Genetic Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

202. Primate Behavior. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

203. Primate Socialization. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

204. Primate Evolution. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Howell

205. Comparative Anatomy. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) White

206. Fossil Man. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Sarich

208. Biochemical Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

209. Human Adaptation. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Sarich

210. Special Topics in Physical Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Mitton

211. Primate Ecology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

212. Osteology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

Medical Anthropology

215A-215B. Advanced Medical Anthropology. (4,4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Anthropological theory, data, and methodology in relation to the health sciences. Lectures, readings, and supervised field research. May be taken in association with Medical Anthropology at UCSF.

216. Infectious Diseases of Anthropological Importance. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

217. Population Genetics and Health Status. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

218. Topics in Biomedical Anthropology. (3) Course may be repeated for credit. One hour of lecture and one hour of consultation per week. Prerequisites: Consent of instructor. Module series: parasitology, genetics, nutrition, entomology, immunology, microbiology, physiology.

219. Topics in Medical Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Comparative study of mental illness and socially generated diseases; psychiatric treatment, practitioners, and institutions. (F) Scheper-Hughes

*On leave, spring
**On leave, fall
\*Recipient of Distinguished Teaching Award
Archaeology

220. Western North America. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

221. Mesoamerica. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Graham

222. Archaeology of South America. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

223. African Prehistory. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

224. African Prehistoric Archaeology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

225. European and Near Eastern Prehistory. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Conkey, Tringham

226. Method. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Lightfoot

227. Historical Archaeology Research. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Graduate standing with some background in archaeology, or undergraduates who have taken 2, or consent of instructor. Historical archaeology seminar. Subject matter will vary from year to year. (F,SP) Deetz

230. Special Topics in Archaeology. (4) Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Conkey; (SP) Staff

Social and Cultural Anthropology

240A-240B. Fundamentals of Anthropological Theory. (6) Two hours of lecture and two hours of discussion per week. Prerequisites: Required of all graduate students in social/cultural anthropology. Advanced survey of the major theoretical and empirical areas of social and cultural anthropology. Sequence begins fall. (F,SP) Graburn, Phillips; Simmons, Scheper-Rughes

245. History and Theory of Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Staff

249. Seminar in Social and Cultural Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. 

250A. Culture and Personality. (4) (F,SP) DeVos

250B. Deviance. (4)

250C. Applied Anthropology. (4)

250D. Economic Anthropology. (4)

250E. Political Anthropology. (4)

250F. Religion. (4) (F) Brandes

250G. Social Issues and Anthropological Ethics. (4) (SP) Berreman

250H. Art and Culture. (4)

250L. Anthropology of Law. (4)

250L. Ethnological Field Methods. (4)

250K. Social Inequality. (4)

250L. Urban Anthropology. (4)

250M. Ecological Anthropology. (4) (F) Anderson

250N. Education and Culture. (4) (SP) Ogbu

250Q. Social Interaction. (4)

250P. Social Change and Development. (4)

250C. Peasant Societies. (4)

250T. Analysis of Field Data. (4) (F) Beharid

250X. Special Topics. (4) (F,SP) Staff

251. Research Design. (4) Course may be repeated for credit. Two hours of seminar per week. (SP) Millon

Note: For similar course offered in 1988-89, see Demography 296.

Folklore

250B. Problems in Folklore. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

251. Psychology and Folklore. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

252. North American Indian Folklore. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor.

253. Special Topics in Folklore. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Staff

Linguistic Anthropology

270. Seminars in Linguistic Anthropology. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor: Courses will vary from year to year. See Departmental Internal Catalog for detailed descriptions of course offerings for each semester.

270A. Semantics. (4)

270B. Interactional Sociolinguistics. (4) (SP) Gumperz

270C. Language Variation. (4)

270E. Formal Ethnography. (4)

270F. Ethnobiology. (4) (SP) Berlin

270G. Color Categorization. (4)

270H. Ethnolinguistics. (4)

270I. Decision Making. (4)

270X. Special Topics in Linguistic Anthropology. (4) (F) Gumperz

Area Studies

280. Seminars in Area Studies. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Courses will vary from year to year. See Departmental Internal Catalog for detailed descriptions of course offerings for each semester.

280A. Latin America. (4)

280B. Sub-Saharan Africa. (4)

280C. South Asia. (4) (SP) Berreman

280D. China. (4)

280E. Japan. (4)

280F. Southeast Asia. (4) (F: Ong; SP: Anderson)

280G. Oceania. (4)

280H. European Society. (4) (SP) Brandes

280I. United States Culture and Society. (4)

280J. South American Ethnology. (4)

280K. South American Ethnology. (4)

280X. Special Topics in Area Studies. (4) (SP) Nadler

290. Survey of Anthropological Research. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture bi-weekly. Required each term of all registered graduate students prior to their advancement to Ph.D. candidacy. (F,SP) Staff

Application of Quantitative and Computer Methods to Anthropology

293. Problems in Data Analysis. (4) New course. Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Advanced practical and seminar in quantitative and qualitative data analysis and computing.

298A. Supervised Research. (2-12) Course may be repeated for credit. Variable units for field research per week. Prerequisites: Consent of Instructor. Practice in original field research under staff supervision. One unit of credit for every four hours of work in the field. (F,SP)

298B. Supervised Research. (4) Course may be repeated for credit. Two hours of consultation per week. Prerequisites: Consent of Instructor. Analysis and write-up of field materials. (F,SP) Staff

299. Directed Reading. (1-6) Course may be repeated for credit. One to eight hours of conferences per week. Prerequisites: Consent of Instructor. Individual conferences intended to provide directed reading in subject matter not covered by available seminar offerings. (F,SP) Staff

309. Directed Research. (1-12) Course may be repeated for credit. Two to eight hours of conferences per week. Prerequisites: Consent of Instructor. Individual conferences to provide supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to eight hours of consultation per week. In preparation for Ph.D. examinations. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the degree. (F,SP) Staff

Professional Training

301. Professional Training: Teaching. (1-6) Course may be repeated for credit for a maximum of twelve units. Must be taken on a satisfactory/unsatisfactory basis. Eight hours of lecture and section and two hours of seminar per week. Group consultation with instructor. Supervised training with instructor on teaching undergraduates. (F,SP) Staff

Interdepartmental Studies Courses

Undergraduate Courses

IDS 183. Modernity: Nietzsche, Weber, Heidegger and Foucault. (4) Three hours of lecture per week. Thinking about modernity as crisis has produced some of the most important works of our age. In this course we will examine the problematization of modernity in four thinkers: Nietzsche (nihilism and history), Weber (rationalization and the social sciences), Heidegger (technology and thought) and Foucault (welfare and interpretation). We will consider how each of these thinkers diagnoses the dangers and opportunities of our modern condition.

Graduate Courses

IDS 215. Faunal Analysis in Archaeology. (4) One hour of lecture, one hour of discussion, and two 3-hour laboratories per week. Prerequisites: Paleontology 128 or a course in comparative anatomy. Introduction of systematics of animal common to find in archaeological contexts, principles and procedures in faunal analysis of archaeological sites, practical training in osteology and research methods, and preparation of a faunal analysis of an archaeological site. Sponsoring departments: Anthropology and Paleontology.

IDS 226. Human Evolution, Prehistory and Paleoenvironmental. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. A seminar course devoted to consideration of current research in Paleopathology and related subjects. Sponsoring departments: Anthropology and Paleontology.
Architecture

College of Environmental Design

Department Office: 223 Wurster Hall, 642-4942
Chair: Howard Friedman, A.B., F.A.I.A.

Professors:
- Christopher Alexander, Ph.D. Harvard University. Architectural design, space
- Edward A. Arell, Ph.D. of Edinburgh. Building technology, energy
- Richard Benemer, M.Arch. Harvard University. Architectural design
- Samuel Davis, M.E.D., F.A.I.A. Yale University. Architectural design
- Margaret P. Dams (Hem, M.A., M.F.A. California College of Arts and Crafts, Mills College. Photography
- Warren Paul Ellis, Jr. University of California at Los Angeles. Social factors in design
- Norman R. Givens, Ph.D. Yale University. Architectural history
- Howard Friedman, A.B., F.A.I.A. University of California at Berkeley. Professional practice
- Sanford Hirshen, B.Arch., F.A.I.A. Columbia University. Architectural design
- Spiro Kostof, Ph.D. Yale University. Architectural history
- Raymorid Lifchez, M.S., M.A., M.C.P. Columbia University; Architecture
- Joseph Esherick, B.Arch., F.A.I.A. (Emeritus) University of San Francisco. Social factors in design
- Mark A. Smith, M.Arch. University of California at Berkeley. Architectural design
- Mark A. Smith, M.Arch. University of California at Berkeley. Building technology
- Paul E. Groth, Ph.D. University of California at Berkeley. History of the environment. Architecture
- Randolph Langenbach, M.Arch. Harvard University. Architectural preservation. Design
- Gail Schiller, Ph.D. University of California at Berkeley. Building technology
- Mark A. Smith, M.Arch. University of California at Berkeley. Computers and design
- Jili Stoner, M.Arch. University of Pennsylvania. Architectural design

Creating livable environments means balancing complex social, political, economic, and technical requirements with human needs. Understanding these components and methods of design and ultimately realizing them are the major objective of our educational endeavor. To respond to this challenge, faculty members in Architecture represent a variety of scholarly and professional backgrounds.

Although ability in building design is often considered to be the goal of our educational system and our graduates, knowledge about how people can affect environments and manage human, financial, and natural resources in the creation of that environment is our major emphasis. Students follow programs in environmental history, behavioral sciences, resource management, and design theory. Problem identification, computerization, and the reconciliation of technical, aesthetic, and social concerns are pursuits which often do not entail building construction. The department prides itself on educating not only good architects, but also environmentally knowledgeable citizens.

Undergraduate Programs

The four-year program leading to the degree of Bachelor of Arts in Environmental Design with a major in Architecture requires the completion of core work in study areas ranging over a diversity of subjects. These may include mathematics, physics, engineering, courses in design, graphics and architectural history, in aspects of architecture as a profession and finally, in the social sciences and humanities.

Graduate Programs

The department offers the professional degree Master of Architecture and the academic degree Doctor of Philosophy.

Master of Architecture. The professional degree, Master of Architecture, will be awarded to students who successfully complete a program of studies of from one to three years' duration depending upon previous preparation. An undergraduate degree from the College of Environmental Design or in an allied field is preferred. Additional information is available from the departmental graduate program.

Joint Program with the Department of City and Regional Planning.

This Doctor of Philosophy program is open to exceptionally qualified students who present outstanding academic records along with clear evidence of commitment and ability in architectural research and scholarship. Graduate Division requirements with respect to admission, the language requirement, candidacy, and the dissertation under Plan B apply (see Index). Applicants must hold a bachelor's degree from an accredited institution, but the department makes no restriction as to the discipline of the undergraduate preparation. Additional information is available from the departmental graduate program.

Joint Program with the Department of City and Regional Planning.

This Doctor of Philosophy program is open to exceptionally qualified students who present outstanding academic records along with clear evidence of commitment and ability in architectural research and scholarship. Graduate Division requirements with respect to admission, the language requirement, candidacy, and the dissertation under Plan B apply (see Index). Applicants must hold a bachelor's degree from an accredited institution, but the department makes no restriction as to the discipline of the undergraduate preparation. Additional information is available from the departmental graduate program.

Joint Program with the Division of Structural Engineering and Structural Mechanics and the Department of Architecture.

The two departments offer a joint program with a concurrent degree for exceptionally qualified students. Students must fulfill the course requirements for both departments, but are not required to cross-count courses from each department toward the other department thus achieving a saving in time enrolled, varying from one semester to one year (depending on the specific amount of advanced standing individually). Applicants should seek admission to the Department of Architecture and indicate on their application that they wish to be considered for the joint program.

Additional prerequisites for admission to the professional Master of Architecture program are college-level or equivalent mathematics through analytical geometry and beginning calculus and beginning physics through mechanics.

The basic course leading to the Master of Architecture degree shall take the specific content of the College of Environmental Design and the Department of Architecture. The basic course leading to the Master of Architecture degree shall take the specific content of the College of Environmental Design and the Department of Architecture.

Master of Arts Degree in Design. There is a small program in Visual Studies at the graduate level leading to the Master of Arts degree in design. Students with an interest in pursuing graduate work in photography or interior design are encouraged to pursue this program.
of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: 100A-100B. Problems in design of buildings of intermediate complexity. Each section deals with a selected topic, such as housing, site planning, institutional buildings, community development, and interiors. Studio work is supplemented by lectures, discussions, and field trips. (F,SP) Staff

102. Design Development in Architecture. (5) Forty-five hours of lecture/seminar and 75 hours studio/tutorial per semester. Prerequisites: 100A-100B. The development of architectural concepts into detailed design including the integration of structure, construction, and building systems, and the production of construction documents. Studio work is supplemented by lectures, discussions, readings, and field trips. (F,SP) Stoller, Staff

105. Community Design Studio. (5) Forty-five hours lecture/seminar and 75 hours studio tutorial per semester. Prerequisites: 100A. Synthesis of social, political, and technological issues through architectural case studies.

109. Seminar in Architectural Design. (1-4) Course may be repeated for credit when topic changes. Fifteen hours of lecture per unit per semester. Prerequisites: consent of Instructor.

109A. Seminar in Architectural Theory.

109B. Seminar in Architectural Criticism.

109C. Current Issues in Architecture.

109X. Special Topics: Architectural Design.

200A-200B. Fundamentals of Architectural Design. (7) 200A must be taken on a satisfactory/unsatisfactory basis. Sixty hours of lecture/seminar and 120 hours of studio per semester. Introductory course in architectural design and theory for graduate students. Problems emphasize the major social, technological and environmental determinants of building form. Studio work is supplemented by lectures, discussions, and field trips. (F,SP) Staff

201. Case Studies in Architectural Design. (5) May be repeated for credit. Forty-five hours of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: 100A-100B or 200A-200B. Each section deals with a specific problem such as housing, high-rise design, interiors, community development. Studio work is supplemented by lectures, discussions, readings, and field trips. (F,SP) Staff

202. Final Project in Architectural Design. (5) Forty-five hours of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: 100A-100B or 200A-200B. Selected topics such as social policy and building form, environmental considerations, design development, and the ethics of the profession. (F,SP) Staff

219A. Design in the Third World.

219B. Designing for Special Populations.

219C. Programming and Evaluation.

219D. Social Aspects of Housing Design.

219E. Social Form and Spatial Organization.

219F. Urban Parks.

219X. Special Topics: Social and Cultural Bases of Design.

Practice of Design

120. Introduction to the Practice of Architecture. (3) Forty hours lecture and 20 hours of discussion per semester. Architect, owner, developer, contractor relations, contract documents, and the ethics of the practice. (F,SP)

121. Introduction to Community Development. (5) Fifteen hours of lecture/seminar and 180 hours of internship in Bay Area agencies and organizations. Prerequisites: 100A. (SP) Staff

122. Seminar in the Practice of Design. (1-4) Course may be repeated for credit when topics differ. Fifteen hours of lecture per semester. Prerequisites: 100A-100B and senior standing. Introduction to the practice of design and development and testing of various methods, tools, and techniques available for environmental designers. (F,SP) Staff

123. Social and Cultural Factors in Design.

123A. Seminar on Social and Cultural Bases of Design.

123X. Special Topics in the Practice of Design.

220. Advanced Study in the Practice of Design. (5) Course may be repeated for credit. Forty-five hours lecture/seminar per semester. Prerequisites: 122 or consent of instructor. Professional practice, its organizations, methods, and problems.

222. Advanced Study in Community Development. (3) Thirty hours of lecture/seminar per semester. Political and ethical implications of professional intervention aimed at social change, and its impact on current practice.

225. Architectural Internship. (5) Thirty hours of lecture/seminar and 135 hours of internship per semester. Prerequisites: 120 and undergraduate seniors need consent of instructor. An intensive and structured exposure to the professional practice of architecture utilizing the resources of practicing architect's offices as the laboratory. (F,SP)

229. Seminar on the Practice of Design. (1-4) Course may be repeated for credit when topics change. Fifteen hours of lecture per semester. Prerequisites: 122 or consent of instructor. Selected topics such as issues of project development and professional practice, construction law, materials and specifications, construction management, marketing and management, professional writing, issues in community development and public policy. For current section offerings see departmental announcement. (F,SP) Staff
c climatic, design, mechanical systems, natural lighting, artificial lighting, acoustics. For current section offerings see departmental announcement. (F,SP) Arens, Staff

249A. Solar Technology.

249X. Special Topics in the Physical Environment in Buildings.

Structures and Construction

150. Introduction to Structures. (3) Thirty hours of lecture and 30 hours of discussion per semester. Prerequisites: Physics 5A. Study of forces and structural constraints in the design of buildings. Structural concepts are explored in laboratory settings. (F,SP) Staff

152. Introduction to Construction. (3) Forty-five hours of lecture and 20 hours of discussion per semester. Study of typical building subsystems, types of construction, choice of materials and details of design. (F) Langenbach

159. Seminar on Structures and Construction. (1-4) Course may be repeated for credit when topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 150.

159A. Building Performance: Case Studies.

159B. Building Performance: Failures.

159C. Building Production: Theory and Practice.

159D. Building Materials.

159E. Construction Economics.

159F. Special Topics: Structures and Construction.

250. Advanced Study of Structures. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: Civil Engineering 128A-128B. Tension structures, shell structures, long span structures, model analysis and experimental structures. (F) Schiller

252. Advanced Study of Construction. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: 152 or consent of instructor. Processes and methods of building construction. (SP) Staff

253. Architectural Design for Seismic Forces. (4) Sixty hours of lecture/seminar per semester. Prerequisites: Civil Engineering 128A-128B. Elements of seismic design concepts and construction problems of buildings with emphasis on experience gained from recorded earthquakes. Seismic design and design considerations based on studies of recently stable building forms. Urban technology of earthquake hazards mitigation. (SP) Lagorio

259. Seminar on Structures and Construction. (1-4) Course may be repeated for credit as topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 250 or 252 and consent of instructor. Selected topics such as experimental structures, architectural preservation, construction management implementation and geologic hazards to construction. For current section offerings see departmental announcement. (F,SP) Prozen

259A. Construction and Geologic Hazards.

259B. Experimental Structures.

259C. Materials and Specifications.


259E. Preservation and Conservation: Implementation.

259X. Special Topics: Structures and Construction.

History of Architecture

170A-170B. An Historical Survey of Architecture and Urbanism. (4) Forty-five hours of lecture and 15 hours of seminar/discussion per semester. The first part of this sequence studies the ancient and medieval pe-

170A. Survey of Urban Design. (3-4) Formerly 172. Students who have taken 172 may not receive credit for 171. Forty-five hours of lecture per semester; additional 15 hours of seminar for higher unit value. Prerequisites: 170A-170B. The evolution of urban form, civic design, and planning theory with emphasis on the development of the modern city. (SP) Kostof

172. Great Cities. (3,4) Formerly 173. Students who have taken 173 may not receive credit for 172. Forty-five hours of lecture per semester; additional 15 hours of seminar for one additional unit. Prerequisites: 170A-170B. A study of the physical fabric of a great city and its changing character through time. (F,SP)

173A. Modern Architecture. (3) Formerly 179, sec. 3; 174; and 179C. Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Kostof

173B. Baroque Architecture. (3) Formerly 176, sec. 4; and 178. Forty-five hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. (F) Kostof

174A. American Architecture. (3) Formerly 178, sec. 1. Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Kostof

174B. Vernacular Architecture. (3) Formerly 179, sec. 1. Forty-five hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Kostof

175A. Pre-Columbian Architecture. (3) Formerly 179, sec. 5; 179D. Forty-five hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Kostof

175B. African Architecture. (3) Formerly 179, sec. 2. Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Bourdier

175C. Japanese Architecture. (3) Formerly 179, sec. 6; 191J. Forty-five hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. (F) Treib

175D. Islamic Architecture. (3) Formerly 176. Course may be repeated for credit. Prerequisites: 170A-170B and consent of instructor. (SP) Kostof

179. Seminar in Architectural History. (1-4) Course may be repeated for credit when topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 170A-170B and consent of instructor. For current section offerings see departmental announcement. (F,SP) Staff

179A. Medieval Architecture. (3) Formerly 179, sec. 1. Fifteen hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. For current section offerings see departmental announcement. (F,SP) Staff

279. Seminar in the History of Architecture. (1-4) Course may be repeated for credit when topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 179 or consent of instructor. Selected topics in architectural theory, urban design, Renaissance-Baroque architecture, modern architecture. For current section offerings see departmental announcement. (F,SP) Kostof, Staff

279A. African Architecture.

279B. Asian Architecture.

279C. California Architecture.

279D. History of Housing.

279E. Mesoamerican Architecture.

279F. Modern Architecture.

279G. San Francisco Architecture.

279H. Urban Design.
Consent of instructor: Energy supply at the community scale through development of locally available renewable energy resources (solar, wind, biomass). Architecture, site planning and urban development; review of conservation and supply technologies. For students in design, planning, energy, public policy, and related fields. Term project. Sponsoring departments: Architecture, Landscape Architecture, and Energy and Resources Group.

*IDS 238. Environmental Design: Stress and Health. (2-3) One additional unit available for students doing special research projects—two additional hours of seminar per week. One 2-hour lecture/discussion per week. Prerequisites: Consent of instructor. Interdisciplinary course to explore the influence of selected aspects of the physical and social environment on health. Among topics to be discussed are density and crowding, and migration, urbanization, industrialization, and stress as they influence health and disease. Sponsoring departments: Biomedical and Environmental Health Sciences and Architecture.

Visual Studies

180A-180B. Introduction to Visual Studies: Word and Image. (4-4) Thirty hours of lecture and 90 hours studio per semester. Prerequisites: Environmental Design 11A-11B or consent of instructor. A prerequisite is to B. Projects in graphic form, color, and word-image relationships. (F,SP)

280. Advanced Visual Studies. (1-4) Course may be repeated for credit. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: VS 181, 186. Advanced work in visual studies and photography. For current section offerings see departmental announcement. (F,SP)

Dhamaens

281. Seminar In Photography. (3) Course may be repeated for credit. Forty-five hours of lecture/seminar per unit per semester. Prerequisites: 181 and 186. Selected topics such as Seminar in Photography, Photography as an Art Form, or Environmental Photography. For current section offerings see departmental announcement. (SP)

Art and History of Art

College of Letters and Science

Practice of Art

Department Office: 238 Kroeber Hall, 842-2582
Chair: Christopher G. Brown, M.F.A.

Professors:
- Boyd G. Allen, M.A.
- Joan Brown, M.F.A.
- Robert Hartman, M.A.
- Sylvee Lark, M.F.A.
- James F. Melcher, M.F.A.
- George Miyasaki, M.F.A.
- David Simpson, M.A.
- Brian Wall
- Stephen Blechert, M.A. (Emeritus)
- Sidney Gordon (Emeritus)
- John C. Hay (Emeritus)
- Karl A. Kaestle, M.A. (Emeritus)
- Earl Loran, M.F.A. (Hon. Emeritus)
- John McCray, M.A. (Emeritus)
- Felix Ruvolo (Emeritus)
- Jacques Sirén, M.A. (Emeritus)
- Peter H. Voukou, M.F.A. (Emeritus)

Associate Professors:
- Jerold Ballantine, M.F.A.
- Christopher G. Brown, M.F.A.
- Anne L. Healy, B.A.
- Mary L. O'Neal, M.F.A.
- Assistant Professors:
- Richard Shaw, M.F.A.
- Adjunct Professor:
- James H. Elliott, M.A.

Four goals underlie the teaching in the Department of Art:
1. To advance the body of knowledge of human experience through esthetic investigation.
2. To help students learn to think visually.
3. To help students understand the strategies that artists have devised to deal with esthetic problems in both traditional and non-traditional methods of artmaking.
4. To help students develop a creative intelligence through practicing a visual arts discipline.

To the extent that artmaking is a means for rendering the un说得 knowable, H can be regarded as complementary to scientific investigation.

While the undergraduate major is largely made up of studio courses, it also requires at least three courses in art history and one in the analysis of work by students. Art and other disciplines that artists have investigated and developed in the past and how specific notions have affected the perception that human beings have of themselves and their circumstances.

Work by students is featured in the exhibitions of the Worth Ryder Art Gallery, an adjunct educational facility that is open to the public.

Major Program

Lower Division: Art 10, 12, and 14. Art 10 is prerequisite to Art 12.

Upper Division: Art 150, 117 or 118, and five additional upper division courses in Practice of Art. Three of the studio courses must be taken with three different members of the regular faculty.

History of Art: A minimum of three courses, at least one of which must be upper division.

With the consent of the major adviser, a student may be given credit toward the major for up to two art-related courses taken outside the department, e.g., Set Design (Dramatic Art), Photography (College of Letters and Science), etc.

Honors Program in the Practice of Art. Students with an overall GPA of 3.5 or higher who are in their senior year may, with the permission of a regular faculty member, enroll in the honors program. This is an independent study course, taken for a minimum of one semester and a maximum of two semesters and comprising a minimum of three units and a maximum of six units. A final grade is given at the completion of the program. Honors courses count toward the art major as they are taken for a letter grade.

Graduate Program

The Department of Art offers a two-year program of study leading to the M.F.A. degree in the Practice of Art.

The B.A. or B.F.A. in studio art or its equivalent is prerequisite to the M.F.A. degree.

For the M.F.A. the student must complete a minimum of twelve semesters of course work that includes six graduate seminars and 30 units of studio and independent study. Students must produce a comprehensive body of creative work, to be exhibited in a M.F.A. exhibition and summarized in a written thesis.

Further information about this program may be obtained from the Art Office, 238 Kroeber Hall.

Lower Division Courses

10. Color and Composition. (3) Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Emphasis on color and media such as wood, metal, and plastic is encouraged. (F)

12. Figure Drawing and Painting. (3) Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Emphasis on composition and color and black-and-white, primarily in time. Art 117 or 119 is required of all art majors. (F,SP)

115. Materials and Processes of Painting. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on concepts of form, color, and media such as wood, metal, and plastic is encouraged. (F)

116. Drawing and Composition. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on form and color such as wood, metal, and plastic is encouraged. (F)

120. Intaglio. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

14. Introduction to Sculpture. (3) Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Emphasis on materials and physical aspects of sculptural structures. Field trips and illustrated lectures will further acquaint students with the ideas that sculptors have explored in the 20th century. (F,SP)

39. Lower Division Seminar. (3) Two 1 ½-hour Instructional periods per week. Weekly discussions will introduce students to the language of art, concepts of form, color, and space that are introduced to the M.F.A. student. (F,SP)

No undergraduate students may take graduate seminars for credit. An M.F.A. student may not enroll in more than two seminars per semester.

Upper Division Courses

102. Approaches to Painting. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on concepts of form, color, and media such as wood, metal, and plastic is encouraged. (F)

116. Materials and Processes of Painting. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on concepts of form, color, and media such as wood, metal, and plastic is encouraged. (F)

117. Drawing and Composition. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

120. Intaglio. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

122. Lithography. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

124. Advanced Projects in Printmaking. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14, and plus 6 units of either 120 and/or 122. Nontraditional projects in printmaking. (SP)

130. Fabricated Metal Sculpture. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. The construction of metal sculpture using welding, brazing, and soldering techniques. (F)

131. Cast Metal Sculpture. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. The formation of metal sculpture using lost-wax and other traditional techniques. (SP)

132. Ceramic Sculpture. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Students will learn how to use the basic tools and methods for developing images in fired clay. These include throwing forms on the wheel. Some work will be done with glazes and other means for enriching surfaces. (F,SP)

133. Wood Sculpture. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. The construction of wood sculpture using wood-working equipment for constructing sculpture. Use of color and media such as wood, metal, and plastic is encouraged. (F)

134. Environmental Sculpture and Sited Work. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Students will learn how to use the basic tools and methods for developing images in fired clay. These include throwing forms on the wheel. Some work will be done with glazes and other means for enriching surfaces. (F,SP)

140. Linear Structures: Artists' Books and Narrative Art. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the human figure in painting and drawing composition. (F,SP)

141. Temporal Structures: Video and Performance Art. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Projects are developed using video and performance methods in which time and change become key elements in an artwork. Regular screenings of professional tapes will illustrate uses of the medium and provide a historical context. (F)

150. Art Analysis. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

155. Upper Division Seminar: Theory and Criticism. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. The focus of the course will be on ways of inventing narrative connections among images through the use of the body and other mediums. (SP)

165. Upper Division Seminar: Theory and Criticism. (Course may be repeated for credit. Two 3-hour Instructional studio periods and one 3-hour open studio period per week. Prerequisites: 12, 14 and 10 or equivalents. Emphasis on the use of the human figure in painting and drawing composition. (F,SP)

180. Independent Study for Advanced Undergraduates. (1-3) (On leave, fall, spring) Credit up to a maximum of 12 units per semester. Individually arranged with a faculty member. (SP)

199. Supervised Independent Study for Advanced Undergraduates. (1-3) (On leave, fall, spring) Credit up to a maximum of 12 units per semester. Individually arranged with a faculty member. (SP)
to be arranged. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

General prerequisite for graduate courses in the Practice of Art is at least a B average in the undergraduate major in Art.

**Graduate Courses**

**200. Advanced Problems in Drawing.** (3) Course may be repeated for credit. Two 3-hour Instructional studios, and one 3-hour open studio period per week. Prerequisites: Graduate standing and consent of instructor. (F,SP)

**201. Advanced Workshop in Painting.** (3) New course. Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: Graduate standing and consent of instructor. Application of individualized problems in the study of various methods and materials in painting under supervision of instructor. Individual and group critiques of student work as well as presentations and discussion of related outside topics. (F,SP)

**202. Advanced workshop in Printmaking.** (3) New course. Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: Graduate standing and consent of instructor. Exploration of individualized problems in etching, lithography, and/or other printmaking processes under supervision of instructor. Individual and group critiques of student work as well as presentations and discussion of related outside topics. (F,SP)

**203. Advanced Workshop in Sculpture.** (3) New course. Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: Graduate standing and consent of instructor. Individual exploration of various non-traditional modes in sculpture using various methods and materials of students' choice. Both individual and group critiques of student work as well as presentations and discussion of related outside material. (F,SP)

**204. Advanced Workshop in Non-Traditional Modes of Artmaking.** (3) New course. Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: Graduate standing and consent of instructor. Individual and group exploration of various non-traditional modes of artmaking including video, photography, performance, site specific installations, etc., particular mode(s) and course content to be determined by instructor. Individual and group critiques of student work as well as presentations and discussion of related outside material. (F,SP)

**215. Seminar: Issues and Ideas.** (3) Course may be repeated for credit. One 3-hour period per week. Prerequisites: Graduate standing and consent of instructor. Open to graduate students in History of Art. Students will be required to attend lectures given at the University or elsewhere in the Bay Area by artists and other art professionals. The scheduled weekly seminar session will provide a forum for discussing issues raised in these presentations. (F,SP)

**216. Seminar: Theory and Criticism.** (3) New course. Graded on a credit/no credit basis. One 3-hour period per week. Prerequisites: Graduate standing and consent of instructor. Weekly meetings will provide a forum for the discussion of issues related to assigned readings in the field of art criticism, art theory, and art criticism. (F,SP)

**295. Independent Study for M.F.A. Students.** (3-9) Course may be repeated for credit. Individual hours to be arranged. Prerequisites: Admission to the M.F.A. program. M.F.A. candidates, special study—M.F.A. Committee members as well as other faculty. (F,SP)

299. Supervised Independent Study for Graduate Students. (1-3) Course may be repeated for credit. Individual hours to be arranged. Prerequisites: Graduate standing and consent of instructor, graduate advisor, and chairman. Special projects by graduate students undertaken with a specific member of the faculty. (F,SP)

**History of Art**

Office: 409 Doe Library, 942-5510
Chair: Andrew F. Stewart

Professors:

- Tsvetana Alpern, Ph.D., Harvard University. Baroque and Northern Tradition
- Michael Baxandall, M.A., Cambridge University. European art
- James Cahill, Ph.D., University of Michigan. Chinese and Japanese art
- Jacques de Caso, Ph.D., Yale University. 18th-19th Century European art
- Timothy J. Clark, Ph.D., London University. Modern art
- James Morrow, Ph.D., Columbia University. Late Gothic, Northern Renaissance
- Loren Parkhust, Ph.D., Harvard University. Italian Renaissance art
- Andrew F. Stewart, Ph.D., Duke University. Greek and Roman art
- Josephine Williams, Ph.D., Harvard University. Indian and Southeast Asian art
- David H. Wright, Ph.D., Harvard University. First Millennium A.D.
- Darrell A. Amyx, Ph.D. (Emeritus) University of California at Berkeley.
- Jean V. Bony, Agregé (Emeritus) Université de Paris. Romanesque and Gothic art
- Herschel B. Chipp, Ph.D. (Emeritus) Columbia University. Modern art
- L.D. Ettlinger, D.Phil. (Emeritus) University of Halle. Northern Tradition
- Walter W. Horn, Ph.D. (Emeritus) University of Hamburg, Medieval art
- Peter H. Selz, Ph.D. (Emeritus) D.F.A. (Hon.) University of Chicago. Modern and contemporary art

Associate Professors:

- Harvey Stahl, Ph.D., New York University. Institute of Fine Arts. Romanesque, Gothic, Later Byzantine art
- Ann M. Wagner, Ph.D., Harvard University. Modern art
- Assistant Professors:
- Carol Armstrong, Ph.D., Princeton University. Late 19th-early 20th-century European art
- Marbelth Graybill, Ph.D., University of Michigan. Japanese art
- Margareta Lovel, Ph.D., Yale University. American and English art

**Major Program**

The major provides a thorough education in the history of the visual arts. The major programs for western and Asian cultures as well as the opportunity to do special study in an area of the student's choice. Fundamentally a humanistic inquiry and often multidisciplinary in approach, the program provides majors with essential training in those perceptual and historical, research and critical skills needed for many professions. Majors frequently go on to careers in business, law, or the arts as well as to graduate study in the History of Art and careers in teaching, museum work, and conservation.

**Undergraduate Curriculum.** The major in History of Art will consist of not fewer than 12 courses, and shall include the following:

1. One course in the practice of art; 2. Two lower division survey courses in the history of western art (10A: Ancient to Medieval; and 10B: Renaissance to Modern); 3. Two courses in the History of Asian art (either a lower division survey or an upper division course); 4. Three upper division lecture courses in three of four areas of western art: Ancient, Medieval, Renaissance-Baroque, and Modern; 5. One seminar; 6. One upper division course in history relating to the student's main focus of interest (may substitute a course in another department with prior consent of advisor). Students may choose from the following range of possibilities: (a) additional art history courses, including upper division lecture courses, seminars, and courses in the 190 series; (b) additional courses in related disciplines—beyond the requirement in part 6 above; (c) additional courses in the practice of art; (d) courses that deal primarily with art or architectural history but are taught in other departments, such as Near Eastern Studies, Environmental Design, Classics, etc. Courses outside the department (options b,c,d) must be approved by the undergraduate adviser.

**Honors Program.** Students with at least 3.3 grade-point average both overall and in all upper division courses completed in the major are eligible for admission to the History of Art Honors Program. Candidates for Honors in the History of Art are required to complete satisfactorily, within their senior year, an Honors project, normally a thesis, consisting of at least two semesters of continuing academic work under faculty supervision. The first semester is usually a seminar, directed research, or independent study course; work done in History of Art 192 or in another upper division course requiring an acceptable research paper may also be counted as the first semester project. The second semester is taken as History of Art H195. Those who have completed the program will graduate with Honors, High Honors, or Highest Honors in the major depending upon their final GPA in upper division art history courses. Applications, which require the signature of the project director and the undergraduate major adviser, are available in the History of Art office.

**Minor Program**

Required: Five upper-division courses in three of the following five areas: Asian (130s), Ancient (140s), Medieval (150s), Renaissance-Baroque (160s-170s), and Modern (180s). One course may be a seminar (110). All courses must be taken for a letter grade. An overall GPA of 2.0 is required in all courses applied to the minor. A minimum of three courses must be taken at Berkeley.

**Recommended:** History of Art 10A and 10B, and one Practice of Art course, preferably drawing.

**Graduate Study**

The department offers a program of doctoral study and two programs leading to the M.A. degree only. Requirements for the M.A. programs and the M.A. portion of the doctoral program are generally similar, but there are significant differences in application procedures, the sequence and timing of courses, and the expectation of continued study. The degree programs are:

- M.A./Ph.D. Program. An integrated master's and doctoral program in preparation for college teaching, advanced research, and specialized curatorial careers.
- M.A. Program. A terminal master's program for students who wish to undertake two years of intensive study in the general field of the History of Art, to combine the study of the History of Art with another area of intellectual inquiry or academic specialization, or to receive graduate training in the History of Art to proceed with specialized careers.

- M.A./M.L.I.S. Program. A concurrent program with the School of Library and Information Studies to prepare students for careers in art librarianship.

**M.A. Programs**

**Preparation and Application for Admission**

1. Undergraduate Training: Applicants for admission must hold a Bachelor of Arts degree or its equivalent from an institution of acceptable standing. An undergraduate major in the History of Art is not necessary. Students who have high academic achievement and a background in history, literature, the practice of art, or similar humanistic disciplines are welcome. Those with little or no work in the History of Art may have
to complete some additional study to meet breadth requirements.

2. Statement of Purpose. All students should be as precise as possible in describing their intellectual background and interests in the History of Art and the expectations they have for graduate study in the Berkeley program. Students who expect to continue for the Ph.D. should apply for the M.A./Ph.D. program; their statement should specifically address their purpose in doctoral study, but need not specify a particular field. Applicants to the M.A. or M.A./Ph.D. programs should also describe the relation of their intended study to their particular intellectual interests and professional goals. M.A. applicants with a special interest in interdisciplinary study should specifically address their interdisciplinary interests. Applicants interested in interdisciplinary studies should elect to do a special paper under the joint supervision of the History of Art and other graduate departments.

3. Languages. Because all students are expected to enroll in research courses in their first semester, proficiency in appropriate foreign languages will be necessary upon entry into any program of study in the History of Art. All students in the M.A. program are required to take a foreign language colloquium at the beginning of their first semester, and the second (the requirement for which must be satisfied no later than the beginning of the second semester). The first semester of the program is intended to improve proficiency in a language not used as a native language by the student. A second semester course may permit students to address specific career and interdisciplinary interests and may involve study off campus, such as in a museum or special collection.

4. Qualifying Paper or M.A. Thesis. The qualifying paper is a perfected version of a seminar paper, and bibliography. It should demonstrate scholarly competence in the investigation of a limited problem. If the qualifying paper is to serve as a thesis for the M.A. degree, it must be submitted in accordance with the regulations of the Graduate Division and be approved by a committee of three readers, including one faculty member of the History of Art Department. Students enrolled in the M.A./Ph.D. program who have been advanced to doctoral candidacy (see below) may submit the qualifying paper in this way if they wish to receive an M.A. degree, but it is not required.

For M.A. students with special interests who do not intend to proceed to doctoral study, an appropriate alternative may be substituted for the M.A. thesis, such as an'extended research paper, or a seminar paper. M.A. students with special interdisciplinary interests may elect to do a special paper under the joint supervision of the History of Art and other graduate departments.

M.A. Degree Requirements (for all programs)

1. Breadth. These requirements may be partially or wholly satisfied by previous course work.

(a) Students of Western art. One upper division course or seminar in each of the following areas: Ancient, Medieval, Renaissance, Baroque, Modern, and Asian.

(b) Students of Asian art. One upper division course or seminar in each of the three Asian areas (Japan, China, and India and Southeast Asia), and at least two upper division courses or seminars in one of the areas of western art listed above in (a) plus a third course in another of these areas.

2. Course work. Ten courses, of which at least five are at the graduate level. Of the five, three seminars are required. One course may be taken in connection with teaching (History of Art 300) and another to prepare the qualifying paper (or M.A. thesis) (History of Art 601). The remaining electives are the previous semester’s upper division courses, or additional graduate seminars in the History of Art or related fields, or special study courses (History of Art 299) involving individual study on selected topics. Special study courses may permit students to address specific career and interdisciplinary interests and may involve study off campus, such as in a museum or special collection.

3. Languages. Two are required. At the time of admission students are expected to have a reading knowledge of one language and a good start on the second (the requirement for which must be satisfied no later than the beginning of the third semester).

(a) Students of western art. German; and French, Italian, Dutch, Latin, or Greek.

(b) Students of Asian art. One European language (French or German), and one major Asian language (normally Chinese, Japanese, or Sanskrit).

4. Qualifying Paper or M.A. Thesis. The qualifying paper is a perfected version of a seminar paper, normally no longer than 50 pages including footnotes and bibliography. It should demonstrate scholarly competence in the investigation of a limited problem. If the qualifying paper is to serve as a thesis for the M.A. degree, it must be submitted in accordance with the regulations of the Graduate Division and be approved by a committee of three readers, including one faculty member of the History of Art Department. Students enrolled in the M.A./Ph.D. program who have been advanced to doctoral candidacy (see below) may submit the qualifying paper in this way if they wish to receive an M.A. degree, but it is not required.

For M.A. students with special interests who do not intend to proceed to doctoral study, an appropriate alternative may be substituted for the M.A. thesis, such as an extended research paper, or a seminar paper. M.A. students with special interdisciplinary interests may elect to do a special paper under the joint supervision of the History of Art and other graduate departments.

5. M.A./M.L.I.S. Program. The History of Art component of this concurrent degree course is nearly identical to the regular M.A. program except that one upper division course may be taken. Students should take Introduction to Library Services (L 200) in their first semester of study and then proceed to fulfill all or nearly all of the History of Art requirement, that is, a special bibliography course (L 299) be taken concurrently with the second or third seminar in the History of Art. In the third year students fulfill the remaining requirement by the completion of the following management courses—Information Services in Organizations (L 261), Public Libraries (L 262), Work with Children and Young Adults in School and Public Libraries (L 254), or College and University Libraries (L 255). Students with courses in library service must choose a seminar or colloquium in the History of Art collections: Orientation of Non-Book Materials (L 224) in the slide and photographic archive, and Evaluation of Reference Services (L 257) in the Art History/Classics Graduate Service.

Ph.D. Degree Requirements

1. Admission. (a) Students already in the M.A./Ph.D. program at Berkeley. Students in post-classical western art can petition, usually at the end of their fourth semester of study, to transfer into the M.A. and Asian art at the end of their sixth semester, in order to continue in the Ph.D. program. The basis for this review will be primarily the qualifying paper and work in seminars.

(b) Students with an M.A. degree in History of Art or a closely related field from another institution. The M.A. thesis should be submitted with the application for admission. Students who expect to complete their thesis after the application deadline should submit the thesis as soon as it is completed; final action on the application, however, cannot be taken until the thesis is received. Students taking an M.A. without a thesis should submit two substantial research papers instead. After one year of coursework, including seminars in other courses, with regular faculty, post-M.A. transfer students apply for final permission to proceed toward the Ph.D.

2. Course of Study. Each student selects a general field, an emphasized area or areas, and a related outside subject which together provide the appropriate background for dissertation research. A guidance committee appointed for each student determines requirements in these areas and in other fields, such as history and literature. The requirements normally include courses and seminars and a dissertation research. On the average this phase of the program requires two years to complete.

3. Languages. More than two languages are often required for research in a student’s general field. Research languages are determined by the graduate advisor in consultation with the student and the guidance committee. For students of Classical or Medieval Art, Latin and/or Greek are required.

4. Dissertation Prospectus. Before taking the qualifying examination, a student prepares a written proposal that defines the scope, approach, and rationale of the dissertation. It is presented to the guidance committee.

5. Qualifying Examination. The examination is conducted by an interdepartmental committee appointed by the Dean of the Graduate Division on behalf of the Graduate Council. It consists of two or three written papers followed by oral examination. The oral examination tests the student’s basic knowledge of a general field, detailed knowledge of a special area or areas within it, and the ability to integrate studies in an appropriate outside field with work in the History of Art.

6. Dissertation. The dissertation is a book-length study of a problem in the history of art written under the supervision of a dissertation committee. The dissertation committee is nominated by the graduate adviser following consultation with the student, and is to be composed of three Academic Senate members from the Berkeley campus, one of whom must be from a department other than the History of Art. A minimum of three years must pass before the candidate is reviewed annually to ensure completion of the dissertation in a reasonable number of years, normally two or three.

7. Normative Time. Normative time is defined as the elapsed calendar time in semesters that under normal circumstances would be needed to complete all requirements for the degree. It is estimated that the student is engaged in full-time, uninterrupted study and is making desirable progress toward the degree. The normative time for the Department of History of Art is 14 semesters or seven years.

Further information concerning these programs may be obtained from the Graduate Secretary, History of Art Department, 405 Doe Library, University of California at Berkeley; Berkeley, CA 94720.

Lower Division Courses

10. History of Western Art. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: If possible the two courses should be taken consecutively, fall before spring. An historical survey of selected works of painting, sculpture, and architecture from antiquity to the present. The two semesters form an introduction to the major artistic movements in Western art as well as to the study of history of art. Stress is placed on the acquisition of perceptual and critical skills, the interpretation of style and meaning, and the ability to relate works to a broader visual tradition and historical context.

10A. Ancient to Medieval. (4) (F) Stahl, Visitor

10B. Renaissance to Modern. (4) (SP) Alpers, Armstrong

30. The Arts of Asia: India, China, and Japan. (4) Three hours of lecture and one hour of discussion per week. A survey of selected works of architecture, sculpture, painting, and the decorative arts of India, China, and Japan. The course is intended to serve as an introduction to basic art-historical issues and methodology as well as to provide a cultural and historical perspective for understanding the great monuments of Asian art.

40. History of Western Art. (4) 10B. Renaissance to Modern. (4) 10A. Ancient to Medieval. (4) (SP) Wright

60. Freshman Seminar. (4) Course may be repeated once with different instructors. Three hours of seminar per week. Topic varies. For descriptions of current offerings, consult the departmental listing in 405 Doe. (SP) 405 Doe

61. Introduction to the History of Art. Sculpture. (4) Two hours of lecture and one hour of discussion per week. Selected examples of sculpture emphasizing the human figure, including portraits and narrative reliefs, from ancient Egypt to modern America.

62. Introduction to Italian Renaissance Art. (4) Three hours of lecture and one hour of discussion per week. In-depth study of a limited number of fourteenth, fifteenth, and sixteenth century masterpieces of Italian Renaissance
sance painting, sculpture, and architecture created in Florence, Rome, Venice, and the Italian courts.

81. Introduction to Modern Art (for Non-Majors). (4) One 2-hour lecture and one 2-hour discussion per week. Selective survey of modern developments in painting, sculpture, graphic arts, photography, architecture and design, primarily from about 1880 to about 1960. Emphasis on detailed analysis of examples in the Bay Area, on developing critical and writing skills. (SP) Wright

Upper Division Courses

Open to nonmajors. General prerequisite: Upper Division standing or consent of the instructor. Unless otherwise stated, the "A" part of a sequence is not prerequisite to the "B" part.

130A. Early Chinese Art, Part I. (4) Three hours of lecture and one hour of discussion per week. Chinese art of the Neolithic and Bronze Age. From the earliest period to the end of the Han dynasty (early third century A.D.); especially ceramics, bronzes, jade, and lacquer. (F)

130B. Early Chinese Art, Part II. (4) Three hours of lecture and one hour of discussion per week. Chinese art in the medieval period: Six Dynasties through Sung Dynasty (third-thirteenth centuries A.D.), especially Buddhist sculpture, ceramics, tomb figurines, and medieval court arts.

131A. Early Chinese Painting. (4) Three hours of lecture and one hour of section per week. The history of Chinese pictorial art and painting from the beginnings in the late Chou dynasty through the Sung dynasty (fourth century B.C. to ca. A.D. 1270), with concentration on the later periods (10th-13th centuries). (F) Cahill

131B. Later Chinese Painting. (4) Three hours of lecture and one hour of section per week. The history of Chinese painting in the Yuan, Ming, and Ch'ing dynasties (14th-18th centuries). (SP) Cahill

133. Arts of Japan. (4) Three hours of lectures and one hour of discussion section per week. An historical survey of the architecture, painting, and sculpture of Japan from prehistoric times to the nineteenth century.

134A. The Arts of the Japanese Temple. (4) Three hours of lectures and one hour of section per week. The architecture and sculpture of Japanese Buddhist temples, 7th-13th centuries.

134B. Japanese Painting to 1600. (4) Three hours of lectures and one hour of section per week. The three main topics within a careful survey are Buddhist painting, native handscrolls, and painting in the Zen milieu. (F)

135B. Japanese Painting of the Momoyama and Tokugawa Periods (ca. 1560- ca. 1900). (4) Three hours of lecture and one hour of section per week. There are three major themes: decorative screenpainting (in its architectural context), genre painting and ukiyo-e, and literati painting (bun'ga). (SP) Graybill

136A. The Art of India, Indus Valley Through 550 B.C. (4) Three hours of lecture and one hour of section per week. A survey of Indian art from the Indus civilization through 550 B.C. This class will focus on Buddhist architecture with emphasis on the development of (pictorial) narrative, the evolution of style and iconography and problems of dating. (F) Williams

136B. The Art of India, 500-1530 A.D. (4) Three hours of lecture and one hour of section per week. A survey of Hindu sculpture and architecture in India from 500 B.C. to the 16th-14th centuries. (SP)

136C. The Art of India, 1350 A.D. to the Present. (4) Three hours of lecture and one hour of section per week. A selective survey of major developments in Muslim and Rajput painting from 1350 to the present. (F)

137. The Art of Southeast Asia. (4) Three hours of lecture and one hour of discussion per week. The art of Cambodia, Thailand, Burma, and Indonesia focusing on the period from 400 to 1500 A.D. Sculpture and architecture will be considered as well as a body of Indian and indigenous elements. (F)

140. Aegean Art. (4) Three hours of lecture and one hour of discussion per week. The art of Crete and Greece in the Bronze Age, with attention to connections with neighboring cultures.

141. Greek Sculpture and Painting. (4) Three hours of lecture and one hour of discussion per week. In addition to a close study of the major works, particular emphasis will be given to underlying key issues such as narrative strategies, modes of address in sculpture and painting, political propaganda in art and the rise of the creative artist. Wherever possible, newly discovered work will be included and paid special attention.

141A. Albrecht Dürer's Art (ca. 1470-1520 B.C.). (4) Three hours of lecture and one hour of discussion per week. The painting, sculpture and architecture of the Greek world from the Persian Invasions to the age of Alexander. In addition to close study of the major work, particular emphasis will be given to underlying key issues such as narrative strategies, modes of address in sculpture and painting, political propaganda in art and the rise of the creative artist. Special attention, wherever possible, will be paid to newly discovered work. (SP) Stewart

141B. Classical Greek Art (ca. 500-320 B.C.). (4) Three hours of lecture and one hour of discussion per week. The painting, sculpture and architecture of the Greek world from Alexander to Cleopatra. In addition to close study of the major work, particular emphasis will be given to underlying key issues such as narrative strategies, modes of address in sculpture and painting, political propaganda in art and the rise of the creative artist. Special attention, wherever possible, will be paid to newly discovered work. (SP) Stewart

141C. Hellenistic Art (ca. 330-30 B.C.). (4) Three hours of lecture and one hour of discussion per week. The painting, sculpture and architecture of the Greek world from Alexander to Cleopatra. In addition to close study of the major work, particular emphasis will be given to underlying key issues such as narrative strategies, modes of address in sculpture and painting, political propaganda in art and the rise of the creative artist. Special attention, wherever possible, will be paid to newly discovered work. (SP) Stewart

145. Roman Art. (4) Two 2-hour lectures per week. The art of Rome and of the Roman Empire, from its sources in the Republican era to the Age of Constantine the Great. (F) Wright

150A. Medieval Art. (4) Two 2-hour lectures per week. Medieval art to about 1050. (F)

150B. Medieval Art. (4) Two 2-hour lectures per week. Medieval art to about 1500. (F)

151. Late Antique Art. (4) Two 2-hour lectures per week. Developed for students with a particular interest in the history and culture of the later Roman world from Constantine to the iconoclastic controversy. (F) Wright

154. Byzantine Art. (4) Three hours of lecture and one hour of discussion per week. A survey of the art and architecture of the Byzantine empire from the 4th to the 15th centuries with emphasis upon the evolution of painting in fresco, mosaic, and manuscript illumination and upon the influence of Byzantine art in western Europe. (SP)

155A. Romanesque Art. (4) Three hours of lecture and one hour of discussion per week. A survey of the visual arts in Europe from about 1000 to 1150 A.D. Emphasis is placed on the character and development of the major regional schools and upon the broad artistic influence of the monastic, pilgrimage, and crusading movements. The elaboration of new iconographic themes and the influence of small scale precocial works will receive special attention.

155B. Early Gothic Art. (4) Three hours of lecture and one hour of discussion per week. Gothic art and architecture from the origins of French Gothic to its international pre-eminence in the late thirteenth century. The related developments of architecture, sculpture, and stained glass at the major cathedrals are closely examined, as well as the evolution of pictorial & narrative styles in religious and secular illustration. (SP) Stahr

157. The Illuminated Book in Northern Europe: 13th-15th Centuries. (4) Three hours of lecture and one hour of discussion per week. The development of several types of illuminated manuscripts from the fifteenth century to the sixteenth century. The major themes include the development of the Book of Hours and the Magnificat in France, and the Low Countries. Topics include types of illuminated books and their traditions of illustration, relations of the illustrations to the text, and changing attitudes to the medium. (SP) Marrow

160. Italian Renaissance Art. (4) Three hours of lecture and one hour of discussion per week. Each course covers all media—painting, sculpture, architecture—end is organized topically. Topics include churches, chapels, palaces, villas, altarpieces, portraits, fresco decoration, tombs, public sculpture, festival decoration, etc. The works of art are interpreted in terms of style, iconography, function, setting, patronage, and cultural context.

160A. The Fourteenth Century. (4)

160B. The Italian Courts, 15th and 16th Centuries. (4)

160C. Florence and Tuscany, 15th Century. (4) (F)

160D. Florence and Tuscany, 16th Century. (4) (SP)

160E. Rome and Central Italy, 15th Century. (4) (SP) Partridge

160F. Rome and Central Italy, 16th Century. (4) (SP) Partridge

160G. Venice and the Veneto, 15th Century. (4) (SP) Partridge

160H. Venice and the Veneto, 16th Century. (4) (SP) Partridge

162. Italian Art and Its Circumstances 1400-1527. (4) New course. Three hours of lecture and one hour of discussion per week. The course studies the cultural environment of Italian painting and sculpture from about 1400 to about 1527. The main topics are: artists' careers, patrons; mechanics of patronage (corporate, individual, court); subject matters, religious and secular; physical techniques; intellectual techniques; mediation between "high culture" (literature, mathematics, science) and art; contemporary reception in Italy; contemporary reception abroad; modern view of the Renaissance since Burckhardt. (SP) Baxandall

166. Early Netherlandish Painting. (4) Three hours of lecture and one hour of discussion per week. Survey of Franco-Flemish and Early Netherlandish painting from ca. 1250 to 1525. Major artists treated monographically (Jean Puellae, the Limbourg brothers, Robert Campin, Jan van Eyck, Rogier van der Weyden, Hugo van der Goes, Hieronymus Bosch, and others) but emphasis is also placed on the changing functions of art during this period. Emphasis on the transition from the medieval to the early Renaissance periods in the North. (F) Narow

168. German Painting, 1350-1550. (4) Three hours of lecture and one hour of discussion per week. Survey of the evolution of German painting in the late Middle Ages and the Early Renaissance. Major artists treated monographically (e.g., Lochner, Witt, Schongauer, Düer, Grunewald, Altdorfer, and Cranach).

170. Southern Baroque Art. (4) Three hours of lecture and one hour of discussion per week. The major artists (among them Caravaggio, Bernini, Velazquez, and Poussin) and the major concerns (including genres such as history painting, landscape, low-life, and notions of illusionism at the end of the sixteenth century in art, Italy, France, and Spain).

174. Types of Dutch and Flemish Painting in the 17th Century. (4) Three hours of lecture and one hour of discussion per week. A general study of Netherlandish painting of the seventeenth century organized according to the major types of painting: portraits, landscapes, still-life, and low-life, and the kinds of meanings with which they were endowed. (F)

175. Rubens, Rembrandt, and Vermeer. (4) Three hours of lecture and one hour of discussion per week. The works of these three leading painters in the north will be contrasted and used to introduce the major concerns of northern art of the time.
180A. Modern Art: Rococo to Realism (1740-1840). (4) Three hours of lecture and one hour of discussion per week. Painting in Europe during the Romantic era. (SP) de Caso

180B. Sculpture in 19th Century France. (4) New

180C. Medieval. (4)

180D. Rodin and His Times. (4) Three hours of lecture and one hour of discussion per week. A study of the art of Rodin from 1870 to 1914, with reference to the art of Symbolist and Art Nouveau period. (F) Armstrong

182A. The Beginnings of Modernism: French Painting from 1848 to 1900. (4) Three hours of lecture and one hour of discussion per week. The art of the 19th century: Impressionism and Post-Impressionism. (SP) de Caso

182B. Modernism in Europe 1800-1938. (4) Three hours of lecture and one hour of discussion per week. A survey of modernism in art from mid-19th century to the mid-20th century. (F) Armstrong

183A. American and British Art (1550-1800) Survey I. (4) Three hours of lecture and one hour of discussion per week. The development of American and British art from the Renaissance to the early 19th century. (SP) de Caso

183B. American Art (1800-Present) Survey II. (4) Three hours of lecture and one hour of discussion per week. A survey of American art from the founding of the United States to the present. (SP) de Caso

184. American Architecture: Domestic Forms. (4) Three hours of lecture and one hour of discussion per week. The development of American domestic architecture from the colonial period to the present. (SP) de Caso

186. Twentieth-Century Sculpture. (4) Three hours of lecture and one hour of discussion per week. Sculpture in the 20th century: Modernism and Postmodernism. (SP) de Caso

189A. American Art: 20th Century. (4) Three hours of lecture and one hour of discussion per week. From Thomas Eakins to the present. (F) Selz

189B. American and Bay Area Architecture. (4) Three hours of lecture and one hour of discussion per week. American and Bay Area architecture from the colonial period to the present. (SP) de Caso

190. Special Topical Courses in Art History. (4) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Topics concentrate on the history of art and related issues. (SP) de Caso

200. Graduate Proseminar in the Interpretation of Art Historical Materials. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing and consent of instructor. An introduction to the fundamentals of art history, including technical and innovative approaches to the study of art. (SP) Armstrong

202. Proseminar in Chinese Painting: Bibliography and Methods. (2) Must be taken on a satisfactory/unsatisfactory basis. Two hours of meeting each week. Prerequisites: Some ability in literary Chinese. The course will familiarize students with reference works and research methods for the study of Chinese painting, and give them training in carrying out research projects. (F) Armstrong

230. Seminar in Chinese Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (F) Carll

234. Seminar in Japanese Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

236. Seminar in the Art of India. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Williams

240. Seminar in Ancient Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

244. Seminar in Roman Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

250. Seminar in Early Medieval Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

251. Seminar in Late Medieval Art in Northern Europe. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

252. Graduate Seminar in European Art, 1400-1800. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

262. Graduate Seminar in Northern Renaissance Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

270. Seminar in Baroque Art. (4) Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Graduate standing and consent of instructor. (SP) Armstrong

275. Graduate Seminar in 18th Century Art. (4) New course. Course may be repeated for credit. May be listed as 270. Graduate Seminar in the History of Art. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing and consent of instructor. An introduction to the fundamentals of art history, including technical and innovative approaches to the study of art. (SP) Armstrong

Graduate Courses

General prerequisites: graduate standing and consent of the instructor, and possibly courses in the history of art and reading knowledge of languages.
University Art Museum

The University Art Museum plays an active role in instruction and research, giving students an opportunity for experience in connoisseurship and organization of exhibitions. (See University Art Museum in Index for further information.)

Asian American Studies (Special Studies or College of Letters and Science)

Program Office: 3407 DeWitt Hall, 642-6555

Professor: Herman T. Takaki, Ph.D.

Associate Professors: Elaine H. Kim, Ph.D. L. Ling-chi Wang, M.A.

Assistant Professors: Amado Y. Cabazas, Ph.D. (Coordinator) Sau-lung C. Wong, Ph.D.


Undergraduate Major Advisers: Mr. Cabazas, Ms. Megino.

Choice of Program

A student can complete the major in Asian American studies in the College of Letters and Science or in the Department of Ethnic Studies, each with an A.B. degree. Students in each program are subject to the requirements of the respective college or department.

Undergraduate Program

The Asian American Studies Program offers a unified and comprehensive undergraduate curriculum which seeks to make at least three major contributions. First, it prepares students for positions of service and leadership in Asian American communities. To do this, the program draws heavily on the curricula of such schools and departments as Education, Public Health, Law, and Sociology. The program itself offers instruction in those areas relating to the special needs of Asian American communities. Second, the program explores the hitherto neglected aspects of the cultural, political, and historical experience of Asians in America. In doing so, it provides the undergraduate with thorough instruction on the experience of Asians in the United States, and prepares students for graduate work in their own and allied fields. Third, the program broadens the curriculum at Berkeley to include instruction which reflects the conditions of Asians and other Third World people living in America.

Breadth Requirements—Special Studies. (For College of Letters and Science breadth requirements, see the college announcement.) Five courses outside the Department of Ethnic Studies, two of which must be at the upper division level, including: (1) One course in computer literacy; (2) One course in each of the following areas: humanities, social science, and natural science.

The Major

Lower Division. The student seeking to major in Asian American studies must either have satisfied or be in the process of satisfying the following: (1) Reading and Composition (Asian American Studies 2A-2B, English 1A-1B, or equivalent); (2) Asian American Community Language or Spanish (one year); (3) 20A, 42B, or 20C; (4) Ethnics Studies 145, 165, and one of the 192 courses (of Ethnic Studies, Asian American Studies); (4) two courses in Ethnics Studies (Chicano Studies, Ethnic Studies, Native American Studies) or Afro-American Studies; (5) Field Studies 197—six units (cumulative).

Upper Division. (1) Asian American Studies 120, 145, 165, and one of the 192 courses (or Ethnic American Studies, Asian American Studies); (2) Ethnic Studies 130; (3) Two courses in Asian American Studies; (4) Two courses in Ethnics Studies (Chicano Studies, Ethnic Studies, Native American Studies) or Afro-American Studies; (5) Field Studies 197—six units (cumulative).

Honors. The Asian American Studies Program will provide a program for students interested in the A.B. degree with honors. A student will be recommended for honors if the student has completed at least 30 units in two semesters with a grade-point average of at least 3.3. All work undertaken in the Asian American Studies Program and has been approved specifically for honors by the Ethnic Studies Department chair and the Asian American Studies Coordinator upon the recommendation of the faculty adviser for the major. The honors student will be required to complete H195 Senior Honors Seminar for Asian American Studies Majors. In order to graduate with an A.B. degree with honors, a student must obtain at least a 3.3 GPA for all coursework undertaken at the University.

The Minor

Requirements: One lower division course and five upper division courses.

1. Lower Division: One course: Asian American Studies 20A or 20B.

2. Upper Division: Five courses:
   a) History: One course: Asian American Studies 120-129, 151, or 192A
   b) Issues: One course: Asian American Studies 141-149, 165, 166, or 192B
   c) Humanities: One course: Asian American Studies 172, 173, 180, or 192C
   d) Electives: Two courses in Asian American Studies

Lower Division Courses

1. Basic Reading and Composition. (2) Three 1-hour lectures and one 1-hour tutorial per week. This course develops basic skills in academic essay-writing and fosters productive writing habits by providing intensive writing practice on a variety of issues relevant to Asian Americans. Readings are mostly by Asian American authors; topics include ethnic identity, language and communication, racism, stereotyping, sex roles, family relationships, and career success, etc. Two units recorded credit but recognized as four units of workload in computing study lists. (F,SP) Wong in charge

2A. Reading and Composition. (4) Three 1-hour lectures and one 1-hour tutorial per week. Prerequisites: 1, Subject A or equivalent. Through the study of the literary, political, social, and psychological dimensions of representative works of Asian American literature, this course introduces students to close textual analysis, fosters critical judgment, and reinforces academic writing skills. (F,SP) Wng in charge

2B. Reading and Composition. (4) Three 1-hour lectures and one 1-hour tutorial per week. Prerequisites: 2A, English 1A or equivalent. This course examines literary works by Asian American, Afro-American, Chicano and Native American writers in their political and social contexts, focusing on the complex and often contradictory experiences of the ethnic minorities in the U.S. Emphasis is on literary interpretation and sustained analytical writing. (F,SP) Wng in charge

20A. Introduction to the History of Asians in the United States. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: 2A, English 1A or equivalent. This course analyzes the Asian American experience from 1848 to the present. Topics include an analysis of the Asian American perspective; cultural roots; immigration and settlement patterns; labor, legal, political, and social history. (F,SP)

20B. Introduction to the Contemporary Issues in the Asian American Community. (3) Three 1-hour lectures and one 1-hour discussion per week. Introduction to Asian American communities covering the evolution of
20C. Introduction to the Culture of Asians in the United States. (3) Three 1-hour lectures and one 1-hour discussion per week. An analysis of the intellectual and artistic activity characteristic of Asian American communities in the work of the arts, social patterns, and expression (e.g., language and literature) reflecting the historical aspects and political concerns which influence the culture.

Upper Division Courses

120. Comparative History of Asian Experience in America. (3) Two 1½-hour lectures and one 3-hour seminar per week. Prerequisites: 20A. Analysis of the similarities and dissimilarities of the Asian experience in America; methods of comparative approach to Asian American history; common Asian experiences in areas such as immigration, labor, economic development, race relations, community institutions and development, occupational patterns will be analyzed and compared. (SP) Cabezás

121. Chinese American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. Chinese American history, 1848 to present. Topics include: Chinese immigration, anti-Japanese racism, labor, concentration camps, agriculture, art and literature, and personality and culture. (SP) Takahashi

122. Japanese American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. This course will be presented as a seminar with selected topics in order to give students an opportunity to participate in the dynamics of the study of Japanese American history. Topics include: immigration, anti-Japanese racism, labor, concentration camps, agriculture, art and literature, and personality and culture. (SP) Staff

123. Korean American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. Koreans in America from 1876 to the present. Topics include: comparative immigration and settlement patterns; labor and socioeconomic life; political activities; community organization; and issues related to the contemporary population influx. (SP) Kim

124. Pilipino American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. American immigration, labor, and socio-economic adaptation, education, and political organizations. This course will also examine the refugee policies, programs, services, and problems together with their impact in the context of American race relations. (F) Cabezás

125. Socio-Economic and Educational Issues of Southeast Asians in the U.S. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. An analysis of the contemporary issues in the Southeast Asian American community. Topics include: socio-economic adaptation, education, and political organizations. This course will also examine the refugee policies, programs, services, and problems together with their impact in the context of American race relations. (SP) Chung

126. Southeast Asian Migration: From Tradition to Resettlement. Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. A study of the background and characteristics of the Southeast Asian refugee migration to the United States. Special emphasis will be placed on the effects of the war and the role of cultural traditions in the adaptation of Southeast Asians to American society. (SP) Cabezás

127. The Peoples of Hawaii: A Comparative Historical Analysis. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. A comparative historical study of the experiences of Asians and Pacific Islanders in Hawaii from 1778 to the arrival of Captain James Cook to the present. Readings and lectures will examine immigration, labor, culture, politics, and economic developments in the islands.

130. Asian American Experience and U.S. Foreign Policy. (3) Three 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or consent of instructor. A historical and comparative examination of the impact of U.S. foreign policy toward East and Southeast Asian countries on the development of Chinese, Pilipino, Indo-Chinese, Japanese, and Korean communities with emphasis on such issues as race relations, cultural nationalism, national security and internal political dynamics. (SP) Wang

141. Law in the Asian American Community. (3) Two 1½-hour lectures per week. Prerequisites: 20A. This course will examine the nature, structure, and operation of selected legal institutions as they affect Asian American communities and will attempt to analyze the roles and effects of law, class, and race in Asian American society. May be taken with 197. (F) Staff

142. Asian American Psychology. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. This course is designed to acquaint the students with the basic information and concepts relevant to the mental health of Asian Americans with particular emphasis on the service delivery aspect. It attempts to correct the traditional deficiencies in the academic curricula, which fail to focus on the ethnic and cultural complexity of the Asian American communities in the area. May be taken with 197. (F) Staff

143. Asian American Employment: Patterns and Issues. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. This course will examine the employment realities of Asian American labor and examine some of the different strategies for approaching the problems of employment, underemployment, exploitation, affirmative action, etc. May be taken with 197. (SP) Kim

144. Language, Ethnicity and Society: Asian American Language Issues. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B or consent of instructor. Language needs and problems of Asian Americans; linguistic, psycholinguistic, and sociolinguistic factors affecting acquisition of English and maintenance of native languages; language and cultural identity; implications for research, materials and resource development, classroom teaching, and educational policy-making. (F) Staff

145. American Political Institutions and the Asian American Community. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. An examination of the purpose, power, and function of the executive, legislative and judicial branches of the federal government and their relationship to the Asian American community today and the present. A range of contemporary issues to illustrate how government institutions and the Asian American community define issues and respond to political challenges. (SP) Staff

149. Housing and Community Development in the Asian American Community. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. The role of housing-related institutions in minority communities; formal/informal structures and processes affecting the Hispanic American family and personality. (SP) Staff

150. Asian American Family and Community. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. The role of housing-related institutions in minority communities; formal/informal structures and processes affecting the Hispanic American family and personality. (SP) Staff

151. Asian Women in America. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. An analysis of the contemporary issues in the Asian American community; The course presents a range of contemporary issues to illustrate how government institutions and the Asian American community define issues and respond to political challenges. (SP) Staff

155. American Language Issues. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. An examination of the purpose, power, and function of the executive, legislative and judicial branches of the federal government and their relationship to the Asian American community today and the present. A range of contemporary issues to illustrate how government institutions and the Asian American community define issues and respond to political challenges. (SP) Staff

173. Creative Writing. (3) One 2-hour lecture and one 3-hour writing lab per week. Prerequisites: 20A or 20B or 20C. Asian American writing as an expression of and contribution to Asian American culture; a study of literary, cultural, and minority American art. Interpretation of themes, symbols and language, characterization, and community portrait in literary works. Practice in forms and techniques of verse and prose writing. (SP) Staff

180. Survey of Asian Immigrant Literature. (3) Course may be repeated for credit as topic changes. Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: Two years of Asian language or consent of instructor. Introduction to novels, short stories, poetry, and other literature by the following Asian immigrant groups: Chinese, Japanese, Korean, Pilipino, and Vietnamese. Class will be conducted in one of the languages each time it is offered.

190. Seminar on Advanced Topics in Asian American Studies. (3) Course may be repeated for credit when topics change. One 3-hour seminar per week. Prerequisites: Two years of Asian language or consent of instructor. Seminar in Asian American Studies with topics to be announced at the beginning of each semester. (F,SP) Staff

192A. Seminar on Asian American History. (3) Formerly 1918. Three hours of seminar per week. Prerequisites: 120 or consent of instructor. Advanced seminar in Asian American history, for majors. Students will do original research on a historical topic or issue, and write a major paper. (SP) Cabezás

192B. Seminar on Asian American Communities. (3) Formerly 191B. Three hours of seminar per week. Prerequisites: 166 or 166 or consent of instructor. Students will study Asian American issues in relation to American social structures through weekly field placements. (F,SP) Staff

192C. Seminar on Asian American Culture. (3) Three hours of seminar per week. Prerequisites: 172 or consent of instructor. Study of how Asian American history, family life, and cultural legacies are reflected and contributed to Asian American art (including visual art), music, theatre, and literary art.

1915. Senior Honors Seminar for Asian American Studies Majors. (3) Three hours of seminar per week. Prerequisites: 165 and consent of instructor. Research seminar for seniors, designed to support and guide the writing of a senior thesis. (F,SP) Staff

197. Field Study in Asian American Communities. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Meetings to be arranged. Prerequisites: Upper division standing and consent of

3On leave. Spring
4Senior Honors seminar
5Recipient of Distinguished Teaching Award
Additional Major Requirements

Once accepted in the major, the student is expected to select an area focus (Area I: China, Area II: Japan, Area III: Southeast Asia), a disciplinary focus within that area, and is required to complete the following coursework:

1. One additional year of language appropriate to the area of regional specialization. After this second year, further study of the language at the upper division level is encouraged and will count toward the major unit requirement as indicated in the following sections. It is to be noted that, in the case of Malay/Indonesian and Thai, all or part of the first two years' work carries upper division credit. In this instance the first two years' work will satisfy the language requirement but will not count toward the major unit requirement.

2. Completion of a minimum of 36 units of upper division course work in at least two departments.

3. Disciplinary Focus. At least 12 of the 36 units must be in one department (not a language department) and must include one course which relates to the theories, methods, and techniques of that discipline, but which is not exclusively an area studies course.

4. Senior Thesis. A thesis of approximately 50 pages in length is to be completed under the supervision of the major adviser or other appropriate faculty member. Three units of independent study credit in Asian Studies 196 will be given for work on the thesis, these units to count among the 36-unit major requirement.

Area I: China

A. The student must complete one additional year of Chinese (Mandarin). Further study of the language is also encouraged, and will count toward the major unit requirement as indicated below.

B. The student must select one of the following disciplinary foci and complete at least 12 units of work from the courses listed there (see Item 3 under "Additional Major Requirements" above).

Anthropology

1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;

2. Anthropology 170, China (4);

3. One course from among the following: Anthropology 143, Plural Societies (4); Anthropology 146, Comparative Peasant Society (4); Anthropology 148, Men's Ecological Relationships (4).

History

1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;

2. Two courses from among the following: History 116A-116B-116C, China (4,4,4); History 117A-117B, Topics in Chinese History (4,4).

History of Art

1. History of Art 192A, Undergraduate Seminar: Problems in the Research and Interpretation in the Several Areas of the History of Art (4);

2. Two courses from among the following: History of Art 130A, 130B, Early Chinese Art (4,4); History of Art 131A, Early Chinese Painting (4), 131B, Later Chinese Painting (4).

Economics

1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;

2. Economics 106, The Economics of Marxim (3).

3. Two other courses chosen with the consent of the major adviser.

Political Science

1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;

2. Political Science 171, Japan (4);

3. One of the following courses: Anthropology 149, Culture and Personality (4); Anthropology 150, Social Problems in Changing Cultures (4).
History
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Two courses from among the following: History 118A, 118B, Japan (4,4); History 119A, 119B, Topics in Japanese History (4,4).

Political Science
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Two courses from among the following: Political Science 143A, 143B, Northeast Asian Politics (4,4); Political Science 128A, 128B, The American Role in Asia (4,4).

C. Additional units necessary to complete the unit requirement of the major may be selected from among the courses listed under other disciplinary foot above and from the following:

Geography 110, Industrial Geography and Urban-Regional Development (3);
History of Art 134A, The Arts of the Japanese Temple (4); History of Art 135A, 135B, Japanese Painting (4,4);
Music 134A, Music of the East Asia Tradition (4);
Music 134B, Music of Japan (4).

D. Up to 16 units of the major requirement may be elected from the following language and literature courses offered by the Department of Oriental Languages:

Oriental Languages 100A-100B, Advanced Japanese (5-6);
Oriental Languages (Japanese) 124, Classical Japanese Poetry (3); Oriental Languages (Japanese) 125, Heian Prose (3); Oriental Languages (Japanese) 126, Japanese Medieval Prose (3); Oriental Languages (Japanese) 127, Nikkii Literature (3);
Oriental Languages (Japanese) 128, Japan Drama (3); Oriental Languages (Japanese) 129, Edo Literature (3); Oriental Languages (Japanese) 149A, 149B, Advanced Colloquial Japanese (3,3);
Oriental Languages (Japanese) 155, Modern Japanese Literature (3); Oriental Languages (Japanese) 159, Contemporary Indonesian Literature (3); Oriental Languages 133A, 133B, Survey of Japanese Literature in Translation (3); Oriental Languages 121A-121B, Development of Buddhism in the Far East (3-3); Oriental Languages 122, Buddhism and Contemporary Society in East Asia (3).

E. In exceptional cases individual waivers of specific course requirements for valid academic reasons will be considered with the approval of the major adviser.

Area III: Southeast Asia

A. The student must complete one additional year of Malay/Indonesian or Thai, or a second year of Dutch or French in the case that a relevant Asian language is not offered. It is to be noted that, in the case of Dutch, Thai, and Malay/Indonesian, all or a part of the first two years' work carries upper division credit. In these two instances the first two years of Dutch or French will satisfy the language requirement, but will not count toward the major unit requirement.

B. The student must select one of the following disciplinary foot and complete at least 12 units of work from the courses listed there (see item 3 under "Additional Major Requirements" above).

Anthropology
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Anthropology 185, Mainland Southeast Asia (4);
3. One course from among the following: Anthropology 143, Plural Societies (4); Anthropology 146, Comparative Peasant Societies (4); Anthropology 149, Man's Ecological Relationships (4).

Geography
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Geography 163, Southeast Asia (3);
3. Two courses from among the following: Geography 100, Cultural Geography of Indigenous Peoples (3); Geography 104, The City in the Third World (3); Geography 116, Economic Geography of the Non-Industrial World (3).

Political Science
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Two courses from among the following: Political Science 143C, Southeast Asian Politics (4); Political Science 143D, Policy Problems of Southeast Asia (4); Political Science 129A, 129B, The American Role in Asia (4,4).

In exceptional cases individual waivers of specific course requirements for valid academic reasons will be considered with the approval of the major adviser.

Honors Program
Open to seniors in the group major in Asian Studies whose grade-point average is 3.5 or higher in all university work and 3.6 or higher in the major. The program consists of completion of Asian Studies H195A-H195B (3,3), which includes the writing of an honors dissertation. The honors dissertation is in lieu of the senior thesis and is expected to be a more substantial contribution to knowledge, both in its length and originality; it is also read by two faculty members.

Minor Program in Asian Studies
There are three minor program options in Asian Studies. These options give the student an introduction to the study of one region of Asia (China, Japan, or Southeast Asia) through social science and humanities courses. Minimum requirements are five upper division courses with a C or better in each course. Three of the five upper division courses must be taken on the Berkeley campus. There is no Asian language requirement for the minor.

Option I. Minor in Chinese Studies: Five upper division courses from among the following:

Anthropology: 170, China
History: 116A, Early China; 116B, The Middle Period; 118C, Modern China; 117A, Social History of China; 117B, Modern Chinese Intellectual History
History of Art: 130A, Early Chinese Art, Part I; 130B, Early Chinese Art, Part II; 131A, Early Chinese Painting; 131B, Later Chinese Painting

Legal Studies: 161, Law in Chinese Society
Music: 134A, Music of the East Asia Tradition

Oriental Languages: 116, The Classics of Chinese Philosophy; 121A-121B, Development of Buddhism in East and Inner Asia; 122, Buddhism and Contemporary Society in East Asia; 131A-131B, Chinese Literature in Translation

Political Science: 128A-128B, The American Role in Asia; 142C, Comparative International Relations; 140B, Comparative Communism; 140C, Selected Topics in Communist Politics; 143A-143B, Northeast Asian Politics

Sociology: 183, Contemporary Chinese Society

Option II. Minor in Japanese Studies: Five upper division courses from among the following:

Anthropology: 170, Japan

History: 118A, Japanese History, Archæological Period to 1800; 118B, Japanese History, 1800 to the Present; 119A, Social History of Japan; 119B, Economic History of Japan


Music: 134A, Music of the East Asia Tradition; 134B, Music of Japan

Oriental Languages: 121A-121B, Development of Buddhism in East and Inner Asia; 122, Buddhism and Contemporary Society in East Asia; 133A-133B, Japanese Literature in Translation

Political Science: 128A-128B, The American Role in Asia; 143A-143B, Northeast Asian Politics

Option III. Minor in Southeast Asian Studies: Five upper division courses from among the following:

Anthropology: 185, Mainland Southeast Asia; 186, Insular Southeast Asia

Geography: 163, Southeast Asia

History of Art: 137, The Art of Southeast Asia

Music: 133A, Music of the Southeast Asia Tradition

Political Science: 128A-128B, The American Role in Asia; 143C, Southeast Asian Politics; 143D, Policy Problems in Southeast Asia

Southeast Asian Studies: 122, Authors and Audiences in the Malay World; 123, The Poetry of Indonesia and Malaysia in Translation; 124, Insular Southeast Asian Traditions; 125, Introduction to Modern Indonesian and Malaysian Literature

Upper Division Courses

H195A-H195B. Senior Honors. (3,3) Credit and grade to be awarded upon completion of the major. Course may be repeated without credit toward the 36 unit major. Individual study supervised by appropriate faculty adviser. Prerequisites: Consent of adviser. Open to seniors in the Group in Asian Studies. Individual conferences to be arranged with the major adviser or other appropriate faculty member for collection and analysis of research materials and preparation of the undergraduate thesis. (F,SP)

H196. Senior Thesis. (3) A maximum of 3 units of credit to be awarded towards the major. Course may be repeated without credit toward the 36 unit major. Individual study supervised by appropriate faculty adviser. Prerequisites: Consent of adviser. Open to seniors in the Group in Asian Studies. Individual conferences to be arranged with the major adviser or other appropriate faculty member for collection and analysis of research materials and preparation of the undergraduate thesis. (F,SP)

Graduate Program
The Group in Asian Studies offers an M.A. degree program in Asian studies. Students in the program confine themselves to one of four areas of Asia: East Asia (China), Northeast Asia (Japan/Korea), Southeast Asia, or South Asia. The group, in cooperation with...
the Graduate School of Journalism and the Graduate School of Business Administration, also offers a concurrent M.J./M.A. in journalism and Asian studies and a concurrent M.B.A./M.A. in business administration and Asian studies.

The group is authorized to award the degree of Doctor of Philosophy in Asian studies, but for practical and academic reasons this degree program is very restricted. Applicants with specific disciplinary interests should apply to a particular department rather than to the interdisciplinary group. Interested applicants should contact the Group in Asian Studies for additional information.

Astronomy

(College of Letters and Science)

Department Office: 601 Campbell Hall, 642-5275

Professors:
Jonathon Aarons, Ph.D.
C. Stuart Bowyer, Ph.D.
Stuart Davis, Ph.D.
Carl F. Heiles, Ph.D.
Ivan R. Huenemoerder, Ph.D.
Leonard von Gutfeld, Ph.D.
Christopher McKee, Ph.D. (Physics)
Jonny Nelson, Ph.D.
Frederick H. Shu, Ph.D.
Joseph I. Siegel, Ph.D.
Hyron Spinrad, Ph.D.
William J. Welch, Ph.D.
Leland E. Cunningham, Ph.D. (Emeritus)
John G. Phillips, Ph.D. (Emeritus)
Harold F. Weaver, Ph.D. (Emeritus)

Associate Professor:
Imke de Pater, Ph.D.

Assistant Professors:
Gibor Basri, Ph.D.
Aleks Filippenko, Ph.D.

Adjunct Professors:
Donald C. Backer, Ph.D.
Bernard Oliver, Ph.D.

Adjunct Associate Professors:
Charles Altshuler, Ph.D.
Richard Klein, Ph.D.

Lecturer:
David D. Cuttleback, Ph.D.

Major Advisers: Mr. Heiles, Mr. Basri

Graduate Advisers: Ms. de Pater, Mr. Davis, Mr. Spinrad.

The Department of Astronomy offers undergraduate and graduate instruction in a wide variety of fields, including theoretical and observational astrophysics; infrared, X-ray, and radio astronomy; galactic structure and dynamics of stellar systems; high-energy astrophysics and cosmology; and spectroscopy. A considerable amount of research and teaching related to astronomy is done in other units at Berkeley, including the Space Sciences Laboratory and the Physics Department. Various professors in the Chemistry, Mathematics, Statistics, and Electrical Engineering departments have an active interest in astronomy and are available for consultation.

A variety of instruments is available to students and staff, including a 30-inch telescope at Leuschner Observatory (note the campus), a 120-inch telescope at Lick Observatory, an 85-foot radio telescope and three 20-foot dishes used as a mm. Interferometer at Hat Creek Observatory. Laboratories are available for the development of radio, infrared, and X-ray instruments, and for the precise measurement of optical images and spectra.

The Major

During the first two undergraduate years students must, in addition to fulfilling certain specific requirements of the College of Letters and Science, pursue studies that will prepare them for future work in astronomy. Specifically, the department requires that during the first two years students take courses that provide a thorough understanding of:


In addition, students are urged to take foreign language courses that will enable them to gain a reading knowledge of any one of the three languages: German, Russian, and French.

The last two years, leading to the A.B. degree in astronomy, are spent in more intensive work, primarily in the fields of astrophysics, mathematics, and physics. The specific plan of study to be followed by each student is to be worked out in consultation with the departmental adviser for the major, and must include at least 24 units of upper division work in astronomy and allied fields.

Prospective astronomy students are encouraged, but not required, to take Astronomy 7 and 80 while in the lower division. Astronomy majors are required to take Astronomy 127A-127B-127C. With the approval of the departmental adviser concerning students planning to do graduate work in astronomy may take a graduate course in astronomy.

Astronomy 190, an undergraduate seminar in astronomy and astrophysics, is recommended.

The remainder of the student's course will be chosen from the following list: Analytic Mechanics (Physics 105), Evolution of the Universe and Optics (Physics 110A-110B), Modern Physics and Advanced Electrical Laboratory (Physics 111), Introduction to Statistical and Thermal Physics (Physics 112), Introductory Nuclear Physics (Physics 124), Nuclear and Particle Physics (Physics 129), Quantum Mechanics and its Applications to Atomic Physics (Physics 137A-137B), Introduction to Plasma Physics (Physics 142), Analysis for Applied Mathematics (Math 120A-120B), Mathematical Tools for the Physical Sciences (Math 121A-121B), Numerical Analysis (Math 128A-128B), Physics of the Earth (Geophysics 122A-122B), Introduction to the Theory of Probability and Statistics (Statistics 101-102).

Honors Program. For honors in astronomy a student must fulfill the following requirements: (1) grade-point average of at least 3.5 in all courses in astronomy and related fields and an overall grade-point average of at least 3.3 in the University; (2) if Astronomy 127A-127B-127C is taken, a minimum of two A's and one B; (3) an individual project, either research or study, involving at least three units of Astronomy H195. The student's project is chosen in consultation with the departmental adviser and the written report is judged by the adviser and one faculty member.

Graduate Programs

The graduate program is aimed at the Ph.D. degree. Entering students need not have majored in astronomy, although some background in astronomy is desirable. A strong background in physics is essential, however. In order to facilitate reading of research papers in German, Russian, and French, as part of their graduate work, entering students are urged to study at least one of these languages as undergraduates.

In addition to the qualifying examination required by the University, the department requires students to pass a preliminary examination, written tests breadth and depth of knowledge of three specialized research areas chosen by the student from a list of about 10. Students choose, with the aid of their adviser, courses in the department which are useful in preparing for the preliminary and qualifying examinations. In addition, students must pass a modest number of graduate courses taken outside the department and must acquire on the job experience. A tutorial program is designed to maintain regular contact with the faculty. The program normally takes four to five years. Additional information on the program is available upon request from the Department.

The requirements for the M.A. degree are 24 units in graduate or upper division undergraduate courses (12 of them in graduate courses) and the preliminary examination.

Lower Division Courses

3. Descriptive Cosmology. (2) Two hours of lecture per week. Prerequisites: 10 or consent of instructor. Non-mathematical description of research and results in modern extragalactic astronomy and cosmology.

4. The Solar System and Beyond. (2) Two hours of lecture per week. Prerequisites: 10 or consent of instructor. A discussion of the history and evolution of the solar system, including results from recent space-probe exploration. Some facility in high school mathematics expected.

6. Breakthrough Discoveries in Modern Astronomy. (2) Two hours of lecture per week. Prerequisites: 10 or consent of instructor. Considers the major breakthrough discoveries that have, from time to time, dramatically changed the astronomer's understanding of the universe; it describes the state of astronomical knowledge when each breakthrough occurred and analyzes how the breakthrough changed that state.

7. Introduction to Modern Astronomy and Astrophysics. (4) Three hours of lecture and up to two hours of laboratory per week. Prerequisites: Good facility in high school physics and mathematics. Not open to students who have had 10. Description and interpretation of astronomical phenomena using the laws of modern physics. Modern astronomical instrumentation. (F,SP)

Joe Bower, Bowyer

7S. Self-Paced Introduction to Modern Astronomy and Astrophysics. (1-4) May be repeated for credit up to a total of 4 units. One to four hours tutorial discussion per occasional/frequent laboratory exercises. Prerequisites: Good facility in high school physics and mathematics. Not open to students who have had 10. The same material as 7S but in a self-paced format. Units assigned depending on number of study modules completed.

8. The Universe Through Radio Eyes. (2) Two hours of lecture per week, plus an occasional field trip. Prerequisites: 10, 10S, 7, or 7S, or consent of instructor. Topics vary and may include modern instrumentation, the three degree cosmic radiation, radio galaxies and quasars, pulsars, interstellar and intergalactic gases, interstellar masers, and radar studies of the solar system. Emphasis on physical understanding with occasional use of mathematics.

9. Selected Topics in Astronomy. (2-3) Course may be repeated for credit, taking different sections (A, B, C, etc.) each time, for a maximum of three hours per week, depending on course. Prerequisites: 10, 10S, 7, or 7S, or consent of instructor. Seminars in a variety of topics offered each semester. Topics explored in greater depth than in introductory courses. Classes taught by graduate students. Discussion and class participation encouraged. (F,SP)


9B. Relativity and Cosmology. (2) Evolution and origin of the Universe. Quasars. Curved spacetime, gravitation, observational tests.

9C. Stellar Systems. (2) Course may be repeated for credit, taking different sections (A, B, C, etc.). Star clusters, galaxies, and clusters of galaxies. Formation dynamics and evolution.

9D. Solar System. (2,3) Sun, planets, spacecraft exploration. Formation and evolution of the solar system.

9E. Interstellar Medium. (2,3) Gas and dust between the stars, regions of star formation, structure of the galaxy, chemical composition.

9F. Observational Astronomy. (2,3) Telescopes, astronomical photography, and observing techniques.

100. Introduction to General Astronomy. (4) Students who have completed 7 will receive credit for 10. Three hours of lecture and one hour of discussion per week. Not open to students who have completed 7. A description of modern astronomy with emphasis on the structure and evolution of stars, galaxies, and the Universe. Additional topics discussed include quasars, pulsars, black holes, and extraterrestrial communication, etc. Individual instructor's synopses available from the department. (SP)

101. Current Problems in Astronomy. (3) Students who have taken Astronomy 214 or IDS 253 may not receive credit for 201. Three hours of lecture per week. Prerequisites: Math 105, 110A, 110B; upper division standing. Seminar format discussions on current research programs. The formulation and solution of problems in astronomy. This course meets for two hours per week in an informal setting where group discussions of student presentations will take place on astronomical issues of current interest. The focus will be on the presentation of the research of the class members, but also on the nature of scientific inquiry itself. Students should learn by experience how to recognize scientific problems and resolve them. (F) Bowyer

102. Special Topics in Astronomy. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics will vary from semester to semester. See department for announcements. (F, SP)

103. Solar System Astrophysics. (3) Three hours of lecture per week. Prerequisites: Astronomy 7, Phys 7A-7B-7C, Math 504A-50B. The study of solar system astronomy: planetary formation, interior structure, atmospheres, surface features, planetary magnet systems, comets, asteroids, satellites, magnetospheres. (SP) de Pater

104. Graduate Courses

201A. Physical Processes in Astronomy. (4) Three hours of lecture per week. Prerequisites: Astronomy 105, 110A; 110B concurrently, open to advanced undergraduates with GPA of 3.70. An introduction to the basic physics of astronomy and astrophysics at the graduate level. Principles of energy transfer by radiation and matter, elements of classical and quantum theory of photon emission: bremsstrahlung, cyclotron and synchrotron radiation, Compton scattering, atomic, molecular and nuclear electromagnetic transitions. Collision excitation of atoms, molecules and nuclei. (F) Shu

201B. Physical Processes in Astronomy. (3) Three hours of lecture per week. Prerequisites: 201A. Principles of gas dynamics, magnetohydrodynamics and elementary kinetic theory, with particular emphasis on ionized gases (plasmas). Aspects of convection, shock waves, high speed winds of astrophysical relevance and wave phenomena. Concepts of high energy particle acceleration in a nova remnant. Collective phenomena in stellar systems. (SP) Shu

217. Stellar Atmospheres. (3) Three hours of lecture per week. Prerequisites: 201. Spectral characteristics of normal and peculiar stars. Interpretation via model atmosphere, line profiles, curve of growth, etc. Line and continuous opacity, line-blanketing, convection, LTE extended atmospheres. Current problem areas. (F) Basri

218. Stellar Dynamics and Galactic Structure. (3) Three hours of lecture per week. A basic course. Structure and kinematics of the galaxy: stellar population concepts, dynamical evolution of stellar systems with and without encounters. (SP) King

220. Stellar Structure and Evolution. (3) Three hours lecture per week; occasional laboratories or observing time. Prerequisites: Physics 7 series, Mathematics 50A-50B-50C. Instruments in modern astronomy and physical discussion of stars—the observations, theory of stellar evolution. Stellar systems—clusters, the galaxy, external galaxies, and clusters of galaxies. Cosmological observations and interpretation. (F) King

227. Stellar Structure and Evolution. (3) Three hours lecture per week; occasional laboratories or observing time. Prerequisites: 127A, 127B recommended. Interstellar matter, high energy astrophysics, condensed objects. (F) Bieging, Alcock

228. Special Topics in Astronomy. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics will vary from semester to semester. See department for announcements. (F, SP)

234. Solar System Astrophysics. (3) Three hours of lecture per week. Prerequisites: 127 series or consent of instructor. The physical foundations of solar system astronomy. The study of planetary atmospheres and surfaces, Meteors, comets, and the interplanetary medium. Observational techniques and problems. (SP)

235. Special Topics in Astronomy. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics will vary from semester to semester. See department for announcements. (F, SP)

236. Radio Astronomy. (3) Three hours of lecture per week. Prerequisites: 216 recommended. Comparison of radio and optical instrumentation and techniques. Detailed application of radiation and physics to objects observed in the radio range. Including emission and absorption of gas clouds, and relativistic plasmas, with application to current observations. (F)

105. Self-Paced Introduction to General Astronomy. (1) Lab may be repeated for credit up to maximum of 4 units. Prerequisites: Not open to students who have completed 7 or 10. One to four hours of discussion and possible one hour of laboratory per week. The same material as 10 but in a self-paced format. Units and grades assigned at end of semester, depending on number of study units completed.

106. Seminar. (2) Two 1-hour seminars per week. A small-size undergraduate seminar exploring one astronomical topic in depth with students being responsible for much of the presentation. Possible topics include quasars, pulsars, black holes, and the Universe. Additional topics optionally discussed include extraterrestrial communication, etc. Individual Instructor's synopses available from the department. (F,SP)

107. Supervised Independent Study and Research. (1-4) Course may be repeated for credit up to a total of 4 units. Prerequisite: Not open to students who have completed 7, 10 will receive no credit for 10. One to 4 hours of discussion and possible one hour of laboratory per week. The same material as 7 or 10. Seminar format discussions on current research programs. The formulation and solution of problems in astronomy. Grades assigned at end of semester, depending on student's progress and resolve them. (F) Bowyer

217. Stellar Atmospheres. (3) Three hours of lecture per week. Prerequisites: 201. Spectral characteristics of normal and peculiar stars. Interpretation via model atmosphere, line profiles, curve of growth, etc. Line and continuous opacity, line-blanketing, convection, LTE extended atmospheres. Current problem areas. (F)


219. Undergraduate Seminar. (2) Course may be repeated for credit. Two 1-hour seminars per week. Prerequisites: Upper division standing. Seminar format discussions on current research programs. The formulation and solution of problems in astronomy. This course meets for two hours per week in an informal setting where group discussions of student presentations will take place on astronomical issues of current interest. The focus will be on the presentation of the research of the class members, but also on the nature of scientific inquiry itself. Students should learn by experience how to recognize scientific problems and resolve them. (F) Bowyer

195. Special Study for Honors Candidates. (2-4) Individual project of research or study. (SP)

196. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent study. Prerequisites: 127A-127B. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

Upper Division Courses

101. Current Problems in Astronomy. (3) Students who have completed 127A-127B/127C may not receive credit for 101. Three hours of lecture per week. Prerequisites: Physics 7 series, Math 50A-50B. Introduction to the principal fields of modern astrophysical research. This course is intended primarily for majors in the physical sciences and engineering. (F)

127A. Astrophysics of Stars and Stellar Systems. (3) Three hours of lecture per week; occasional laboratories or observing time. Prerequisites: Physics 7 series, Mathematics 50A-50B-50C. Instruments in modern astronomy and physical discussion of stars—the observations, theory of stellar evolution. Stellar systems—clusters, the galaxy, external galaxies, and clusters of galaxies. Cosmological observations and interpretation. (F) King

127B. Stellar Structure and Evolution. (3) Three hours lecture per week; occasional laboratories or observing time. Prerequisites: Physics 7 series, Mathematics 50A-50B-50C. Instruments in modern astronomy and physical discussion of stars—the observations, theory of stellar evolution. Stellar systems—clusters, the galaxy, external galaxies, and clusters of galaxies. Cosmological observations and interpretation. (F) King

127C. Interstellar Matter and High Energy Astrophysics. (3) Three hours lecture per week; occasional laboratories or observing time. Prerequisites: 127A, 127B recommended. Interstellar matter, high energy astrophysics, condensed objects. (F) Bieging, Alcock

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics will vary from semester to semester. See department for announcements. (F, SP)

200A. Introduction to Current Research. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour lecture per week. Prerequisites: Consent of instructor: Survey of research currently being performed in the department or the University. (F)

200B. Introduction to Current Research. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour lecture per week. Prerequisites: Consent of instructor: Continuation of 200A. Study of a research topic with an individual staff member. (SP)

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
229. Seminar. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. In addition to the weekly colloquia, the department offers seminars in advanced topics, several of which are announced at the beginning of each semester. A maximum of 5 units may be taken per semester with a limitation of 2 in any one section. (F,SP)

299. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirement for the doctoral degree. (F,SP)

Professional Courses

300. Instruction Techniques in General Astronomy. (2-5) Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture per week. Prerequisites: Consent of instructor. Discussion and practice of teaching techniques as applied to astronomy. Open to graduate students who are presently graduate student instructors. Two units for course plus 1 section; three units for two discussion sections. (F,SP)

301. Undergraduate Astronomy Instruction. (1-2) Course may be repeated for credit up to a maximum of 4 units. Must be taken on a passes/fails basis. One hour of lecture and 3-6 hours of laboratory per week. Prerequisites: An elementary astronomy course and consent of instructor. Open to a limited number of highly qualified undergraduate students interested in astronomy teaching at the college level. Students will participate in a seminar on educational methods and engage in tutorial or laboratory-teaching under supervision of a faculty member. (F,SP)

Interdepartmental Studies Courses

Graduate Courses

IDS 252. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisites: Physics 137A-137B, 112 or 114A-114B. Equations of stellar structure, radiative transfer and convection, thermonuclear reactions and stellar energy generation; stellar models, degenerate configurations, evolutionary sequences; supernovae, neutron stars, black holes, nucleosynthesis. Sponsoring departments: Physics and Astronomy. (F)

IDS 254. High Energy Astrophysics. (3) Three hours of lecture per week. Prerequisites: 201 or consent of instructor. Basic physics of high energy radiation processes in an astrophysical environment. Cosmic ray production and propagation. Applications selected from pulsars, x-ray sources, supernovae, interstellar medium, intergalactic medium, extragalactic radio sources, quasars, and big-bang cosmology. Sponsoring department: Physics and Astronomy. (SP) Sadjodet

IDS 285. Theoretical Astrophysics Seminar. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. The study of theoretical astrophysics. Sponsoring departments: Astronomy and Physics. (F)

Biochemistry

(College of Letters and Science)

Department Office: 401 Biochemistry Building, 642-5252


Adjunct Associate Professor: Edward E. Penhof, Ph.D. University of Washington. Micromolecular synthesis control mechanisms.

Lecturer: Mark D. Alper, Ph.D. University of California at Berkeley

Departmental Major Advisers: Mr. Kirsch, Mr. Linn, Mr. Nellans, Mr. Rine, Mr. Schuhman, Mr. Wilson.

Freshman and Sophomore Adviser: Mr. Tjian.

Graduate Advisers: Mr. Ames, Mr. Tomer, Mr. Rine.

Biochemistry attempts to define living systems and processes in conceptual terms. Its studies range from the determination of the three dimensional arrangement of atoms of complete molecules and how structure determines biological function, to the molecular understanding of such complex processes as development, mutagenesis, pathogenesis, and aging. Biochemistry provides an excellent foundation for research and teaching in the life sciences as well as for further study leading to professional work in any aspect of the health or environmental sciences.

The Major

Students interested in the biochemistry major may pick up an undergraduate handbook at 401 Biochemistry Building.

Lower Division. Chemistry 1A-1B and 5, or 4A-4B; Mathematics 1A-1B; Physics 8A-8B or 7A-7B; Chemistry 8A-8B (or 112A-112B—see below).

Recommended: Additional courses in biological and physical sciences; a reading knowledge of one foreign language (German, French, Japanese, Russian).

Upper Division. Chemistry 112A-112B or 112H (or Chemistry 8A-8B—see below); Chemistry 130A-130B or Chemistry 120A-120B; Biochemistry 100A-100B, 101, 190; Research courses (3 units, or if Chemistry 8A-8B is taken, 6).

Organic chemistry sequence: The major requirement for organic chemistry can be satisfied either by the Chemistry 8A-8B or the Chemistry 112A-112B sequence. The latter option must be exercised by those students contemplating the Honors Program and by those interested in graduate study in biochemistry. Students who will declare the biochemistry major after spring 1988 should enroll in the Chemistry 112A-112B sequence.

Requirement for admission to the major: A grade-point average of 2.7 or above in prerequisite courses is required, effective fall 1988.

Transfer Students: Transfer students should not enroll in Biochemistry 100A or 101 without first consulting the major advisors. Note that Chemistry 5 is a prerequisite for Biochemistry 112A and 112B and cannot be taken concurrently with Biochemistry 100A or 100B because of a schedule conflict.

Honor Program: A student enrolled in the major who has an overall grade-point average of 3.0 or higher and a grade-point average of 3.3 or higher in courses acceptable in the major may, with the approval of the major advisor, enroll in the honors program no later than the beginning of the senior year. In addition to the courses prescribed above, the student in this program will be required to complete at least 3 units in Biochemistry 112A and 112B and to write a report based on the research. Certain graduate biochemistry courses will be open to these students on approval of the instructor and adviser.

To remain in the honors program a student must maintain a grade-point average of at least 3.3 in biochemistry courses, continue at a satisfactory or higher in all work completed at the University.

Graduate Program

The department offers the M.A. degree (under either Plan I or Plan II as described in the Graduate Division section of this catalog), and the Ph.D. degree. All students working for the Ph.D. degree are required to take as graduate student instructors for two semesters. For information concerning the requirements of either degree consult a graduate adviser in the department.

Lower Division Courses

10. Of Molecules and Man: A View for the Layman. (3) Two 1½-hour lectures and one hour of section per week. Examination of molecular mechanisms that underlie normal functions of living organisms and ways these mechanisms are disrupted by disease and environmental agents. Designed to provide non-biology majors with an understanding of modern biochemistry and the ways man controls and alters the biology of his life and environment. (SP) Alper

Upper Division Courses

100A-100B. General Biochemistry. (4) Three 1-hour lectures and one 1-hour section meeting per week. Prerequisites: Chemistry 8B or equivalent and a course in physical chemistry. A course in general biology is recommended. Chemical and physical factors concerned, in life processes, including the chemistry function, degradation, and biosynthesis of major cellular constituents: energy transfer, lipids, carbohydrates, amino acids, and the functioning of excitable membranes. DNA replication, transcription, and recombination are discussed individually and as they pertain to the regulation of gene expression. (F,SP) Alper, Kirsch, Keohane, Schuhman, Rine

101. General Biochemistry Laboratory. (8) Three 1-hour lectures and three 3-hour laboratories per week. Prerequisites: Chemistry 5 and 100A (may be taken concurrently). Experiments planned to accompany lectures in 100A-100B. (SP) Staff

102. Survey of the Principles of Biochemistry. (4) Three 1-hour lectures and one 1-hour section meeting per week. Prerequisites: Chemistry 8B or equivalent. Recommended: courses in physical chemistry and bi-
119. Research. (2-4) Course may be repeated for credit. To be arranged. Prerequisites: 100A, 101 and 102. Staff

201. Advanced Biochemical Laboratory Methods. (2-2-2) Three 1-hour lectures and three 3-hour laboratories per week. Prerequisites: 100A-100B or consent of instructor. The sections are taught in tandem and may be taken individually.

245. Seminar on Eukaryotic Gene Expression. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour meetings per week. Prerequisites: 244 or 296 or 299, or consent of instructor. Report and discussion of original research and current literature on eukaryotic gene expression, with emphasis on the unicellular eukaryote Saccharomyces cerevisiae. (F,SP) Schekman

254. Seminar on Regulatory Substances in Bacteria. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Biochemistry courses and consent of instructor. Presentation and discussion of current research literature in bacterial genetics. (F,SP) A. Ames

255. Seminar on Chromosomal Structures. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: 100A-100B and consent of instructor. Review of current literature and discussion of original research on proteins involved in the basic biochemistry and function of the nucleus and its constituents. (SP) Chamberlin

257. Seminar on Mechanisms of Genetic Regulation In Yeast. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of discussion per week. Prerequisites: Graduate standing and consent of instructor. Presentation and discussion of current research and literature concerning the regulation of gene expression, with emphasis on the yeast Saccharomyces cerevisiae. (F,SP) Rine

260. Physical Biochemistry. (3) Two 1½-hour lectures per week. Prerequisites: Year courses in organic chemistry, and general chemistry or consent of instructor. Recommended: course in biochemistry. Application of modern physical concepts and experimental methods to the analysis of the structure, function, and interaction of large molecules of biological interest. (F) Schachman

270. Introduction to Research Seminar. (2) Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour seminars per week. Prerequisites: Graduate standing in the department. Seminar presentation of student research projects and discussion. Intended for first year graduate students. (F) Schelman, Nellas

285. Research Seminar. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour or two 1½-hour meetings per week. Prerequisites: 602 or 296, taken concurrently. Seminar presentation and evaluation of results in the area of the student's current research. (F,SP) * Staff

290. Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Graduate students only. (F,SP)
Bioengineering—Graduate Training at Berkeley and UC San Francisco (Special Studies)

The University of California at Berkeley and San Francisco campuses, offer a joint graduate program in Bioengineering. This program permits students to benefit from both the strong clinical and health sciences resources available on the San Francisco campus and the strong engineering and basic sciences resources available on the Berkeley campus.

The program is interdepartmental as well as intercampus. It combines related interests and research activities from five of the seven engineering departments and from several nonengineering departments (e.g., Physiology-Anatomy, Physiological Optics, Biophysics) at Berkeley with those of the faculty from all four professional schools (Dentistry, Medicine, Nursing, and Pharmacy) at San Francisco.

All students in the program are simultaneously enrolled in the Graduate Divisions of both the San Francisco and Berkeley campuses and are free to take advantage of courses and research opportunities on both campuses.

The program awards Master of Science in Bioengineering and Doctor of Philosophy in Bioengineering degrees that can be the names of both campuses.

Students with a B.A. or B.S. degree in engineering, biology, or other sciences are eligible for admission. Students can obtain additional information and application material by contacting either campus at one of the addresses below:

Bioengineering Graduate Group, School of Medicine, 1166 Moffitt Hospital, University of California at San Francisco, CA 94143; (415) 476-5151

Bioengineering Graduate Group, College of Engineering, Meakin Interdisciplinary Studies Center, University of California at Berkeley; Berkeley, CA 94720; (415) 642-8790

Upper Division Courses

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised independent study. (FSP) Staff

Graduate Courses

299. Individual Study or Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in the direction of a staff member in the project of selected aspects of teaching (lecture, laboratory, or seminar). (FSP) Staff

Professional Courses

300. Teaching Biochemistry. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to two hours of seminar per week or regular conferences. Prerequisites: Graduate standing in the direction of a staff member in the selection of practices of teaching. (FSP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 229. Mechanisms of Enzyme Action. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Current concepts of the mode of action of enzymes. Binding of substrates and allosteric effects of enzymes, and analysis of the thermodynamics and kinetics of these reactions. Catalytic mechanisms utilized by enzymes and correlation of mechanism with 3-dimensional structure. The design of mechanism-based enzyme inhibitors. Sponsoring departments: Chemistry and Biochemistry. (FSP) Kirch, Klinman

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Upper Division Courses

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised independent study. (FSP) Staff

Graduate Courses

299. Individual Study or Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in the direction of a staff member in the project of selected aspects of teaching (lecture, laboratory, or seminar). (FSP) Staff

Professional Courses

300. Teaching Biochemistry. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to two hours of seminar per week or regular conferences. Prerequisites: Graduate standing in the direction of a staff member in the selection of practices of teaching. (FSP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 229. Mechanisms of Enzyme Action. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Current concepts of the mode of action of enzymes. Binding of substrates and allosteric effects of enzymes, and analysis of the thermodynamics and kinetics of these reactions. Catalytic mechanisms utilized by enzymes and correlation of mechanism with 3-dimensional structure. The design of mechanism-based enzyme inhibitors. Sponsoring departments: Chemistry and Biochemistry. (FSP) Kirch, Klinman

Bioengineering
Plan C (specialization in the area of ecology; study of the relations between living things and their environment):
Boaty 104 (4 units) or 120 (4 units) or 125 and 127; Botany 107 and 187 (3-2 units) or 188 and 132 (3-2 units) or 162 (7 units) or Biology 100 (10 units) or Entomology 100 (4 units); Physiology 109 (3 units) or Zoology 124 (4 units) or 128 (3 units) or Entomology 103 and 105L (2-2 units) or Entomology 105 (3 units) or Zoology 140 (3 units) or Botany 154 (2 units).

Additional upper division courses in biological sciences to complete 30 semester units of upper division work in the major.

Plan D (specialization in marine biology):
Biology 160 (2 units); Zoology 142 (3 units) or Paleontology 112 (4 units); Zoology 108 and 186 (3-2 units) or 162 (7 units) or Biology 100 (10 units) or Zoology 166 and 186 (2-3 units) or Botany 102 (3.5 units); BEHS 130A (4 units).

One semester course or summer course (4 unit minimum) at a marine laboratory; additional upper division courses in biological sciences to complete 30 semester units of upper division work in the major.

Plan E (specialization in the area of plant cellular and molecular biology):
Genetics 102 (3 units); Biochemistry 102 (4 units); Botany 100 (4 units); two of the following: Botany 129 (4 units) or Botany 136 (3 units) or Botany 145 (4 units) or Plant Soil Biology 116 (3 units); Botany 130 (3 units) or Botany 134 (4 units) or Botany 184 (4 units) or Genetics 170 (3 units); Microbiology 100 (3 units) or Botany 101 (4 units) or Botany 151 (3 units) or Plant Pathology 120 (4 units) or Plant Soil Biology 110 (3 units). Additional upper division courses in biology to complete a minimum of 30 semester units of upper division work in the major.

Honors Program. The honors program consists of Biology H195, Special Study for Honors Candidates (3 units), involving preparation of a thesis.

Research Facilities. The Electron Microscope Laboratory is an instructional and research unit of the College of Letters and Science. It houses equipment for transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The staff is skilled not only in the operation and maintenance of instruments, but in all standard techniques of sample preparation and most specialized ones. Qualified undergraduate and graduate students, postdoctoral associates, faculty, and research staff in biological and physical sciences, once trained, may make arrangements for use of the instruments in research. Instruction is provided in the form of both classes and individual training. Individual training is provided as Biology 499 (1-5 units). Registered students and faculty are not charged for training. Nominal charges are made for use of the laboratory for individual research work. Permission from the director, non-UC personnel can be accepted for training or laboratory use. Equipment can be used outside normal hours. The laboratory provides demonstration blocks of the electron microscope and preparative techniques for on-campus classes and can make special arrangements for tour groups.

Lower Division Courses

1A. General Biology. (4) Three 1-hour lectures, one 3-hour laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A-1B. Chemistry 8A recommended concurrently. General introduction to cell structure and function, molecular and organism genetics, animal cell department, form and function. Intended for students majoring in the biological sciences, but open to all qualified students. (F) Bentley, Stent, Witt

1B. General Biology. (4) Three 1-hour lectures, one 3-hour laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A-1B. General introduction to plant development, form and function; population genetics, ecology and evolution. Intended for students majoring in the biological sciences, but open to all qualified students. (SP) Colwell, Feldman, West

2. Topics in Biology. (1) Course may be repeated for credit with consent of instructor. Sections 1-8 letter grading; sections 9-12 on a pass/no pass basis. One 2-hour discussion per week. Prerequisite: Prefreshman or junior or senior standing. Consent of instructor is required. Reading and discussion of the literature on specific topics in the field of biology. (F,SP) Srebnik

7. An Introduction to Biology, Evolution and Race. (3) Two 1-hour lectures and one 2-hour discussion/lab per week. This course does not count toward a major. This course can not be repeated for credit. Further, in the context of biological principles, historical and current views on race will be examined. (SP) Collins

11. Introduction to the Science of Living Organisms. (4) Studies may not receive credit for this course if they have credit for both Zoology 109 and Botany 10. Three hours of lecture and one 3-hour laboratory per week. Prerequisites: For students not majoring in Biology or Psychology, 9 units of college level work, and completion of course requirements in English. Consent of instructor is required. (F) Srebnik

12. Natural History of Fungi. (3) Two 1-hour lectures and one 2-hour discussion/lab per week. An introduction to the major kinds of fungi, with special emphasis on their role in human history as well as their general ecological and evolutionary significance. Topics will also include fungal morphology and identification and various uses of fungi in food, beverage, and medical industries. Field trips to collect wild fungi (especially mushroom) and to visit industries will be a major part of the course. (SP) Jones, Licht

20. Principles of Paleontology. (3) Three 1-hour lectures and one 3-hour laboratory demonstration per week. An introduction to the major forms of life through geologic time and a consideration of the nature of fossil data. Approaches and problems in the study of paleontology and paleobiology. Topics include the diversity and distribution of marine and marine mammals; classification of living and extinct organisms; and techniques for the study of paleontology. (SP) Wilde

215. Molecular Biology of Eukaryotic Microorganisms. (3) Two 1-hour lectures per week. Prerequisites: Genetics 205 or F100 and course in organic chemistry. A critical examination of the fundamental principles of molecular biology. Emphasis on the nature of genetic information and its control. (SP) Huisman

221. Comparative Phylogeny and Endodontology Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Consent of instructor. Reviews and interprets current literature in vertebrate endodontology and histology. (F,SP) Aponte, Barn, Licht, Nicol

230. Cell Motility Research and Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Consent of instructor. Reviews and interprets recent reports of current literature in cell motility and cytokinetics, organization and assembly. (F,SP) Burnsio, Schitwa

250. Tropical Biology—An Ecological Approach. (3) Ten 1-hour lectures and 30 hours of laboratory per week. Prerequisites: Graduate standing in a biological
discipline and a course in general ecology or consent of instructor. Evolution and dynamics of tropical biota, their relationships to tropical environments; an intensive field course in Costa Rica. Offered in cooperation with the Organization for Tropical Studies. This course is sponsored by the Graduate Council. (SP) Brown, Costa Rica. Graduate, Berkeley. Human biochemical genetics

Allen H. Smith, Ph.D., Ph.D. Otago (New Zealand). Epidemiology of occupational related diseases

Robert C. Speer, Ph.D., Cambridge University. Engineering aspects of environmental and occupational health

S. Leonard Syme, Ph.D. Yale University. Social and cultural influences on the development of disease

Michael E. Tarter, Ph.D. University of California at Los Angeles. Computer-intensive models-free statistics

Constantine H. Tappella, Ph.D. University of Wisconsin. Immunological assays: native and induced soluble protein

John I. Thornton, D.O. University of California at Berkeley. Forensic science

Nevian A. Velez, Ph.D. University of Colorado. Comparative immunology and microbiology of marine mammals

Edward T. Wei, Ph.D. University of California at San Francisco. The use of the polymerase chain reaction (PCR) in the study of selected pathogenic bacteria and fungi. (SP)

Wenxin Weneke, Jr., M.D., M.P.H. Colorado University. Epidemiology: cancer; AIDS

Chin Long Ong, M.D., Ph.D. University of Medical Sciences in Malaysia

Sanford S. Eiberg, Ph.D., L.H.D., h.c. (Emeritus)

Neil F. Holmes, Ph.D. (Adjunct)

Stewart H. Martin, D.V.M., Ph.D. (Emeritus)

John H. Jeffrey, Ph.D., S.B.D., L.L.D. (Emeritus)

William IE Reeves, Ph.D., M.P.H. (Emeritus)

Irving R. Tabershaw, M.D. (Emeritus)

Associate Professors:

Catherine P. Koehlman, Ph.D. Stanford University. Engineering aspects of environmental health: combustion

Hina M. Matala, Ph.D. University of California. Soil science, environmental pollution, and environment

Irene J. Reynolds, Ph.D. University College London. Factor-analysis models and the method of moments

Professors:

Noree Baker, Ph.D. (Adjunct)

Raymond K. Neff, Sc.D. (Adjunct)

Stanley B. Pruimser, M.D. (Clinical)

William Mifsud Smith, M.D., M.P. (Adjunct)

John E. Swartzberg, M.D. (Clinical)

Assistant Professors:

W. Thomas Boyce, M.D. (Adjunct)

James T. McGregor, Ph.D. (Adjunct)

Assistant Professor:

Alayn R. Walford, Ph.D. (Adjunct)

Lecturers:

Michael S. Ascher, M.D., F.A.C.P.

Richard W. Emmins, M.D., M.P.H., D.P.H.

Virginia Emster, Ph.D.

Gary D. Friedman, M.D., M.S.

Karen G. Grant, M.P.H.

John Harris, M.D., M.P.H.

Norman G. Hearst, M.D., M.P.H.

H. W. Herrmann, M.D.

George A. Kahlcke, M.D.

Carol A. Langnuser, M.A.

Deane Merril, M.D.

Thaddeus Midura, Ph.D.

Rosalee Moore, Ph.D.

Ronald R. Roberto, M.D., M.P.H.

Thomas W. Rogers, M.D.

Guido J. Rosati, B.S.

James P. Seward, M.D.

Alexander T. Shulgin, Ph.D.

Harrison A. Stubbs, Ph.D.

Sherrte C. Swartzberg, M.D.

Ralph H. Thomas, M.P.H., Ph.D., D.Sc.

S. Benson Werner, M.D., M.P.H.

Janice W. Yager, Ph.D., M.P.H.

The mission of the Department of Biomedical and Environmental Health Sciences is to educate graduate students on the scientific basis of the promotion of health and prevention of disease in the human population and to engage in continued research for the advancement of health sciences. The successful accomplishment of such an ambitious and challenging mission requires a faculty with expertise in a range of disciplines as well as teaching and research programs that facilitate interdisciplinary communication and exchange of ideas. Although the development of an interdisciplinary curriculum presents many obstacles, the department has been able to combine the diverse teaching and research talents of its faculty in a creative and innovative manner that meets the educational needs and goals of the department and the career objectives of its students.

The domain of the activities includes identification of the biological, chemical, physical, social and environmental factors which affect human health; development of analytic methods and investigative models to measure and assess the impact of these factors on health; and to recommended and evaluate health programs. Some areas of special interest include the study of arthropod-borne viral diseases, air and water pollution in the etiology of cancer and other diseases, host-parasite relationships in infectious diseases, the toxicology of chemicals in the environment, the human health aspects of the work place, and forensic science. Since investigation of these problems requires interdisciplinary approaches, students are encouraged to develop prospective studies within the Department of Environmental Health Sciences, the school, and on the campus.

The range of disciplines represented by the faculty in the Department includes biostatistics, chemistry, engineering, entomology, epidemiology, forensic science, genetics, immunology, medicine, microbiology, psychology, sociology, and toxicology. To accomplish the educational mission and goals of the department, the faculty are organized into four curricular programs: biomedical sciences, biostatistics, environmental health sciences, and epidemiology. The curricular programs utilize the professional degree programs administered by the School of Public Health (i.e., M.P.H. and Dr.P.H.) and the Interdisciplinary Graduate Group Degree programs administered by the Graduate Division. The latter include M.A. or M.S. and professional degree programs in biomedical, environmental health sciences, epidemiology, immunology, medical microbiology, and parasitology.

The following sections have been established for courses 197, 198, 199, 295, 296, 297, 298, 299, 801, and 802. The courses may be repeated for credit, but some sections may not be given every semester.

K. Environmental Health Sciences

L. Biostatistics

M. Department M.P.H. (BioEnv.)

N. Epidemiology

P. Biomedical Sciences

Q. Epidemiology/Biostatistics M.P.H. Program

S. Forensic Science

Upper Division Courses

103. Microbiology Related to Health and Disease. (4) Three 1-hour lectures and one 2-hour discussion per week. Prerequisites: Elementary biology and chemistry. (F) University of California San Francisco. Correlation of medicine and microbiology. Funct de of biostatistics for detection, isolation and identification of human viruses in clinical specimens. (F) Staff

104. Introduction to Medical Virology. (3) Three 1-hour lectures per week. Prerequisites: Elementary courses in biology and chemistry, including biochemistry, or consent of instructor. Basic principles of molecular biology, pathogenesis, epidemiology, and control of medically important viruses. (F) Hardy

104L. Laboratory in Medical Virology. (3) Three 2-hour laboratories and one 2-hour discussion per week. Prerequisites: Concurrent enrollment. Basic laboratory course emphasizing identification of viruses and rickettsias by indirect fluorescent antibody and complement fixation methods. (F) Hardy, Moe-Holling

105. Introduction to Medical Microbiology. (F) Formerly 105 and 105L. Three 1-hour lectures, three 2-hour laboratories, and one 2-hour discussion per week. Prerequisites: Elementary courses in chemistry or consent of instructor. Basic principles of cellular structure and function of pathogenic bacteria and fungi, pathogenesis, epidemiology, host-immune responses, and phagocytes. Laboratory techniques: Culture, serology, bacteriology, virology, mycology, parasitology, histology, immunology, histopathology, and blood chemistry. (F) Staff

Vedros, Grant, Walford

106. Introduction to Hematology. (2) Three hours of lecture and two 2-hour laboratory periods. Prerequisites: Consent of Instructor. Theories, principles, and recent developments in blood coagulation, hemostatic mechanism, and Immunohematology. Analyses of
formed blood elements, including normal and abnormal characteristics. (F) Rogers, Grant

121. Introduction to Vital and Demographic Statistics. (4) Three 1-hour lectures and one hour of discussion/section per week. Statistical and evaluation methods in study of human mortality, morbidity, and natality. History of vital statistics, critical appraisal of census and vital data, measurement of risk, and introduction to life tables. Health records system, analysis of mass data. (F) Tarter

122. Introduction to Health Statistics. (3) Two hours of lecture, one hour of discussion and two hours of laboratory per week. Prerequisites: High school algebra. Basic introduction to descriptive and inferential statistics, tables, rates and rate adjustment. Regression and correlation, statistical aspects of basic experimental and observational health research designs. (F) Langhauser

130A. Introduction to Probability and Statistics in Biology and Public Health. (4) Three 1-hour lectures and one 2-hour discussion/section per week. Prerequisites: 120A or equivalent. Regression, analysis of variance, bioassay, analysis of covariance, design of experiments, and nonparametric analysis with biomedical applications. (F) Selvin, Langhauser

130B. Introduction to Probability and Statistics in Biology and Public Health. (4) Three 1-hour lectures and one 2-hour discussion/section per week. Prerequisites: 130A or equivalent. Design of surveys in public health. Sampling techniques and theory. Program evaluation. Health services research and policy. Construction of health status indicators. (F) Malani

145. Analytical Aspects of Environmental Chemistry. (2) New course. Two hours of lecture per week. Prerequisites: Organic and analytical chemistry, identification and on-going surveillance of materials which may be responsible for problems related to the contamination of environments. Microchemical, microscopic, and instrumental methods of analysis of diverse materials. (SP) Langhauser

149. Chemical Hazards in the Workplace. (3) Two 1½-hour lectures per week. Prerequisites: Basic Chem. 8A-BB or permission of instructor. Introduction to the scientific and technical basis of the evaluations of risk to human populations from exposure to chemicals in the workplace and in the environment surrounding it. Koshold, Speer

150. Environmental Health in the Community. (2) Two hours of lecture per week. Prerequisites: Chemistry 1A; Mathematics 1A. Fundamentals of water quality, waste treatment, air quality, and food hygiene related to health. (F) Oswald

156. Microbiology of Water and Wastewater. (3) Two 1½-hour lectures and 1½-hour laboratory demonstration per week. Prerequisites: Elementary courses in biology and chemistry. Principles of microbiology applicable to the aquatic environment, drinking water, and waste water. (SP) Cooper

160. Introduction to Epidemiology and Environmental Health. (1-3) Three hours of lecture and one 1½-hour discussion section per week. Prerequisites: Prior background in biological sciences and a course in biostatistics required or consent of instructor. Introduction to principles, methods, and uses of epidemiology and environmental health. The course is divided into two modules. The first covers the principles and methods of epidemiology and reviews the epidemiology of important specific diseases, and the second presents special issues concerning the physical environment. Variable unit course; 3 units for 2 modules: 2 units for epidemiology module, 1 unit for environmental health module. Examination exams offered for both modules. (SP) Reinbold, Speer, Staff

161. Trace Microanaysis. (4) Two 1-hour lectures and two 3-hour laboratory per week. Prerequisites: Upper division standing in a physical or natural science. A systematic approach to the microanalysis of materials using chemical and physical techniques. Emphasis on materials of forensic and environmental pollution significance. (SP) Thorton

183. Forensic Toxicology Laboratory. (2) Two 1-hour lecture/discussion and one 3-hour laboratory per week. Prerequisites: Upper division standing in a physical or natural science. Detection and estimation of toxic substances in the human organism by chemical methods. Analysis of biological material. Detection and estimation of toxic substances in the human organism by chemical and physical means. (F) Shulgin

185. Principles of Optical Microscopy. (3) Two hours of lecture and one 2-hour laboratory per week. Principles of optics as applied to problems of image generation, the use of microscopy and optical techniques for the investigation of the structure and organization of materials. (F) Shulgin

197. Field Study in Public Health. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Includes field trips to local communities and organizations at which health service is provided. Field experience in health-related organizations, and departments at the state or local level. (SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Requires three hours of work per unit per week. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. Supervised experience relevant to specific academic discipline. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Requires three hours of work per unit per week. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

201A. Principles of Infectious Disease. (5) Three 2-hour lectures and two 2-hour laboratories per week. Prerequisites: 104 or equivalent. Principles of microorganisms and the disease processes they cause. (SP) Swartzberg

204. Advanced Medical Microbiology. (3-4) Course may be repeated for credit. Two 2-hour lectures/discussion sections per week. Prerequisites: 105 or consent of instructor. Analysis of bacterial and fungal cell components and host factors that play a role in medically important disease states. Design of research projects utilizing sterile techniques and consent of instructor. Analysis and interpretation of experimental data. (SP) Tampella

207. Analytical Methods in Microbiology. (4) One 1½-hour lecture with one 3-hour laboratory per week. Prerequisites: Consent of instructor and sections involving sterile techniques and consent of instructor. Theory and practice of current analytical methods used in clinical and research medical microbiology: tissue and cell typing, immunological and molecular probes, electrophoresis, chromatography, radioisotopes, analytical ultracentrifugation. (F) Buehing, Sensabaugh, Tampella, Moe-Hollingsworth

210A. Current Problems in the Public Health Laboratory. (1.5) Formerly 210. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: Graduate standing in biomedical sciences. Existent federal and state regulations and standards for clinical and public health laboratories; current developments in laboratory instrumentation and safety procedures associated with microorganisms; hospital infection control. (SP) Tampella

210B. Current Issues in the Public Health Laboratory. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: Graduate standing in biomedical sciences. In-depth discussion of a policy affecting Public Health laboratories culminating in a public debate on the issue. Issues vary from year to year. (F) Sensabaugh

212. Molecular Parasitology. (3) New course. Course may be repeated for credit. Two 2-hour lectures/discussion sessions per week for 10 weeks plus term paper. Prerequisites: Basic course in molecular biology, parasitology, biochemistry, or immunochemistry, or consent of instructor. Advanced course in molecular aspects of parasitic immunology, biochemistry, and molecular biology. Will cover molecular parasite biology in relation to mechanisms of pathogenesis and strategies for control. Critical evaluation of scientific literature and current research. Some laboratory techniques will be included. Course content will rely heavily on current literature and will cover selected topics in these disciplines which, in general, describe "state of the art" research and knowledge in these areas. (SP) Agabian

220A. Biostatistical Methods. (4) New course. Three hours of lecture and one 2-hour laboratory per week. Prerequisites: A course in mathematical statistics or two years of calculus plus linear algebra and a mathematics course covering probability. Two distinct topics will be presented: biostatistical computing and risk research methods. Computing techniques, numerical methods, simulation, and general implementation of biostatistical analytic techniques. Modelling of risk processes including design, sample size planning, bias control and multifactor prediction and analysis. Material presented will be illustrated in the laboratory. (F)

220B. Biostatistical Methods. (4) New course. Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 220A. Two distinct topics will be presented: survival analysis and clinical trials. Analysis of survival time data using parametric and non-parametric models, hypothesis testing, and regression. Analysis of survival data with covariates. Biostatistical concepts and models relevant to design, conduct, and analysis of clinical trials and prevention trials with human subjects. (T) To be given even-numbered years. (Brand

1On leave, spring
2Recalled to active service
3Recipient of Distinguished Teaching Award

225. Biometrical Data Analysis—Model Free Curve Estimation. (3-8) Three lectures and 2-12 hours discussion section per week. Prerequisites: 120A or consent of instructor. Generalized linear models and estimation methods. Multivariate data sets. (SP) Rappaport

226A-226B. Special Topics in Biostatistics. (1-3) New course. Consent may be given for credit. One to three hours of lecture/discussion per week. Prerequisites: 202A-202B or consent of instructor. Current issues in biostatistics. Topics will vary from term to term depending on student interest and faculty availability. Possible topics are bioassay, meta-analysis, compartmental models, biostatistical consulting, covariate structure models, bootstrap and jackknife methods, artificial intelligence techniques in biostatistics. (FSP) Redleaf

230A. Stochastic Processes in Biology and Health. (3) Three 1-hour lectures per week. Prerequisites: Mathematics 111 and 123; Statistics 101 or consent of Instructor. Probability generating functions; exponential-type distributions; branching processes; random walk; Markov chains; renewal processes; applications. (SP) Redleaf

230B. Stochastic Processes in Biology and Health. (3) Three 1-hour lectures per week. Prerequisites: 230A or consent of instructor. Poison processes; migration processes; population processes; epidemiological processes; Markov processes; random walks; queueing processes; simple illness-death processes; Kolmogorov differential equations and finite Markov processes; a general illness-death process; migration processes and birth-death processes; applications. (SP) Redleaf

231. Introduction to Multivariate Public Health Statistics. (4) Three 1-hour lectures and one 2-hour discussion section per week. Prerequisites: 120B or consent of instructor. Statistical inference employing multiple regression, multiple component models, discriminant analysis, analysis of covariance, and analysis of multivariate discrete data. (FSP) Redleaf

233. Theory of the Life Table and Competing Risks and Their Applications. (3) Three 1-hour lectures and one 1-hour discussion section per week. Prerequisites: Statistics 101 and 102, or consent of instructor. Description of the life table and its construction; statistical inference and theory of the life table; medical follow-up studies; a new life table for survival and stages of disease; population theory of competing risks; mortality and decrement life table; applications. (F) To be given even-numbered years. Chiang

234. Statistical Methods In Survival Analysis. (3) Three hours of lecture per week. Prerequisites: Calculus, matrix algebra, one year of mathematical statistics. Analysis of survival time data. Parametric and nonparametric models for data fitting and estimation. Regression models for censored data with covariates. Cox proportional hazards model. Accelerated time models; mixture and semi-Markov models. (SP) To be given even numbered years. Malani

240. Evaluation and Control of Airborne Chemicals. (3) Two 1-hour lectures per week. Prerequisites: Graduate standing in Environmental Health Sciences or permission of instructor. Principles of indoor air pollution assessment and control applied to chemicals in industry. Particular emphasis is placed upon interpretation of health standards, statistical monitoring strategies, and industrial ventilation. Emphasis primarily for students specializing in industrial hygiene. (F) Rappaport

241. Industrial Hygiene: Physical Agents. (3) Three hours of lecture per week. Prerequisites: 240. Noise, radiation, and heat as occupational hazards, including industrial hygiene evaluation and related damage-risk criteria. (SP) Rappaport

242. Characterization of Airborne Chemicals. (3) Two 1-hour lectures per week. Prerequisites: Graduate standing in Environmental Health Sciences or permission of instructor. Principles underlying the use of air monitoring methods in industry. Topics include: behavior of gases, vapors and aerosols, mechanisms of absorption and elimination of inhaled toxicants; methods for measuring airborne chemicals. Intended primarily for students specializing in indoor air and industrial hygiene. Topics include air monitoring methods, ventilation measurement, noise measurement, nonionizing radiation measurement. (SP) Rappaport

245. Indoor Air Pollution. (3) New course. Three hours of lectures per week. Prerequisites: Graduate standing or consent of instructor. Introduces the major pollutant classes of concern, describes pollution exposure, health implications of exposures, and investigates policy implications. Pollutants include: combustion products, tobacco smoke, radon, organic chemical and microbiological agents. (SP) Corona, Rappaport

246. Principles of Occupational Diseases. (2) Two hours of lecture per week. Prerequisites: Understanding of basic anatomy and physiology, or consent of instructor. Pathologic pulmonary responses: cardiovascular disease; effects of organic solvents, pesticides, and metals; disorders of the hematopoietic, musculo-skeletal, and reproductive systems; neoplasia, skin diseases, and occupational medical practices and administration of programs. (F) Seward

247. Chemical Risk Assessment. (3) New course. One 2-hour lecture and one 1-hour discussion per week offered as a 3-hour block. Prerequisites: BS 270 or concurrent enrollment in BEHS 253, BEHS 160, 260, or 284, BEHS 240. Covers the objectives, principles and methods for health risk assessment of occupational and environmental exposure to chemicals. Participants will conduct and report components of a health risk assessment for one chemical using animal and human data, and extrapolating risks to a low exposure scenario. (SP) A. Smith, M. Smith, Spear

250. Genetic Toxicology. (3) Two 1-hour lectures per week. Prerequisites: Consent of instructor: Principles of genetic toxicology with emphasis on methods of evaluation of genetic hazards from environmental chemicals. (SP) MacGregor

253. Environmental Toxicology. (3) Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Principles of toxicology applied, including molecular mechanisms of action. Emphasis is on current problems in health agencies at a state, national and international level. (SP) Reigold, Roberto, Werner

254. Chemical Carcinogenesis and Teratogenesis. (3) New course. Three hours of lecture per week. Prerequisites: 253 or consent of instructor. Overview of the mechanisms by which chemicals are thought to cause cancer and birth defects. Approximately four weeks (eight lectures) will be devoted to birth defects (teratogenesis). An up-to-date review of the latest theories will be given in light of the latest findings in biochemistry, cell biology and molecular biology. The importance of these findings for estimating human health risk will also be discussed. (SP) Smith

256. Environmental Health and Infectious Disease. (2) Two hours of lecture/discussion per week. Prerequisites: Elementary course in microbiology or consent of instructor. A survey of important infectious diseases associated with water, food, and vectors. Emphasis on research design, surveillance, distribution, and control. (F) Cooper

258. Toxicology Laboratory. (3) One hour of lecture followed by 7 hours of laboratory per week. Prerequisites: Graduate standing and 253 or consent of instructor. Experimental methods and techniques for evaluating the toxic properties of chemicals. Emphasis on chemicals of industrial importance. (F) M. Smith

259. Applied Algology. (3) Three hours of lecture per week. Prerequisites: Graduate or upper division standing in engineering, biology, or public health. Applications of microbiological systems to human needs. (SP) Stewart

260. Epidemiologic Methods. (3) Three 1-hour lectures per week. Prerequisites: 160 or an equivalent one semester course in epidemiology; 130A or concurrent enrollment or consent of instructor. Principles and methods of epidemiologic research; the epidemiologic approach to the definition of cases and controls; sampling, data collection, analysis, and inference. (F) Winkelstein

261. Current Problems in Epidemiology. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 3-hour lecture per week. Prerequisites: Comprehensive course in epidemiology and biostatistics. Guest lecturers and staff present their current research in epidemiology and related fields, emphasizing the bases for development of research programs, methods employed, and difficulties encountered. (SP) Reigold

262. Advanced Epidemiology. (3) Course may be repeated for credit. Two 1-hour lectures per week. Prerequisites: 260 and 130A or consent of instructors. Theory and application of epidemiology to common diseases of complex etiology. Students select two areas of concentration from several subject modules which are selected annually from current priority issues. Prerequisite required. (SP) Staff

263. Epidemiology and Control of Infectious Disease. (3) Three 1-hour lectures per week. Prerequisites: Prior degree or courses in biomedical sciences and consent of instructor. A discussion of major infectious diseases with emphasis on disease surveillance, investigatory procedures, and prevention programs. Emphasis is on current problems in health agencies at a state, national and international level. (SP) Reigold, Roberto, Werner

264. Occupational Epidemiology. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor: Principles and methods of epidemiology for the design, execution and analysis of occupational health studies, and for occupational health monitoring and surveillance programs. (F) A. Smith

268. Social Epidemiology. (3) One 3-hour lecture/discussion per week. Prerequisites: Consent of instructor. The central focus of this course is a critical review and discussion of social and psychological factors that affect the distribution of disease in populations. The course will cover those risk factors that have been studied most extensively with special attention to methodologic and research design issues, problems in definition and assessment, and problems of confounding. Detailed attention will also be directed toward the role of link psychosocial factors and physiologic function. (SP) Syme

267. Topics in Disease Surveillance. (2) One 2-hour session per week. The course will focus on various ways of doing surveillance for infectious and non-infectious diseases; how the reasons for doing surveillance influence the type of surveillance system selected; and how to evaluate whether or not a given surveillance system is providing the data needed to meet various
goals. Because disease surveillance is integral to and for the basis of a diverse range of epidemiologic studies, the course will also explore in detail the impact of various biases in surveillance data on the conclusions derived from such studies. (F) Reingold

286. Genetic Epidemiology. (2) One 2-hour lecture per week. Prerequisites: 260 or 264. This course covers the environmental and genetic factors influencing the onset of disease. Students will examine the relationship between genetic and environmental influences on disease. (SP) Smith

289. Advanced Occupational and Environmental Epidemiology. (3) Three hours of lecture per week. Prerequisites: 260 or 264. This course covers the epidemiological methods for designing, conducting, and interpreting epidemiological studies of persons occupationally or environmentally exposed to chemical and physical agents. The course builds on material in the course 264, but 260 is sufficient as a prerequisite. (SP) Smith

292. Advanced Epidemiological Techniques. (3) New course. Three hours of lecture per week. Prerequisites: 260, 223, and 231 or consent of instructor. Advanced treatment of epidemiologic techniques, regression methods for epidemiologic data: logistic proportional hazard and survival analysis. Analysis of time-dependent epidemiologic data analysis, analysis of cohort data; epidemiologic data sources, computer methods and computer implementation of analytic techniques. (SP) Sensabaugh

296. Special Topic 1. (1-8) Course may be repeated for credit. Individual conferences. Prerequisites: Qualification as student in biostatistics or environmental health sciences. Designed to permit any qualified student to pursue special study under direction of a faculty member. (F,SP) Staff

297L. General Seminar in Biostatistics. (5-1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar given once a month. Prerequisites: Consent of instructor. Round table discussion of current issues and recent developments in the field of biostatistics. Students who do extra work can take the course for 1 unit. (F,SP) Sensabaugh

298. Group Study. (1-8) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of instructor. Supervised field experience. Regular meetings with faculty are required. (F,SP) Staff

270. Outbreak Investigation. (2) New course. One 1-hour session per week plus field work. Prerequisites: Consent of instructor. The course will teach students how and why clusters of illnesses and epidemics are investigated. In the weekly seminar methods and approaches required for such investigations will be discussed in detail, using published articles from scientific literature to provide examples. Field work, to be conducted from time to time, will involve investigation of actual outbreaks and clusters in conjunction with nearby county health departments and under the supervision of the instructor. (F,SP) Reingold

281. Advanced Forensic Science: Physical Aspects. (4) One 2-hour lecture/discussion and three 3-hour laboratories per week. Prerequisites: Consent of instructor. Detailed analysis of advanced procedural and interpretative problems in forensic science. Focus on problems of a physical nature. (F) Thornton

282. Advanced Forensic Science: Biological Aspects. (4) One 2-hour lecture/discussion and three 3-hour laboratories per week. Prerequisites: Consent of instructor. A detailed analysis of advanced procedural and interpretative problems in forensic science with a focus on problems of a biological nature. (SP) Sensabaugh

284. Forensic Pathology. (2) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour lecture per week. Prerequisites: Senior or graduate standing. Aspects of medicolegal investigations, including sudden and unexpected natural death, time of death, characterization of injuries, analysis of medicolegal evidence, post-mortem examination, the medical examiner system. Required of candidates for the Ph.D. (SP) Sensabaugh, Herman, Rogers, Van Meter

295. Seminars. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Topics to be announced. (F,SP) Staff

296C. Epidemiology/Biostatistics Seminar. (1-4) New course. Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Open to students who have completed the Epidemiology/Biostatistics degree program. Offered each semester to MPH students in the major. Course content will vary from semester to semester. (F,SP) Selvin, Winkelstein

295S. Current Topics in Forensic Science. (1) New course. Course may be repeated for credit. One 2-hour session per week. Prerequisites: Graduation standing in department or consent of instructor. Discussion of current topics in forensic science. (F,SP)

298L. Genetic Epidemiology. (2) One 2-hour lecture per week. Prerequisites: Upper division or graduate courses in epidemiology, genetics or human genetics, and one of the following: (1) Consent of instructor. Design and analysis of a genetic or genetic-epidemiological study. (2) Consent of instructor. Design and analysis of a genetic study. (F,SP) Staff

299. Advanced Epidemiological Techniques. (3) New course. Three hours of lecture per week. Prerequisites: 260, 223, and 231 or consent of instructor. Advanced treatment of epidemiologic techniques, regression methods for epidemiologic data: logistic proportional hazard and survival analysis. Analysis of time-dependent epidemiologic data analysis, analysis of cohort data; epidemiologic data sources, computer methods and computer implementation of analytic techniques. (SP) Sensabaugh

300L. Instructional Techniques in Biostatistics. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirements for a master's degree. (F,SP) Staff

302. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

300L. Instructional Techniques in Biostatistics. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 238. Environmental Design: Stress and Health. (3) One 3-hour lecture/discussion per week. Prerequisites: Consent of instructor: Interdisciplinary course to explore the influence of selected aspects of the physical and social environment on health. Among topics to be discussed are density and crowding, migration, urban and rural residence, and stress as they influence health and disease. Sponsoring departments: Biomedical and Environmental Health Sciences and Architecture. (SP) Syme

IDS 282. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and discussion per week. Prerequisites: Consent of instructor: Reviews and reports of current research in tumor biology. Sponsoring departments: Biomedical and Environmental Health Sciences, Zoology, Physiology, and Microbiology. (F,SP)

*Not offered 1968-69
On leave, spring, fall
3On leave, spring
4On leave, active service
5Recipient of Distinguished Teaching Award

Biophysics and Medical Physics

(College of Letters and Science)

Department Office: 103 Donner Laboratory, 442-4031 Chair: W. Geoffrey Owen, Ph.D.


Assistant Professor:

John C. Owicki, Ph.D. Cornell University. Membranes, immunology.

Assistant Professor:

William S. Blaisle, Ph.D. University of California at Berkeley. Theoretical issues in biophysics.

Professors:


Major Advisers: Mr. Alpen, Mr. Beadman, Mr. Blaisle, Mr. Breiermann, Mr. Glaeser, Mr. Lear, Mr. Mel, Mr. Mortimer, Mr. Nichols, Mr. Owen, Mr. Owicki, Mr. King.

The courses of the department are designed to meet several objectives: (1) to prepare students for advanced work in biophysics, medical physics, and allied fields; (2) to offer for physical science and engineering students selected topics and concepts of biological sciences; and (3) to provide students from biological departments with an introduction to some of the quantitative physical problems and approaches in biology and medicine. Courses 10 and 12 are designed to provide background and perspective in their specified fields.

The Major

The department offers two majors: Biophysics and medical physics. The biophysics major is designed to serve as preparation for graduate study in biophysics and related disciplines, and is also appropriate preparation for students interested in the health and medical sciences. The program consists of a comprehensive background in physics, mathematics, and medical sciences, coupled with core courses in biophysical subject areas which include genetic information and control, protein structure and function, biomembranes and neural networks, and biological energy flow and transduction. The medical physics major provides biologically-oriented students with a background in physics, chemistry, mathematics, and biology, as well as an introduction to some of the quantitative physical problems and approaches in biology and medicine.

Major Requirements

Biophysics

Lower Division. Physics 1A-7B-7C; Chemistry 1A-1B, 8A-8B; Mathematics 1A-1B, 50A-50B; Biology 1A; Chemistry 14.

On leave, spring
On leave, active service
Recipient of Distinguished Teaching Award
Upper Division. Biochemistry 102; two courses from the following: Physics 110A-110B, 112, 124, 137A-137B, or 141A-141B; Biophysics 101, 102, and 111 or 131; one of the following is recommended: Biophysics 123 or any graduate course in Biophysics; also recommended are one upper division course in general physics, one upper division course in physical science, biological science, biophysical science, mathematics, or other related courses, as approved by the academic advisor.

Medical Physics Option

Lower Division. Physics 8A-8B; Chemistry 1A-1B, 8A-8B; Biology 1A-1B; Mathematics 16A. Recommended elective: Biophysics 10 or 12.

Upper Division. Chemistry 130A-130B; Statistics 131A or Biophysics 102; Biophysics 130 and 131; one course from the following: Genetics 102, Molecular Biology 100A; one course from the following: Zoology 104, Physiology 101; additional upper division courses in physical science, biological science, and biophysical science or related courses, as approved by the academic advisor.

Course Substitutions. Under exceptional circumstances and with the permission of the department chair, a student may be allowed to take more than two substitutions in the required courses if such changes are deemed necessary and advisable.

Honors Program. Admission to the honors program in biophysics or medical physics is contingent upon a student’s attaining senior standing with a grade-point average of 3.5 or better on all University work and a grade-point average of 3.0 or better in the courses taken in the major. In addition to completing the normal requirements of the major, the honors student is required to participate in the Honors Journal Club for at least three hours per week and to write a thesis on research performed in Biophysics H195A-195B.

Graduate Program

This program is administered by a campus-wide interdepartmental group which was organized to permit students interested in biophysics to graduate training primarily leading to the M.A. in Biophysics, and the Ph.D. in Biophysics or Medical Physics. Students interested in research in biophysics may work under the supervision of any faculty member belonging to the group without having to pursue other graduate programs offered by the department with which the faculty member is affiliated.

Undergraduate students interested in pursuing graduate work in biophysics should acquire training as undergraduates in the basic physical and biological sciences deemed necessary for the major. These requirements are described below and major requirements that have been removed during the early stages of graduate study.

Further information is available from the Group Office, 101 Donner Laboratory, 642-0379.

Lower Division Courses

10. Atoms, Radiation, and Life. (3) Three hours of lecture and one hour of discussion per week. Basic aspects of atomic radiations with examples from biomedical and physical fields. Provides liberal arts as well as science students with a framework for evaluating phenomena; mass and energy flow in living systems; biomechanics of motion; fluid dynamics and blood flow; feedback and control of biological processes; electrical behavior of excitable cells; the biophysics of sensory processes; vision and auditory detection and response. (F) Nichole

11. Radiation Biophysics. (4) Three hours of lecture and three hours of discussion per week. Prerequisite: Physics 8B, Chemistry 1B. Principles of ionizing and non-ionizing radiation; principles of applications of radiation to biological investigation and to medical diagnosis; effects of radiation dose and its effect on molecular, cell, whole organism, and population levels of biological organization. (SP) Alpen

12. Origin and Evolution of Life. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: High school biology and physics or chemistry. Formation and evolution of the universe; chemical and physical conditions of the early Earth; current thinking on origins of life; development of living organisms. (SP) Blumenau, Jukes

99. Individual Study and Research for Lower Division Undergraduates. (1-2) Course may be repeated for credit. Must be taken on a pass/​no pass basis. Prerequisites: Approval of S or better and prior consent of instructor. Individual course of study and research. A course for lower division students who wish to undertake a program of individual inquiry initiated jointly by the students and a professor. Approval by the chairman of the department must be obtained on a basis of a written proposal. (F,SP)

101. Macromolecular Biophysics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 7C, Mathematics 204A-204B, Chemistry 14, and Biology 1A-1B. The structure and function of biological macromolecules are examined. Topics include: nucleic-acid and protein structure and dynamics by crystallographic and spectroscopic methods; the biophysics of replication, transcription, and translation; allosteric interactions. (F) Mortimer, Brememann

202. Cell Biophysics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 7C, Mathematics 204A-204B, Chemistry 14, and Biology 1A-1B. Biophysical analysis of cellular functions. Includes membrane transport, the physics of bioenergetics, excitable membranes, muscle function, sensory transduction, and cell motility. (SP) Glaesser, Owicki, Locar

211. Molecular and Cellular Radiobiology. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Interactions of electromagnetic radiations and charged particles with matter; radiation chemical lesions induced by radiation; actions of radiations on enzymes, viruses, and bacteria: biophysical models for mutation and lethality. (SP) Tobias

221. Mathematical Models and Methods in Biology. (3) One hour of discussion per week. Prerequisites: Mathematics 204A-204B and Biology 1A-1B, or consent of instructor. The art of mathematical modelling. Selected examples from population dynamics, epidemiology, physiology, and neurobiology. Other topics according to student interests. (SP) Brememann

224. Mathematical Modeling of Biological Systems. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Calculus and differential equations 141-142, or consent of instructor. The art of rendering the essential features of biological systems in mathematical language. Topics include: morphogenesis at the cell and tissue level, circadian rhythms, population dynamics, and evolution. Other topics according to student interest. Emphasis is on biologically realistic models. (F) Oster

240. Advanced Topics in Physical Optics and Crytalography. (1) New course. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1 1/2-hour meeting per week. Prerequisites: Consent of instructor. A combination of didactic presentations and informal discussions of methods and theory in optical physics and diffraction, as applied to crystallography of biological and inorganic materials. Focus on new developments, with the development of suitable background. (F) Glaesser

241. Advanced Topics in Structural Biology. (1) New course. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1 1/2-hour meeting per week. Prerequisites: Consent of instructor. Formal lectures surveying the current interests and new results of research programs in structural biology at Berkeley. (F) Glaesser

280. Topics in Mathematical Biology. (1-3) Course may be repeated for credit. One to three hours of seminar per week. Seminars on topics of interest to students. (F,SP) Staff

299. Seminar. (1-3) Course may be repeated for credit. One to three hours of seminar per week (one unit per hour per week) providing more intensive coverage of selected subjects in biophysics than in regular lecture courses. Requires graduate student along with faculty participant in presenting seminar material. Several hours per week. Prerequisites: Consent of instructor. Enrollment in more than one section is permitted. List of offerings to be announced each semester. (F,SP) Staff

295. Special Topics in Biophysics and Medical Physics. (1-3) Course may be repeated for credit. One to three hours of lecture per week. Lecture courses at advanced level offered as result of current interests of faculty and graduate students. Recent topics have included: electron spin resonance of biomolecules, tumor

Characterization of cell membranes and lip-proteins by physical methods. Systems to be studied include: myelin, erythrocyte, thyloid, and purple membranes; lipid bilayers; model biological membranes. Analytical methods include: electron microscopy, diffusion techniques, magnetic resonance, fluorescence photobleaching recovery, statistical mechanics. Discussions will be set up for use in preparation of papers from the research literature by the students. (F) Owicki
biology-diagnosis therapy, biological energy conversion processes, scanning electron microscope in biology, chemical imaging, three-dimensional image reconstruction, and views of cancer. (F,SP) Staff

288. Supervised Laboratory Research. (1-6) Course may be repeated for credit. Prerequisites: Graduate standing. Supervised lab research in preparation for advancement to candidacy. (F,SP) Staff

289. Research Seminars. (7-9) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to three hours of seminar per week. Research group seminars in fields of biophysical research currently being investigated by departmental faculty members. Listing of continuing and new offerings to be announced each semester. (F,SP) Staff

290. Individual Research: Biophysics and Medical Physics. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual research. (F,SP) Staff

601. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study for the comprehensive or language requirements in consultation with the field advisor. Units may not be used to meet either a language requirement or a master's degree. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. Not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

299. Individual Research: Biophysics and Medical Physics. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual research. (F,SP) Staff

Interdepartmental Studies Courses

Graduate Courses

200A. Cellular Neurobiology. (3) Two 1 1/2-hour lectures per week. Prerequisites: Chemistry 1B, Mathematics 1B, Physics 68, and an introductory neurobiology course. Physico-chemical basis of membrane potentials, electrotonus, action potential generation and propagation, synaptic transmission, sensory receptor function, and vision. Physiology of neurons in specific regions of the nervous system. (F,SP) Staff

200L. Neurobiology Laboratory. (3) Five 2-hour laboratories per week plus one 3-hour seminar per week. Prerequisites: IDS 200A and 200B (200A may be taken concurrently) or consent of instructor. Intended to provide the graduate and advanced undergraduate student with a working knowledge of current anatomical, physiological and biochemical techniques in neurobiology through demonstrations, exercises, and individual research problems. Topics include synaptic transmission, excitable membranes, sensory receptor, and circuits of neurons generating behavior. Sponsoring departments: Physiology-Anatomy, Biophysics and Medical Physics, and Zoology. (F) Staff

205. Systems and Integrative Biology. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 2-hour seminars/lecture every other week. Prerequisites: Graduate standing in Biophysics, Bioengineering, Nutritional Sciences, or Physiology. Presentation and discussion of current research in integrative, developmental, and regulatory biology. Emphasis on interdisciplinary communication and approaches. Sponsoring departments: Biophysics and Medical Physics, Nutritional Sciences, Physiology-Anatomy. (SP) Staff

IDS 493. Physiological Instrumentation. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two-hour laboratory per week. Prerequisites: Course standing or consent of instructor. Topics will cover problems in the detection, amplification, and recording of bioelectric phenomena; together with the use and design of transducers. Sponsoring departments: Physiology, EECS, and Biophysics. (SP) Staff

Bioresources Sciences

(College of Natural Resources)

Department Office: 216 Wellman Hall, 642-6690

Major Advisers: Natural Resource emphasis, John Doyen, 217 Wellman, Denis Hulman, 150 Hilgard, Robert Reabe, 147 Hilgard, Loy Volkman, 350 Hilgard. Animal Science emphasis, Clarence Weinmann, 414 Wellman, Harvey Doner, 125A Hilgard, Robert Lane, 411 Wellman; Steven Lindow, 227 Hilgard; Rudolph Pipa, 319 Wellman; Norman Terry, 8 Giannini.

Group Major in Biological Sciences

(See also the Field Major in Biological Sciences, discussed under the Department of Biology.)

This major program provides an interdisciplinary study of the biology of renewable natural resources and involves faculty and courses from numerous departments within the college. At the lower division level, the major calls for the traditional strong foundation in natural sciences that is characteristic of most major programs in the biological sciences. At the upper division level, students in the program elect either one of two areas of emphasis.

Emphasis on Natural Resources. The focus of this emphasis is on breadth. Selection of at least one course from each of eight distinct subject areas and wide choice of upper-division biology and in natural resources are specific advantages of this emphasis, which provides a broad background in the biological sciences and an excellent preparation for pre-med and graduate and professional studies in many allied biological sciences.

Emphasis on Animal Science. This emphasis provides a broad background in the scientific disciplines that underlie studies in veterinary medicine. It also serves as excellent preparation for graduate work in zoology or other animal sciences. Students are expected to gain an understanding of interest within animal sciences and their resources and sciences. The major adviser or the dean's office in Student Affairs should be consulted about specific courses on the Berkeley campus that fulfill preprofessional requirements.

Biostatistics

(College of Letters and Science)

Group Major Office: 101 Haviland Hall, 642-3241

Co-chairs: Nicholas P. Jewell, Ph.D.; Lucien Le Cam, Ph.D.

Professors:

Richard J. Brand, Ph.D., University of California at Berkeley. Risk research, clinical trials
Leo Breiman, Ph.D., University of California at Berkeley. Computer-oriented multivariate methodology
David R. Brillinger, Ph.D., Princeton University
Keith A. Doks, Ph.D., University of California at Berkeley.

Nonparametrics, survival analysis
David A. Freedman, Ph.D.
Joseph L. Hodges, Ph.D.
Nicholas P. Jewell, Ph.D., University of Pennsylvania.
Sampling and survival analysis
Mary-Claire King, Ph.D., University of California at Berkeley.

Biostatistics, epidemiology
Michael J. Klass, Ph.D.
Lucien Le Cam, Ph.D., University of California at Berkeley.

Asymptotics
Elizabetd L. Scott, Ph.D., University of California at Berkeley.

Applications of statistics in the sciences

*Not offered 1988-89
1 On leave, spring, fall
2 On leave, fall

Steve Selvin, Ph.D., University of California at Berkeley.

Data analysis of epidemiologic problems
Charles J. Stone, Ph.D., Stanford University.
Nonparametric statistics
Michael E. Porter, Ph.D., University of California at Los Angeles.

Computational methodology
Cornellius Tobias, Ph.D., University of California at Berkeley.

Statistical methodology
Warren Winklenn, Jr., M.D., M.P.H., Syracuse University.

Ecology, center, AIDS
Clyde G. Cooper, Ph.D., Sc.D., Johns Hopkins University.

Cancer epidemiology, survival patterns

Chen Long Chiang, Ph.D., University of California at Berkeley. Stochastic processes, life tables

P.K. David, Ph.D., F.I.M.S., University of London.

Combinatorics, spatial patterns

Evan, R. Dempster, Ph.D., University of California at Berkeley. Population and quantitative genetics

W.G. Reeves, Ph.D., M.P.H., Emeritus, University of California at Berkeley. Virus-mosque viruses and organisms

Assistatn Professors:

Hina M. Menter, University College London. Survival analysis, biossostics

William J. Redfearn, Ph.D., University College London. Factor analysis models and the moment of moments

Graduate Advisers:

Mr. Brand, Mr. Jewell, Mr. Le Cam, Ms. Menter, Mr. Redfearn, Mr. Selvin.

Graduate Programs and Degrees

The Group in Biostatistics offers two graduate programs: M.A. and Ph.D. These programs are appropriate for students who have either a strong mathematical and statistical background and an interest in the biomedical sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information, consult the group's main office.

The M.A. degree can be obtained under Plan I or Plan II, but students may proceed directly to the Ph.D. program without obtaining the M.A. degree. The Ph.D. dissertation is administered according to Plan B.

Preparation for Graduate Study

Some entering students will not be adequately prepared in mathematics, statistics, and the subject matter areas. Some prerequisites, however, can be made up during the first year of graduate study. Minimum entrance requirements consist of two full-year courses in calculus and one-year courses in mathematical statistics or biostatistics.

Research Facilities

Graduate students in the group have direct access to a variety of specialized computers as well as the services of the University Computer Center. Research activity in the faculty currently focuses on methodological areas of biostatistical computing, environmental health and epidemiology. Projects in these areas provide opportunities for both practical experience and individual research. Cooperation

*Recipient of Distinguished Teaching Award

*Not offered 1988-89
1 On leave, spring
2 On leave, fall
other departments allows the possibility of unusually broad and effective training in both theoretical and applied directions.

Courses of Instruction

A wide variety of appropriate courses from a number of departments is available to candidates for either the M.A. or the Ph.D. degrees, giving both programs considerable flexibility. Such flexibility allows students in consultation with the major professor and graduate adviser to arrange their own program. See Biomedical and Environmental Health Sciences and Statistics for some of the course listings.

Botany
(College of Letters and Science)

Department Office: 2017 Life Sciences Building, 642-6712

Professors:
Herbert G. Baker, Ph.D. University of London. Evolution and ecology
W. Zachariah Cande, Ph.D. Stanford University. Cell and developmental biology
O Neill R. Collins, Ph.D. University of Iowa. Mycology
Russell J. Jones, Ph.D. University College of Wales. Plant physiology
Donald R. Kaplan, Ph.D. University of California at Berkeley. Genetics of vascular plants
Watson M. Laatsch, Ph.D. Stanford University. Experimental morphology
Robert Emmott, Ph.D. University of California at Berkeley. Systematics. Plant reproductive biology
Roderic B. Rehan, Ph.D. California Institute of Technology. Molecular biology
John A. Rees, Ph.D. University of Washington. Physiology
Lincoln C. Constance, Ph.D. (Emeritus) University of California at Berkeley. Systematics. Plant reproductive biology
Herbert L. Massey, Ph.D. (Emeritus) University of California at Berkeley. Systematics and phytophagy

Associate Professors:
Thomas O. Dungan, Ph.D. University of Michigan. Taxonomy, computer-assisted methods in systematics
Lewis J. Fieldman, Ph.D. Harvard University. Plant growth/development
William G. Gilreath, Ph.D. University of Bonn. Molecular biology
Rudolf Schmidt, Ph.D. University of Michigan. Comparative morphophysiology, Systematics
John W. Taylor, Ph.D. University of California at Davis. Mycology, evolution of fungi

Adjunct Assistant Professor:
Sarah Hale, Ph.D. Washington University. Developmental genetics

University and Jepson Herbaria

Research Botanists:
Lawrence E. Heckard, Ph.D. University of California at Berkeley. Systematics. Marine algae
Paul C. Silvers, Ph.D. University of California at Berkeley. Systematics. Marine algae
Alan R. Smith, Ph.D. Iowa State University. Systematics and evolution. Systematics
John L. Kreh, Ph.D. Texas A&M University. Systematics (Compositae, especially of Chilipepper)

Specialists:
James G. Heiden, Ph.D. University of Oregon. Systematics (euphorbiaceae, especially Senecionaceae)
Isabelle Tavares, Ph.D. University of California at Berkeley. Systematics (labiatae, Urena

Botanical Garden
Principal Museum Scientist:
James Allensworth, Ph.D. University of Michigan. Systematics (iridaceae)

Undergraduate Major Advisers: Mr. Baker, Mr. Feldman.
Graduate Advisers: Mr. Collins, Mr. Dungan, Mr. Feldman, Mr. Grulissem.

The Major

The major in botany is designed to acquaint undergraduates with the fundamental aspects of plant sciences with the opportunity to pursue detailed study of areas of special interest. At the lower division level, undergraduates are expected to acquire a broad foundation in the physical and biological sciences both as a basis for advanced study at the upper division level and as a reasonable introduction to the breadth and diversity of scientific inquiry. At the upper division level, the department offers courses in the areas of structural, systematic, ecological, physiological, cellular and molecular botany. These courses introduce a variety of approaches to the study of plants utilizing concepts from the molecular level to the community level of organization. Knowledge of each of these areas is sufficiently important for the development of a broad perspective of botany that undergraduates are required to take courses in each. On the basis of these required courses, students have the opportunity to pursue one or two of these areas in more detail through elective courses from the departmental curriculum or through courses offered in other departments or colleges.

Lower Division Courses

Botany 101, 102, Genetics 102 or 105; Botany 100 (recommended that this course be taken during fall semester of junior year); Botany 101, or 102, or 120; Botany 105, or 110, or 112; Botany 145; Botany 154, 154E; electives approved by adviser as needed to obtain 30 upper division units.

Honors Program

With the consent of the major adviser, students with an overall grade-point average of 3.3 or higher, subject to a maximum of 3.3 or higher in courses in the major may arrange an individual program of special study (a minimum of two semesters of Botany H195 with at least 1 unit per semester) to begin no later than the first semester of their senior year. Students in the honors program must submit a paper summarizing the research work done and pass an oral comprehensive examination.

For detailed requirements on the major and on the honors program see the departmental undergraduate secretary.

Preparation for Graduate Study

Students planning to study for the Doctor of Philosophy under members of the faculty of the Department of Botany at Berkeley are encouraged to include in their undergraduate programs the following subjects: general botany and zoology or biology, comparative morphology of lower and higher plants, plant physiology, genetics, general and organic chemistry, biochemistry, calculus, general physics, and a firm foundation in at least one language (German, French, Russian, or Spanish). These students are expected to work on the physiological aspects of plant science should include, in addition to the above, a grounding in thermodynamics and physical chemistry. Minor deficiencies in the above subjects may be filled after admission to the Graduate Division. Detailed information on the graduate program in botany will be sent upon request. Address inquiries to the Graduate Admissions Officer, Department of Botany, University of California at Berkeley, Berkeley, CA 94720.

Graduate Program

The purpose of the graduate program in botany is to train students as professional botanists to act as instructors and investigators in basic areas of plant science. This is accomplished in four ways. First, each student is expected to acquire a basic botanical background equivalent to that required of undergraduates at Berkeley. This includes training in structural, systematic, ecological, physiological, and cellular botany. Second, each student will take two courses and seminars in botany and related fields at the graduate level in their area of specialization in the Botany Department or related departments as determined by consultations with departmental advisers. Third, students are expected to develop a program of research in the areas of expertise under the direction of a faculty member in the department. Fourth, each student is required to develop teaching skills through two semesters of teaching as a student assistant in courses in the Botany or Biology Department. Student progress toward these goals will be determined by yearly reviews of progress in research as evidenced by progress toward the completion of the doctoral thesis.

Students should note that faculty of the department of Botany are members of several graduate groups described in appropriate bulletins of the Graduate Division. Students may pursue group programs with a faculty member of botany as their major professor.

For further details on the requirements for the M.A. and the Ph.D. degrees, as well as the facilities available for graduate study in botany, please consult the graduate advisers and the "Guide for All New and Continuing Graduate Students," available through the graduate secretary.

The Botanical Garden in Strawberry Canyon provides opportunities for research with living plants, supplies teaching material for courses on campus, and serves as an outdoor laboratory for students; its collections are especially rich in succulents, South American, South African, European, and Australian plants. The combined University and Jepson Herbaria offer a world-wide, floristic, reference-research collection and library that form a foundation for basic research in systematic botany, ecology, phytogeography, and evolutionary biology. The library is used not only for faculty, but also for visiting scholars and for biologists throughout the United States and other countries. For further information on the Botanical Garden, see index.

Courses and Seminars

Courses and seminars are listed below. Instructor lists, semester offerings, and schedule changes are available at the department office, 2071 Life Sciences Building.

Lower Division Courses

10. Plant Biology. (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: Open without prerequisite to all students and designed for those not specializing in the biological sciences. Emphasis of the course is placed on the fundamental concepts of biology illustrated by the structure and function of plants. (SP)

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: GPA of 3.4 or greater. Lower division independent study and research intended for the academically superior student. Enrollment only with prior approval of faculty adviser directing the research. (F,SP)

Upper Division Courses

100. Diversity of Plants and Fungi. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Biology 1A-1B, Botany 101, or 102; Botany 100 recommended. General biology of plants and various topics in the plant and fungal kingdoms. (F)

101. Survey of Mycology. (4) Two 1-hour lectures and two 3-hour laboratory periods per week. Prerequisites: Biology 1A-1B; Botany 100 recommended. Selected aspects of fungi: their structure, reproduction, physiology, ecology, and genetics; their role in plant disease, human welfare, and food production. Several field trips and one day trip to a mushroom farm; the students will have an opportunity to discuss a mushroom foray. (F)

102. General Botany. (4) Two 1-hour lectures and one 4-hour laboratory per week plus two or three half-hour lectures. Prerequisites: Biology 1A-1B; Botany 100 recommended. General biology of freshwater and marine algae including both phytoplankton and benthos. Emphasis is on morphology, phylogeny, and genetics. Laboratories include study of repre-
sented types, identification of field-collected specimens, techniques for culture, simple experiments on differentiation and reproduction, and economic uses of algae. (F) West

105. Principles of Plant Morphology. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Biology 1A-1B; Botany 100 recommended. An analysis of the structural diversity of multicellular plants, with emphasis on the developmental mechanisms responsible for this variation in form and the significance of this diversity in relationship to the environments in which the plants grow. (SP) Kaplan, Schmid

110. Evolutionary Morphology of Land Plants. (3.5) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Biology 1A-1B; Botany 100 recommended. An analysis of the evolution and comparative morphology of vascular plants studied from the viewpoint of both fossil and living representatives. Schmid

112. Anatomy of Vascular Plants. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Botany 100 and Biology 1A-1B. A consideration of the functional and developmental aspects of cell, tissue, and organ structure, including their adaptations to ecological factors such as pollution, deserts, and water availability. (F) Kaplan, Schmid

115. Plants and Civilization. (3) Students who have taken Botany 15 will receive no credit for 115. Two 1-hour lectures and two hours of demonstration per week. Prerequisite: High school or college botany or horticulture. Man's selection and use of plants for his own purposes and the interrelation between the evolution of domesticated plants and the cultural evolution of man. West

117. Cocoa Agriculture and Technology. (4) Two 1-hour lectures and one 4-hour laboratory per week; two 1-day field trips are required. Prerequisites: Major in biological sciences or related fields or consent of instructor. The history, botany, agriculture, technology, economics, nutrition and culinary aspects of cocoa. (F) West

120. Systematics of Vascular Plants. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Botany 100 and Biology 1A-1B. Lectures on phylogeny, principles, techniques, and history of botanical systematics and the major groups of vascular plants and their evolution. Laboratories devoted to a survey of seed plant families and an introduction to taxonomic techniques. (SP) Staff

125. Introduction to California Plant Life. (2) Two 1-hour lectures per week. Prerequisites: Must be taken concurrently with 127. The relation of California plants and plant communities to soils, climate, and the geologic history of California. A review of use of keys and identification of the native and introduced members of the California flora. (SP) Staff

127. Laboratory in California Plant Life. (2) Formerly part of 125. Two 3-hour laboratories per week. Survey of major California plant families and the use of keys in identification of the native and introduced flowering plants, conifers, and ferns of the state. Must be taken concurrently with 125. (SP) Staff

128. Horticultural Methods in the Botanical Garden. (1) New course. Must be taken on a pass/no pass basis only. Permission of instructor: Consent of Instructor: An introduction to horticultural techniques utilizing the diverse collections of the University Botanical Garden. (SP) Omdull

129. The Botanical Garden. (2) Must be taken on a pass/no pass basis. One hour of lecture and one 4-hour laboratory per week. Prerequisites: Consent of instructor. An introduction to the collections, facilities, and programs of the University Botanical Garden. Special emphasis on curatorial, managerial, and administrative methods. (F) Omdull

130. Plant Cell Biology. (4) Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: Biology 1A-1B. A synthesis of morphological, biochemical, and genetic information on cell function, structure, and development with special emphasis on the plant cell. (F) Candia

138. Plant Molecular Biology. (4) Three 1-hour lectures and 1-2 hours of discussion per week. Prerequisites: Biology 1A-1B, Bio 110, 112, 116, 117. An examination of prokaryotic and eukaryotic plant cells with emphasis on structure and function of nucleic acids, and the expression of the plant genome. (SP) Fischer, Gruissem

145. Plant Physiology. (4) Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: Biology 1A-1B, Bio 110, 112. A study of the physiology and regulation of higher plants, with emphasis on water relations, ion uptake, and developmental physiology. (F) Jones

147. Problems in Plant Physiology. (2) Two 1-hour lectures and one hour of discussion per week. Prerequisite: Consent of instructor: A discussion of current topics and applications relating to the biochemistry and physiology of plants. Emphasis will be placed on the exploration of current research in the field of plant physiology and biochemistry. Feldman, Jones

154. Plant Ecology. (2) Two 1-hour lectures per week. Prerequisites: Biology 1A-1B. A general consideration of the principles of plant ecology at the levels of organisms, populations, and communities. Topics include plant-water relations and carbon balance, plant-animal interactions, population dynamics, and community structure and development. (SP) Staff

154L. Laboratory in Plant Ecology. (2) One 4-hour laboratory per week and two or three 1-day field trips. Prerequisites: 154 (may be taken concurrently). Laboratory for 154 (Plant Ecology). (SP) Staff

H185. Special Study for Honor Candidates. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Consent of instructor; senior standing. 3.0. Enrollment is restricted by the regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Consent of instructor; senior standing. 3.0. Enrollment is restricted by the regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

201. Biology of the Lower Fungi. (4) One hour of lecture, one hour of discussion, one 4-hour laboratory, and one 2-hour laboratory per week. Prerequisites: 101. Current concepts in basic and applied aspects of systematics, development, and reproduction of Ascomycota, Zygomycota, Oomycota, Chytridiomycota, and Deuteromycota (Fungi Imperfecti). Taylor

202. Biology of the Slime Molds and Higher Fungi. (2) Two 1-hour lectures per week. Prerequisites: 101. Myxomycota, Deuteromycota (in part), and Basidiomycota. Colella

202L. Laboratory in Biology of Slime Molds and Higher Fungi. (2) One 4-hour laboratory per week. Prerequisites: 202 (may be taken concurrently). Laboratory for 202 (Biology of Slime Molds and Higher Fungi). Laboratory exercises on systematics and genetics of slime molds and basidiomycetes. One independent research project is required of each student, in addition to the regular exercises. Colella

203. Current Topics in Genetic Mycology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Consent of instructor. Advanced study in mycology. Topics will be announced in advance of each semester. Taylor, Collins

206. Experimental Phycology. (4) Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: 102, or consent of instructor. Emphasis on experimental studies on marine algae, including consideration of principles and methods for axenic and unialgal culture as well as control and development of experiments. Experimental studies on marine algae: culture methods, photosynthetic analysis (field and laboratory), polysaccharide and pigment analysis, control of development and reproduction. (F) West

207. Topics in Phycolology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Consent of instructor for undergraduates; open to all graduate students. Specific topic to be announced in advance each semester. These may be on the physiology, biochemistry, ecology, morphology, anatomy reproduction, and economic uses of marine and freshwater algae. (SP) Gruissem

210. Scientific Photography—Theory and Methodology. (2) One hour of lecture and one 3-hour laboratory demonstration per week. Prerequisites: Graduate standing or consent of instructor. An introductory study to basic principles and the equipment for scientific photography (including darkroom work, flash technique, close-up photography, copy work, photomicrography). Various projects involving scientific photography will be expected of the participants. Jones

212. Topics in Plant Morphology and Anatomy. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Consent of instructor. Advanced study in developmental, cellular, and evolutionary aspects of plant morphology and anatomy. Topics will be announced in advance of each semester. Kaplan, Schmid

221. Advanced Systematics. (2) Two 1-hour lectures per week. Prerequisites: 120 or equivalent and permission of instructor. Lectures will consider the morphological, cytological, biochemical, and experimental foundations of plant systematics, the variation patterns that exist in nature, the taxonomic problems that these patterns pose, and methods for the solution of these problems. Duncan, Omdull

223. Computer Assisted Methods in Systematics and Ecology. (4) Two 1-hour lectures and one 2-hour discussion, and one 4-hour open laboratory per week. Prerequisites: Major in biology and one course in ecology. An examination of the theoretical background and application of computer-assisted methods in systematics and ecology, including measures of similarity and distance, cluster analysis, ordination techniques, evolutionary estimating procedures, and information retrieval. A project using these methods will be conducted by each student. (SP) Duncan

224. Seminar in Plant Nomenclature. (1) One 1-hour lecture per week. Prerequisites: Consent of Instructor. Principles, articles, reifications of current International Code of Botanical Nomenclature; study of Code through application to examples, nomenclatural resources; comparison with Zoological Code. Strother

225. Topics in Systematic Botany. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Consent of Instructor. Advanced study in various topics in plant systematics. Topics will be announced in advance of each semester. (F) Duncan

229. Theory and Practice of Electron Microscopy. (2) May be taken without Botany 233L. Two 1-hour lectures per week. Prerequisites: Graduate standing, approval of major professor, and consent of instructor. Principles and current concepts of biological specimen preparation, examination, and analysis for transmission electron microscopy. (SP) Omdull

230. Laboratory in Theory and Practice of Electron Microscopy. (2) Botany 233L must be taken concurrently with Botany 233L. Two 3-hour laboratories per week. Prerequisites: Graduate standing, major professor, and consent of instructor. The purpose of this course is to prepare graduate students in the biological sciences to use electron microscopy in their research.

236. Seminar in Plant Molecular Biology. (1) Course may be repeated for credit. One 1/2-hour meeting per week. Prerequisites: Consent of instructor: Student presentation discussion in the areas of molecular and developmental plant biology with emphasis on the expression of nuclear and organelle genomes. Topics to be arranged. (F,SP) Gruissem

241. Topics in Hormone Physiology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour meetings per week. Prerequisites: Consent of instructor. The course will emphasize the biochemical and molecular basis of the action of plant growth hormones. Jones

251. On leave, spring

252. Recipient of Distinguished Teaching Award
Further information about the program, including a full statement of the requirements for advancement to the Ph.D., is available upon request from the program office.

Business Administration
(School of Business Administration)

Office: 305 Barrows Hall, 642-7989
Dean: Raymond E. Miles, Ph.D.

Professors:

David A. Aker, Ph.D. Stanford University. (J. Gary Cheek Chair in Marketing/Strategy) Strategy, advertising, market research
K. Roland A. Arts, Econ. Dr. Bohmloch School of Economics. Economics, microeconomics

Frederick E. Baldwin, Ph.D. Princeton University. Strategy, financial services, marketing systems
Wayne S. Boulton, Ph.D., C.P.A. University of California at Berkeley. Auditing, accounting, computers
Louis P. Buxton, Ph.D. Northwestern University. Marketing strategy, statistics
James J. Geist, Ph.D. University of California at Berkeley. Auditing, accounting

Edward P. Macfarlane, Ph.D. University of California at Berkeley. Business ethics and corporate political behavior
Joseph W. Garbarino, Ph.D. Harvard University. Employee relations, bargaining arbitration
Mark B. Garman, Ph.D. Carnegie-Mellon University. Finance, options, arbitrage research

Richard C. Grinold, Ph.D. University of California at Berkeley. Investment management, portfolio optimization
Nils H. Hakanson, Ph.D., C.P.A. (Byron C. Coleman Professor of Finance and Accounting) University of California at Los Angeles. Finance, financial accounting

John C. Harrington, Ph.D. (Reid Flood Research Professor in Business Administration) Stanford University. Game theory, decision theory
Austin C. Hoggatt, Ph.D. University of Minnesota. Finance, investments, experimental economics

Richard H. Holton, Ph.D. (C. T. Grether Chair in Marketing and Public Policy) Harvard University. Marketing international business, entrepreneurship

Ernest Koenigspiegel, Ph.D. Iowa State University. Marketing strategy, logistics, marketing systems

Hayne E. Lehnig, Ph.D. Harvard University. Marketing, trade, and public relations

Baruch I. Lev, Ph.D. (Emile RiNiemela Chair in Accounting) University of Chicago. Financial analysis, accounting, financial regulations

Thomas A. Morschak, Ph.D. Stanford University. Economics, statistical, research

Robert A. Meyer, Ph.D. Stanford University. Economics, marketing, accounting

Raymond E. Miles, Ph.D. Stanford University. Strategic planning, marketing systems

John G. Myers, Ph.D. Northwestern University. Advertising, communications, marketing management

Franco M. Nicoli, Ph.D. University of California at Berkeley. Psychology, brand advertising, corporate communication

Charles A. O'Reilly, Ph.D. University of California at Berkeley. Employee commitment, organizational culture, productivity

David H. Pyly, Ph.D. (Willis E. Booth Professor in Banking and Finance) Boston College. Finance

Karin F. Rubinstein, Ph.D. University of California at Berkeley. Organizational communication, high reliability teams

Kenneth T. Rosen, Ph.D. (California Real Estate Chair) Massachusetts Institute of Technology. Real estate, housing, mortgage insurance

Mark E. Rubinstein, Ph.D. University of California at Los Angeles. Options and market speculation

Wallace F. Smith, Ph.D. University of Washington. Real estate, financial economics

George J. Stalbe, Ph.D., C.P.A. (Michael N. Chetkovich Professor of Accounting) University of Chicago. Financial analysis, accounting

Barry M. Shaw, Ph.D. (Dorothy Tyren Mitchell Chair in Entrepreneurship and Entrepreneurship) Northwestern University. Decision making, attitudes, behavior

George Staudt, Ph.D. Massachusetts Institute of Technology. Information systems, industrial relations

David J. Teese, Ph.D. University of Pennsylvania. Human resources management

David Vogel, Ph.D. Princeton University. Business management, organizational behavior

John T. Wheeler, Ph.D. Massachusetts Institute of Technology. Managerial accounting, budgeting, strategic planning

Janet L. Yellen, Ph.D. Yale University. International economics, macroeconomics
Lower Division Courses

1. Introduction to Accounting. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: Sophomore standing; The identification, measurement, and reporting of economic events on enterprises; the contemporary model and its origins. (F,SP)

Upper Division Courses

110. Microeconomic Analysis for Business Decisions. (3) Students will receive no credit for 110 after taking Economics 100A or 101A. Three hours of lecture and one hour of optional discussion per week. Prerequisites: Economics 1, Macroeconomics 1A-1B, Microeconomics 1A-1B, or equivalents. Microeconomic analysis applicable to the problems of business enterprises with emphasis on the determination of the level of prices, outputs, and inputs; the effects of the state of the competitive environment on business and government policies. (F,SP)

111. Macroeconomic Analysis for Business Decisions. (3) Students will receive no credit for 111 after taking Economics 100B or 101B. Three hours of lecture and one hour of optional discussion per week. Prerequisites: 110 or equivalent. Survey of industry structures and regulations in the transportation, energy, communications, and financial sectors of the American economy. Application of economic analysis to the administrative regulation of prices, investment, service quality, and other managerial decisions. Analysis of regulatory policies and alternatives to economic regulation, including market competition and public ownership. (SP)

112. Economics of Regulated Industries. (3) Three hours of lecture per week. Prerequisites: 110 or equivalent. Survey of industry structures and regulations in the transportation, energy, communications, and financial sectors of the American economy. Application of economic analysis to the administrative regulation of prices, investment, service quality, and other managerial decisions. Analysis of regulatory policies and alternatives to economic regulation, including market competition and public ownership. (SP)

113. Managerial Economics. (3) Three hours of lecture per week. Prerequisites: 110 and 111 or equivalents. Analysis of the theory and practice of decision-making in business firms, utilizing the concepts and techniques of managerial economics. The business decisions to be investigated include pricing policies, internal transfer pricing, and various choices under uncertainty. (F)

114. Forecasting for Managerial Decisions. (3) Three hours of lecture per week. Prerequisites: 110 and 111 or equivalents. Analysis of the theory and practice of decision-making in business firms, utilizing the concepts and techniques of managerial economics. The business decisions to be investigated include pricing policies, internal transfer pricing, and various choices under uncertainty. (F)

115. Management in the Public and Not-for-Profit Sectors. (3) Three hours of lecture per week. Prerequisites: 110 and equivalents. Economic basis of the public and not-for-profit sectors. Institutional arrangements as they impinge on operations in the public sector. Emphasis on managerial approaches and tools to be used in a nonprofit environment. (SP)

120. Managerial Accounting. (3) Two hours of lecture and 2 hours of discussion per week. Prerequisites: 111 and 130. The uses of accounting systems and their outputs in the process of management of an enterprise. Classification of costs and revenues on several bases for various uses: budgeting and standard cost accounting; analyses of relevant costs and other data for decision making. (F,SP)

121. Financial Accounting I. (4) Three hours of lecture and 2 hours of discussion per week. Prerequisites: 1 and 120. An intermediate-level course in the theory and practice of financial accounting. The measurement and reporting of the economic effect of events involving working capital and long-term plant assets, investment in securities, intangible assets. (Required for those specializing in finance and capital markets. (F,SP)

122. Financial Accounting II. (4) Three hours of lecture and 2 hours of discussion per week. Prerequisites: 121. Continuation of 121. Sources of long-term capital; funds statements, financial accounting, analysis for partnerships, consolidated financial statements, adjustments of account using price indexes; accounting for the financial effects of pension plans; other advanced accounting problems. (Required for those specializing in accounting.) (F,SP)

124. Cost Accounting. (3) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 121; 124 recommended. Concepts and problems in the field of professional verification of financial and related information, including ethical, legal and other professional issues, historical developments, and current concerns. (SP)

127. Accounting Systems for Management. (3) Three hours of lecture and one 1½-hour discussion per week. The study of accounting systems, including computer-oriented systems, with an emphasis on the information and control functions of the management decision-making process. The COBOL language will be used. (SP)

128A. Federal Income Taxation I. (Formerly 128). Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 1 and 120; 128A recommended. Determination of individual and corporate tax liability; influence of federal taxation on economic activities; tax considerations in business and investment decisions. (F,SP)

128B. Federal Income Taxation II. (4) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 128A. A study of federal taxation of corporations, shareholders, partnerships; economic and policy analysis of the current structure and proposed reforms; introduction to tax planning and research. (SP)

129. Field Study in Accounting. (3) No formal classes held. Prerequisites: 122 or equivalent or consent of instructor. A planned program of exposure to actual accounting practice designed to broaden students' perspective of the concepts and theory of accounting. Assignment to specific corporations, CPA firms, or government agencies for orientation and work experience. Research reports based on field experience required. (SP)

130. Financial Management. (4) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 110 and 120. Analysis and management of the flow of funds through an enterprise. Cash management, source and application of funds, term loans, types and sources of long-term capital, capital structure, cost of capital, and financial structure, introduction to capital markets. (F,SP)

132. Money and Capital Markets. (3) Three hours of lecture per week. Prerequisites: 111 and 130. Organizational
170. Social and Political Environment of Business. (3) Two 1½-hour lectures per week or one 2-hour lecture and one hour of discussion per week. Prerequisites: Senior standing. Studying the roles of business in a changing social and political environment. Interaction between business and other social institutions. Role of business in the development of social values, goals, and the national priorities of the corporation in dealing with social problems and issues. (F,SP)

171. Business, Government, and Law in the American Political Economy. (3) Course may be repeated for credit with consent of instructor. Two 1½-hour seminar meetings per week. Prerequisites: 175 and/or 170 recommended. In this course, students examine the complex relationship between the public and private sectors in the American political economy. Focus is on diverse interactions among governmental institutions, business organizations, and legal processes which provide the framework for both economic and political activity in the U.S. (SP)

172. Business in Its Historical Environment. (3) Two 1½-hour lectures per week. This course will examine selected aspects of the history of American business. Included will be discussions of the evolution of the large corporation, the development of modern managerial techniques, and the changing relationship of business, government, and labor. (F)

175. Legal Environment of Business. (3) Two 1½-hour lectures per week. An analysis of the law and the legal process, emphasizing the nature and functions of law within the U.S. federal system, followed by a discussion of the legal problems pertaining to contracts and related topics, business associations, and the impact of law on economic enterprise. (F,SP)

176. Legal Aspects of Business Transactions. (3) Two 1½-hour lectures per week. Prerequisites: 175; 180 recommended. The law affecting ownership and use of real property; transfers, titles, development rights, and the regulation thereof in the public interest. (SP)

180. Introduction to Real Estate and Urban Land Economics. (3) Three hours of lecture per week. An examination of appraisal concepts and methods; the role of value estimates in private land-use and real estate investment decisions and in the implementation of public policies affecting urban development. (F)

183. The Financial Management of Real Estate Resources. (3) Three hours of lecture per week. Prerequisites: 180. Real estate debt and equity financing; mortgage market structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development. (F,SP)

188. Introduction to International Business. (3) Two hour seminars and one hour of discussion per week. Prerequisites: Senior standing. Introduction to Accounting, Micro and Macro Economics. The international business environment involving environmental, economic, political, and social constraints on doing business abroad; effects of overseas business investments on domestic and foreign economies; international strategies for the development of a firm; management problems and development potential of international operations. (F,SP)

190. Strategic Planning: Models and Design. (3) Three hours of lecture per week. Concepts of strategy and strategic planning. Models and techniques are evaluated for strategic policy choices, organizational design, and the allocation of resources.
196. Special Topics in Business Administration. (1-3) Course may be repeated for credit. One to 3 hours of lecture per week. Prerequisites: Consent of instructor. Study in various fields of business administration. Topics will vary from year to year and will be announced at the beginning of each semester. (F.S.P)

197. Directed Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised upper division group study. (F)

198. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Enrollment is restricted by regulations listed on pages 61 and 62 of this catalog. (F.S.P)

Graduate Courses

200. Statistical Analysis for Business Decisions. (3) Two hours of lecture and 2 hours of discussion per week. This course provides an introduction to probability theory and statistical analysis and their applications to the problems of business. Topics include: probability distributions, sampling and estimation, hypothesis testing, regression analysis, nonparametric statistics and time series analysis. (F.S.P)

201A. Economic Analysis for Business Decisions I. (3) Three hours of lecture and one hour of optional discussion per week. Economic analysis applicable to the problems of business and operation of the market system. Theory of supply, demand, inputs, and output. Effects of the state of the competitive environment on business policies. (F)

201B. Economic Analysis for Business Decisions II. (3) Three hours of lecture and one hour of optional discussion per week. Prerequisites: 201A or equivalent. Theories of fiscal and monetary policy, as well as other macroeconomic policies, are a central topic. The issues and the evidence will be discussed. Other topics to be covered range from the specifics of the U.S. balance of payments to issues today that broader problems are associated with economic growth and decay in the world. (F.S.P)

202A. Financial Reporting. (3) Two hours of lecture and 1 hour of discussion per week. A study of accounting measurements for general purpose financial reports. The object of the course is to provide a working knowledge and a clear understanding of the contents of published financial statements. (F)

202B. Managerial Accounting. (3) Course may be repeated for credit. Three hours of lecture per week plus one optional hour of tutorial session. Prerequisites: 202A or equivalent. This course emphasizes the use of accounting information throughout the planning, operation, and control stages of managing an organization. The course is divided into three sections to reflect these three stages of management: 1) information for planning and decision-making; 2) information received during operations (cost accounting); and 3) information for control and performance evaluation. (SP)

203. Financial Policies of Business. (3) Two hours of lecture and one hour of discussion per week for 15 weeks or four hours of lecture and two hours of discussion per week for 10 weeks. Prerequisites: 201A, 201B, 202A, 202B, 204A, and 204B. Business finance, with emphasis upon financial problems and policies of corporations, the role of commercial banks, institutional and other investors in supply of funds for corporations. (F.S.P)

204. Information and Management Science. (3) Two hours of lecture and 2 hours of discussion per week. Prerequisites: 200 (may be concurrent). The management science portion (about 80%) surveys the application of mathematical models and computer software to business decision making. Topics include linear programming, project management, inventory control, decision analysis, and simulation. The management information systems portion (about 20%) surveys how computers are used in the management of the business. Topics include database management, systems analysis and design, and telecommunications and distributed processing. (F)

205. Organizational Behavior. (3) Three hours of lecture per week. A general descriptive and analytical study of organizations from the behavioral science point of view. Problems of motivation, leadership, morale, social structure, groups, communications, hierarchy, and control in complex organizations are examined. The interaction among technology, environment, and human behavior is discussed. Alternate theoretical models are considered. (F.S.P)

206. Marketing Organization and Management. (3) Two 1/4-hour lectures per week. Prerequisites: 201A or equivalent. Topics include an overview of the marketing system and the marketing concept, buyer behavior, market research, segmentation and marketing decision making, marketing structures, and evaluation of marketing performance in the economy and society. (F.S.P)

207. Business and Public Policy. (3) Two 1/4-hour lectures per week. Prerequisites: Consent of instructor (who has not had equivalent training) some knowledge and understanding of the ideas, concepts, rules, institutions, and issues that characterize the political, social, legal, and historical environments within which the business system operates. Instructor approach the course material from the viewpoint of a variety of academic disciplines, including law, economics, history, sociology, and political science, as well as varied practical experience. (F.S.P)

209. Market Structure and Economic Performance. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204A-204C, or equivalents. Examinations optimal production and pricing policies for firms in competitive environments; competition and strategy in the presence of imperfect information. How differing market structures and government policies (including taxation) affect output and pricing decisions. Social welfare implications of decisions by competitive firms are also explored. (SP)

211. Market Failures and Boundaries of the Firm. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204A-204C, or equivalents. Efficiency in resource allocation; failure of markets and substitutes for markets, decreases in cost phenomena, public goods and public goods (environmental problems); behavior of firms under regulatory constraints. (SP)

212. Managerial Decisions in Regulated Industries. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204A-204C, or equivalents. Introduction of line regulatory law and the regulatory process. Economic principles of administrative regulation of pricing, investment, and service quality. Analysis of critical problems in regulated industries, including transmission of electricity, natural gas and public utilities, and financial sectors, with emphasis on emerging competition in these industries. Potential regulatory reforms with alternatives to regulation. (SP)

213. Statistical and Econometric Methods for Business. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204A-204C, or equivalents. The theory and use of statistical and econometric methods with special emphasis on practical applications. Topics include regression analysis; special problems in applied regression analysis; simultaneous equations estimation; elements of multivariate analysis. (F)

214. Forecasting Methods for Business. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204A-204C, or equivalents. The course will focus on a variety of time series and cross-sections. These include econometric techniques and purely deterministic (time series) methods, as well as combinations of more than one procedure. The emphasis is on data analysis; the student will learn a forecasting process which can be applied to all types of forecasting problems. To facilitate the learning-by-doing aspect of the course, several computer-oriented problem sets and a forecasting project are selected. (SP)

215. Management in the Public and Non-for-Profit Sectors. (3) Three hours of lecture per week. Prerequisites: 201A-201B, or equivalents. Planning-programming-budgeting systems and benefit-cost analysis for the public and non-for-profit sectors. Resource allocation and planning in the public sector. Use of pricing in public enterprise. Efficiency when profit criteria are absent. Applications in natural resources, medical services, transportation, and education. (SP)

217. Seminar in Applied Econometrics. (3) Three hours of lecture per week. Topics will vary with the interest of the instructor. A description of the topics and objectives of the seminar will be available to prospective students each year. (F)

220A. Financial Accounting I. (4) Three hours of lecture and one 1/4-hour discussion per week. Prerequisites: Consent of instructor. This course and the following course intensively examine the theory and practice of financial accounting, including measurement, income determination, and financial reporting. It is designed for those students who want an in-depth understanding of the concepts and methods of financial accounting. (F.S.P)

222. Financial Information Analysis. (3) Two hours of lecture per week. Prerequisites: 220A; and 230 recommended. Issues of accounting information evaluation with special emphasis on the use of financial statements in corporate decision making. The implications of recent research in finance and accounting for external reporting issues will be explored. Emphasis will be placed on models that describe the user's decision context. (F.S.P)

223A. Doctoral Seminar in Accounting I. (2) Two 2-hour seminars per week for 7 1/2 weeks. Prerequisites: 220A or equivalent, 228A and Economics 201A-201B. A critical evaluation of accounting literature with emphasis on seminar contributions. Topics covered include research methodology in accounting, the private and social value of information. (SP)

223B. Doctoral Seminar in Accounting II. (1-3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 220A or equivalent, 228A and Economics 201A-201B. A critical evaluation of recent accounting literature involving empirical research. (F.S.P)

223C. Doctoral Seminar in Accounting III. (3) Three hours of seminar per week. Prerequisites: 220A or equivalent, 228A and Economics 201A-201B. A critical evaluation of recent accounting literature with emphasis on seminar topics. Topics covered include research methodology in accounting, the private and social value of information. (F.S.P)

225. Advanced Topics in Accounting. (2) Two hours of lecture per week. Prerequisites: 202A, 202B or equivalent. Seminar in advanced topics in accounting focused on current theoretical and empirical issues. Topics include system design of information systems, management information systems, and financial accounting. (SP)

228A. Income Taxation I. (4) Three hours of lecture and one 1/4-hour discussion per week. Prerequisites: 228A or equivalent, 228A and 202A-or 202B. The theory and practice of income taxation relating to its impacts and implications. Topics include an overview of the marketing environment and understanding of the ideas, concepts, rules, institutions, and issues that characterize the political, social, legal, and historical environments within which the business system operates. Instructor approach the course material from the viewpoint of a variety of academic disciplines, including law, economics, history, sociology, and political science, as well as varied practical experience. (F.S.P)

228B. Income Taxation II. (2) Two hours of lecture per week. Prerequisites: 228A or equivalent. The study of the fundamentals of income taxation relating to its impacts and implications. Topics include an overview of the marketing environment and understanding of the ideas, concepts, rules, institutions, and issues that characterize the political, social, legal, and historical environments within which the business system operates. Instructor approach the course material from the viewpoint of a variety of academic disciplines, including law, economics, history, sociology, and political science, as well as varied practical experience. (F.S.P)

228C. Seminar in Income Taxation. (2) Two hours of lecture per week. Prerequisites: 228A or equivalent. The study of the fundamentals of income taxation relating to its impacts and implications. Topics include an overview of the marketing environment and understanding of the ideas, concepts, rules, institutions, and issues that characterize the political, social, legal, and historical environments within which the business system operates. Instructor approach the course material from the viewpoint of a variety of academic disciplines, including law, economics, history, sociology, and political science, as well as varied practical experience. (F.S.P)

229. Management Planning and Control Systems. (2) Two hours of lecture per week. Prerequisites: All core courses. Planning and control systems are an essential tool in the management of modern organizations. Management planning and control are studied through the use of cases illustrative of management practice in both public and private organizations. (SP)

230. Theory of Finance. (3) Two hours of lecture and 1 1/4-hour discussion per week for 7 1/2 weeks. Prerequisites: 203. Financial decision problems, their structure, solution, and implications, in...
cluding decision diagrams and dynamic decision models, the representation of preferences, asset composition models, and the structure of asset prices. (F,SP)

232. Money Markets and Financial Institutions. (2) Two hours of lecture per week. Prerequisites: 204A and 203. Structure and operations of the Federal Reserve System, commercial bank, and nonbank financial institutions. Portfolio composition and market behavior of financial intermediaries and organizations and functions of money markets. The structure of yields on financial assets and the influence of financial intermediaries and monetary policy. (F,SP)

233. Securities Markets and Investment Policies. (2) Two hours of lecture for 15 weeks or 4 hours of lecture forming two periods. Prerequisites: 230. Structure and operation of the securities markets. Relationships between security prices, business cycles, and money market developments. Consideration of individual and institutional investment policies and principles of security analysis. (F,SP)

234. Corporate Financial Management. (2) Two hours of lecture per week. Prerequisites: 230. Valuation of the firm; financial policies of firms, including asset acquisition and replacement, capital structure, dividends, working capital, and management of growth and retirement of new capital. (F,SP)

235. Advanced Topics in Financial Institutions and Financial Markets. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 230. Advanced institutional regulation of financial institutions, the analysis of money and capital markets, and empirical studies on securities prices and portfolio behavior. Topics to cover will vary. (F,SP)

236. Advanced Topics in Security Markets and Investments. (2) Course may be repeated for credit. Two hours of lecture for 15 weeks or 4 hours of lecture for 7½ weeks. Prerequisites: 233. Normative models for investment management, valuation of securities, behavior of market prices, the function and regulation of security markets, and empirical studies on securities prices and portfolio behavior. Topics to cover will vary. (SP)

237. Advanced Topics in Business Finance. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 234. Normative models of financial decisions by business firms, financial regulation and the business firm, and empirical studies in business finance. (SP)

238A-238B-238C. Doctoral Seminar in Finance. (3-12) Two hours of lecture per week. Prerequisites: 234. Three-hour seminar or an elective lecture course in financial economics, including the theory of intertemporal choice under uncertainty or uncertainty, portfolio optimization, asset market equilibrium, valuation of uncertainty, problems in Information, financial econometrics, and empirical verification of financial models. (F,SP)

240. Introduction to Management Science. (3) One 3-hour elective lecture per week. Prerequisites: 244 Survey of management science and its application to business problems. The techniques covered are matrix algebra, linear programming, quadratic programming, queuing theory, Markov chains, and dynamic programming. (SP)

241. Strategic Planning of Production and Operations. (2) Two hours of lecture per week. Prerequisites: 240 or consent of instructor. Strategic issues involved in planning the production and logistics of a firm and model of functions and strategies useful for solving strategic planning. Topics include models of a firm's capacity expansion, facility location, and technology selection decisions; learning curve strategies; and industry cost models. (SP)

242A. Inventory Control. (1) Two hours of lecture per week. Prerequisites: 244A and 244B or equivalent. Focus is on how an inventory and management system can ensure that items are available when and where they are needed and that the total cost associated with the system is kept to a minimum. (SP)

242B. Production and Operations Management. (1) Two hours of lecture per week for 7½ weeks. Prerequisites: 240 (may be concurrent). Managers of businesses, companies, and organizations are responsible for producing and distributing goods and services in an efficient manner. The manager faces constraints and uncertainties with regard to both availability of resources and demands for products. Decision making in this context will be discussed. (SP)

243. Decision Analysis. (2) Two hours of lecture per week. Prerequisites: 240B and 240C or equivalent. Procedures for deciding under uncertainty. Foundations of the expectation model and probability. Current applications of decision analysis. (F)

244. Competitive Decision Making. (2) Two hours of lecture per week. Prerequisites: 243 or consent of instructor. A survey of mathematical models of bargaining, bidding, and negotiations. This course will consider the interaction among the decisions of several decision makers, each with different goals and different information. Examples in oil leasing, contract bidding, and labor negotiations. (SP)

246. Advanced Topics in Management Science. (2-4) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Consent of instructor. This course will focus on a particular topic in management science and its application to business decision-making contexts. The topics covered will include integer programming models, network models, stochastic programming, Markov decision models, continuous-time probability models, and management information systems. (F,SP)

247. Simulation for Business Decisions. (2) Two hours of lecture per week. Prerequisites: 240A, 240B, and 204C or equivalent. Uses of computer modeling in business decision-making contexts. Structure of simulation models; simulation languages, data structures, algorithms, and interpretation of results. Course involves hands-on modeling via simulation projects as well as technique-oriented lectures. (SP)

248A. MIS: Data Management. (4) Three hours of lecture and 1½ hours of discussion per week. Prerequisites: 240A. This course covers several important topics in business data processing including file and data base systems. The problem of data management in large organizations is analyzed, and the logical data modeling process and its strategic importance are studied. Other topics include the use of computer technology and acquiring and managing computer resources. A team project consists of the design and implementation of a data base using a relational database management system package. (SP)

248B. MIS: Systems Analysis and Design. (3) Two 1½-hour lectures per week. Prerequisites: 240A. The goal of this course is to provide future general managers and information systems specialists with expertise in aspects of utilizing information in decision making. Topics covered include the role of information systems in organizations, systems analysis, trade-offs and economic considerations in systems development, hardware selection and review of technological advances relevant to modern organizations. (SP)

248C. MIS: Managerial and Organizational Issues. (2) Two hours of lecture per week. Prerequisites: 240A. This course covers the management and organizational issues associated with the implementation and growth of organizational and computer-based information systems. A management perspective is maintained throughout and technical issues introduced are subordinate to this management perspective. (SP)

248D. MIS: Telecommunication and Distributed Processing. (3) Three hours of lecture per week. Prerequisites: 240A. This course is intended for students who wish to gain better understanding of one of the most important issues facing management today—data and control. Topics are particularly relevant to telecommunication and distributed computer systems. The following topics are covered: a survey of networking technologies; the selection, design, and management of telecommunication systems; strategies for distributed data processing; office automation; and management of personal computers in organizations. (F)

249A. Introduction to Manufacturing Information Systems. (2) New course. Two hours of lecture per week. Prerequisites: 204A and 204B or equivalent. BA 249A or consent of instructor. This course is designed for doctoral-level students who wish to learn about the issues in manufacturing systems and the need for efficient information systems to alleviate some of these issues. Following a brief introduction to various forms of manufacturing systems and some manufacturing control issues, this course will focus on the use of efficient information systems in manufacturing. (F)

249B. Models of Manufacturing Systems. (3) New course. Three hours of lecture per week. Prerequisites: IEOR 262A or equivalent. BA 249A or consent of instructor. This course is designed for doctoral-level students who have training in optimization theory and stochastic processes. Various forms of manufacturing systems will be reviewed and various basic issues arising in such systems will be described. Models to address the issues will be formulated and analyzed using the state-of-the-art management science (operations research) techniques. Topics include but are not limited to: 1) automatic transfer lines; 2) flow lines and assembly systems; 3) dynamic job shop; and 4) flexible manufacturing systems. Other material handling systems and some manufacturing control issues will receive special attention. (F)

249C. Models of Management Information Systems. (3) New course. Three hours of lecture per week. Prerequisites: 204A and 204B or consent of instructor. The purpose of this course is to explore analytical methods used for the analysis and enhancement of information systems. The students are expected to acquire the ability to define critical current problems in the area of information systems and to model and formulate such problems and provide a comprehensive analysis. The material presented in the lectures will provide a necessary background and tools for such an analysis. (SP)

250. Organization Diagnosis and Change. (3) Three hours of lecture per week. Prerequisites: 205. Course examines current models of strategy, structure, process interaction and their historical foundations. Students will apply current theory to traditional cases and to current examples of organization adaptation in the business press. In addition, the course will examine in detail emerging patterns of strategy, structure, and processes—the current enabler of what appears to be a new set of organizational forms. Finally, comparisons will be drawn between U.S. and foreign patterns of adaptation. (SP)

251. Human Resources Management. (3) Three hours of lecture per week. Prerequisites: 205 or consent of instructor. This course is designed for doctoral-level students who wish to gain a better understanding of managing the personnel function. Topics include the processes of recruitment, selection, placement, training, and evaluation of people within organizations. The role of the staff manager with respect to the planning, design, and allocation of tasks and people is considered, with emphasis on the implications for research for management problems and policies. (F)

252. Negotiation and Conflict Management. (2) New course. Two hours of lecture per week. A study of the negotiation process. Students will participate in simulations of various types of negotiations including inter-organization and intr-organization situations involving two-party relationships. Examples are disputes involving managers and subordinates, buyers and sellers, company units, companies and government agencies and labor and management. Other topics include third-party intervention such as mediation and how organization structure can facilitate or hinder conflict management. (F)

253. Public Policy and the Management of Human Resources. (3) Three hours of lecture per week. Prerequisites: 205 and 207, or consent of instructor. This course will analyze government regulation of personnel, including such issues as affirmative action, promotion, affirmative action, equal pay and comparable worth, employment at will, and union relations. Discussion of case studies will focus on corporate and bureaucratic
interest in nonprofit organizations, either as potential managers or as members of boards of trustees. It will be illustrated and built on public policy work in all areas of business administration. Topics include, but are not limited to: (1) legal issues, (2) fundraising, (3) volunteers, (4) financial management issues, and (5) economic relationships with governments. (SP)

275. Legal Aspects of Management and the Market System. (3) Two 1/2-hour seminar per week. Prerequisites: 201A and 207, or consent of instructor. A managerial approach to important legal issues confronting business and government. The policy process and the rules and behavior of government are emphasized. (F)

276. Foundations of Capitalism and Political Economy. New course. One 2-hour seminar per week for 7 1/2 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. The purpose of this course module is to introduce students to the classics of political economy. It focuses on the books that have had the most important impact on shaping our understanding of the nature of capitalism and the relationships between business and society of which it is a part. (F)

279A. International Business and Public Policy. (1) New course. One 2-hour seminar per week for 7 1/2 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. This seminar will explore public policy issues that involve international firms. Host-country/home-country policy issues relating to foreign investment and technology transfer will be covered. Standard theories of trade and investment suggest that the national origin of direct investment is of no significance, but the modus operandi of firms in the U.S. is different from that of domestic firms. Important differences between these domestic and foreign firms will be explored. This seminar will be interdisciplinary in nature and build upon course work in international business, macro and micro economics, and political economy. It will also focus on the role of business in international business and public policy. The emphasis of this seminar will be on the interactions between business, governments, and public policy. (F,SP)

279B. Foundations of Capitalism and Political Economy. (3) Two 1 1/2-hour lectures per week for 7 1/2 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. The interaction of the private and public sectors in urban development; modeling the urban economy. Growth and decline of cities; urban economics; changes in housing, transportation, financing, local government, urban redevelopment and neighborhood change are examined. (F,SP)

280. Real Estate and Urban Land Economics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor, A background in the basics of finance, micro-economics, macro-economics, statistics, and quantitative analysis. Students will be introduced to the fundamentals of real estate financial analysis, including elements of mortgage financing and taxation. The course will apply the standard tools of financial analysis to specialized real estate financing circumstances and real estate evaluation. Topics will include traditional and non-traditional appraisal methods, techniques of real estate financing (wraps, sale-leaseback financing, participations, and alternative mortgage instruments), innovations in real estate financing (section 236, prepaid mortgaging, 241A, the relationship between real estate activity and the macroeconomic environment, housing market activity, and the capital markets. (F,SP)

281. Seminar in Real Estate Investment Analysis. (3) Three hours of lecture per week. Prerequisites: Consent of instructor, A background in the basics of finance, micro-economics, macro-economics, statistics, and quantitative analysis. Students will be introduced to the fundamentals of real estate financial analysis, including elements of mortgage financing and taxation. The course will apply the standard tools of financial analysis to specialized real estate financing circumstances and real estate evaluation. Topics will include traditional and non-traditional appraisal methods, techniques of real estate financing (wraps, sale-leaseback financing, participations, and alternative mortgage instruments), innovations in real estate financing (section 236, prepaid mortgaging, 241A, the relationship between real estate activity and the macroeconomic environment, housing market activity, and the capital markets. (F,SP)

282. Seminar in Real Estate Investment Analysis. (3) Three hours of lecture per week. Prerequisites: Consent of instructor, A background in the basics of finance, micro-economics, macro-economics, statistics, and quantitative analysis. Students will be introduced to the fundamentals of real estate financial analysis, including elements of mortgage financing and taxation. The course will apply the standard tools of financial analysis to specialized real estate financing circumstances and real estate evaluation. Topics will include traditional and non-traditional appraisal methods, techniques of real estate financing (wraps, sale-leaseback financing, participations, and alternative mortgage instruments), innovations in real estate financing (section 236, prepaid mortgaging, 241A, the relationship between real estate activity and the macroeconomic environment, housing market activity, and the capital markets. (F,SP)

283. Seminar in Real Estate Investment Analysis. (3) Three hours of lecture per week. Prerequisites: Consent of instructor, A background in the basics of finance, micro-economics, macro-economics, statistics, and quantitative analysis. Students will be introduced to the fundamentals of real estate financial analysis, including elements of mortgage financing and taxation. The course will apply the standard tools of financial analysis to specialized real estate financing circumstances and real estate evaluation. Topics will include traditional and non-traditional appraisal methods, techniques of real estate financing (wraps, sale-leaseback financing, participations, and alternative mortgage instruments), innovations in real estate financing (section 236, prepaid mortgaging, 241A, the relationship between real estate activity and the macroeconomic environment, housing market activity, and the capital markets. (F,SP)
292D. Research and Theory in Business Administration: Applied Behavioral Science Methods. (2) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: Ph.D. student; 292A or equivalent; one graduate level course in statistics or econometrics. This course will review, critique, and apply statistical tools in the behavioral science literature. It will also give students first-hand experience in applying general statistical techniques to their research problem. Course content will vary from year to year. Topics include but are not limited to: general linear model; logit and probit analysis; factor analysis; log-linear models for contingency tables; structural equation models (including latent variable and other measurement models) and other rate models. Although theory behind many of these techniques will be discussed, the course will emphasize their application both in practical terms on the computer and in critical terms on the extant literature. Term paper will be a first pass at the statistical work in a student's dissertation proposal. (F)

292E. Research and Theory in Business Administration: Stochastic Modelling. (2) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: Ph.D. student; 292A or equivalent; STAT 200A or equivalent; IEOR 283A or equivalent. Students will abstract and develop stochastic models of some specific problems. Each such assignment will be followed by the reviewing and critiquing of the student's work. Topics will be determined by research interests of enrolled students. Term paper will be a first pass at stochastic modeling to be used as part of student's dissertation proposal. (F)

293. Individually Supervised Study for Graduate Students. (1-6) Course may be repeated for credit. Prerequisites: Graduate standing. Individually supervised study of subjects not available to the student in the regular schedule, approved by faculty adviser as appropriate. On leave, spring, fall. (F,SP)

294B. Philosophy of Systems Management. (3) Course may be repeated for credit. Two 2-hour lectures per week. Prerequisites: Econ 100 or 101; or BA 110 or equivalent; or consent of instructor. This course uses economic and institutional analysis to explain the structure and behavior of complex organizations, and especially the business firm. Recent developments in the literature of transactions cost economics are employed to explain why firms vertically integrate, why there may be limits to their growth, how work is organized and how bosses and workers are themselves kept in check. Public policy issues related to the regulation of economic activity, including antitrust, are an integral part of the course. Broader organizational issues, such as the relationship of government and the organizational properties of socialism, are also considered. Sponsoring departments: Business Administration and Economics. (SP) Williamson

295. Entrepreneurship and Business Development. (3) Formerly 295. Four hours of lecture per week. Prerequisites: All core courses or equivalents. Guest lecturers discuss various aspects of starting, operating, and expanding the owner-managed business. Each student prepares a business plan for a new company for which financing is sought. The integration of financial and organizational problems in a well-written proposal is emphasized. (F)

296. Special Topics in Business Administration. (1-3) Course may be repeated for credit. One, two, or three 2-hour lectures per week. Prerequisites: Graduate standing in Business Administration or Engineering. Advanced study in various fields of business administration. Topics will vary from year to year and will be announced at the beginning of each semester. (F,SP)

289. Research Seminar in Business Administration. (2-4) Course may be repeated for credit. One hour of discussion and two hours of seminar per week for 4 units or meet alternate weeks for 2 units. Prerequisites: Admission to Ph.D. program in business administration and consent of instructor. A series of seminars at which current research, will be presented and discussed. Topics will be determined by the sponsoring departments. The theme of a BA 289 section can be based on the literature of an existing business administration field or on a topic that spans more than one field. Students will attend a one-hour seminar and a discussion at which the paper to be presented next will be discussed. (F,SP)

299. Individual Research in Business Problems. (F,SP) Sections 1-32. (1-12) Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Ph.D. student and consent of instructor. Sections 33-100. (3) Prerequisites: MBA students and consent of instructor.

601. Individual Study for Master's Students. (1-5) Units may not be used to meet either unit or residence requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Graduate standing. Individual study for the comprehensive requirements in consultation with field adviser. (F,SP)

602. Individual Study for Doctoral Students. (1-6) May not be used to satisfy unit or residence requirements for the doctoral degree. Course may be repeated for credit up to a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. degree. (F,SP)

Interdepartmental Studies Courses

IDS 170. Economics of Organization. (3) New course. Two 1½-hour lectures per week. Prerequisites: Econ 100 or 101; or BA 110 or equivalent; or consent of instructor. This course uses economic and institutional analysis to explain the structure and behavior of complex organizations, and especially the business firm. Recent developments in the literature of transactions cost economics are employed to explain why firms vertically integrate, why there may be limits to their growth, how work is organized and how bosses and workers are themselves kept in check. Public policy issues related to the regulation of economic activity, including antitrust, are an integral part of the course. Broader organizational issues, such as the relationship of government and the organizational properties of socialism, are also considered. Sponsoring departments: Business Administration and Economics. (SP) Williamson

IDS 270. Doctoral Seminar on the Functions of the Executive. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Graduate standing or consent of instructor. This special interdisciplinary seminar will be organized to celebrate the 50th anniversary of the publication of Tichy and Konrad's The Functions of the Executive, (1938). Classic organizational issues, such as the nature of the employment relationship, communication processes within organizations, and the relationships between the organization and society will be discussed. An attempt will be made to assess what has been learned and what issues require further efforts, with respect to the economics of organizations. The course will also feature invited lecturers from a variety of eminent scholars of economics and organization. (SP) Williamson

IDS 290. Management of Innovation and Policy. (3) New course. Two 1½-hour lectures per week. Prerequisites: Graduate standing in Business Administration or Engineering. This course is designed to introduce students to the innovation process and its management. It draws on a variety of disciplines and attempts to integrate them in a fashion which will generate key insights into how technology can be developed and managed. Sponsoring departments: Engineering and Business Administration. (SP) Reence

Related Courses in the Program in Public and Nonprofit Management

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)

IDS 207. Managers and Management. (3)

IDS 208. Techniques of Management Control. (3)

IDS 209. Applied Microeconomics. (3)

IDS 210. Organizational Understanding for Managers. (3)

IDS 211. Public Sector Accounting. (3)

IDS 212. Financial Management. (3)

IDS 214. Organizational Skill for Managers. (3)

IDS 217. Technology, Tasks, and Politics. (3)

IDS 218. Information Resource Management. (3)

IDS 219. Financing Tools for Public Managers. (3)

For information about these and other courses related to this program, see the Public and Nonprofit Management section of this catalog.

Chemical Engineering (College of Chemistry)

Department Office: 201 Gilman Hall, 642-2291

Undergraduate Affairs Office: 420 Latimer Hall, 642-0473

Professors:
Alevia T. Bell, Sc.D. Massachusetts Institute of Technology. Nanochemistry, chemistry of thin films, plasma science.

Alexis Tai, Ph.D. University of Wisconsin. Chemical physics, liquid crystals.

Harvey W. Blanch, Ph.D. University of New South Wales. Biophysical engineering, enzymology.

Elviya Callis, Ph.D. University of California at Berkeley. Electrochemistry, energy conversion, thermodynamics.

Barbara D. Dank, Ph.D. University of California at Berkeley. Computer processing, process analysis.

Jian S. Fei, Ph.D. University of Delaware. Process control, computer applications.


Donald I. Hanson, Ph.D. University of Wisconsin. Separation processes, environmental conservation.

Dennis W. Hess, Ph.D. Lehigh University. Microelectronics, thin films, plasmas.


Scott Lynn, Ph.D. California Institute of Technology. Synthesis of inorganic chemical processes.


Eric E. Petersen, Ph.D. Pennsylvania State University. Catalysis, reaction engineering, deactivation.

M. Reister, Ph.D. Dr. Ing. Technical University. Molecular thermodynamics, phase equilibrium.

Clayton J. Radke, Ph.D. University of California at Berkeley. Colloid and surface chemistry.

David S. Soano, Ph.D. (Vice Chair) University of California at Berkeley. Polymers, microelectronics, rheology, membranes.

Charles W. Tobias, Ph.D. University of Texas at Austin. Polymer science.

Jeffrey A. Miller, Ph.D. University of California at Berkeley. Chemistry.

Scott Leigh, Ph.D. University of California at Berkeley. Polymer science.

M. Reister, Ph.D. Dr. Ing. Technical University. Molecular thermodynamics, phase equilibrium.

Clayton J. Radke, Ph.D. University of California at Berkeley. Colloid and surface chemistry.

David S. Soano, Ph.D. (Vice Chair) University of California at Berkeley. Polymers, microelectronics, rheology, membranes.

Michael G. Williams, Ph.D. University of Wisconsin. Rheology, viscoelasticity, polymers, hemodynamics.

Louis M. Brown, Ph.D. University of California at Berkeley. Separation processes.


David N. Lyon, Ph.D. (Emeritus) University of California at Berkeley. Cryogenics.

Charles W. Tobias, Ph.D. University of Wisconsin. Biochemical engineering, mass transfer.

Assistant Professors:
David S. Clark, Ph.D. California Institute of Technology. Biochemical engineering, biological spectroscopy.

David B. Graves, Ph.D. University of Minnesota. Plasma physics, high pressure plasma.


Jeffrey A. Miller, Ph.D. California Institute of Technology. Physical chemistry, semiconductor science.

Dimitri Theodorou, Sc.D. Massachusetts Institute of Technology. Polymer science.

Lecturers:
E. Morse Blue, M.S. Massachusetts Institute of Technology.Process design and economics.

On leave, spring

Adjunct to active service

Recipient of Distinguished Teaching Award

*Not offered 1988-89

On leave, spring

On leave, fall
Chemical Engineering Major

The College of Chemistry offers a major in chemical engineering leading to the B.S. degree. The program equips the student for professional work in development, design, and operation of chemical processes and related equipment. Students with high academic attainment are well prepared to enter graduate programs. The curriculum is accredited by the Accreditation Board for Engineering and Technology.

The requirements for the B.S. degree are: A total of 120 semester units; Mathematics 1A, 1B, 50A, 50B; Physics 7A, 7B, 7C; Chemistry 1A, 1B (or 4A, 4B); 112A, 112E (or 112B), 120A, 120B, 125; Chemical Engineering 140, 141, 142, 150A, 150B, 152, 154, 160, 162, 165, and six units of elective courses in chemical engineering and related fields. Additional technical courses approved by the academic advisor, at least nine of which must be from a list provided by the College of Engineering; with approval of the academic advisor, these 15 technical units may be among those used for satisfying special requirements of the interdisciplinary options, if an option program is selected. Satisfaction of the Subject A and the American Heritage and Institutions requirements. Fifteen units in English composition, humanities, and social sciences, chosen from a list provided by the College of Chemistry. See the Announcements of the College of Chemistry for additional information about the Chemical Engineering Program.

Intercallegiate Transfers. Students should complete as a minimum: one year of chemistry, three semesters of physics, at least two years of mathematics starting with calculus, and one course in English composition. If the lower division requirements in mathematics and physics must be completed after transfer, delay in completing the required sequences of upper division courses will result. See the Announcement of the College of Chemistry for additional information.

Options Program. While the standard chemical engineering program provides an excellent preparation for a professional and graduate school in many related fields, some students may wish to emphasize one of these fields in their studies. The options program allows the regularly prescribed elective units (in Chemical Engineering, Engineering, Advanced Technical and perhaps Breadth) to be applied toward an in-depth study of a single field and its relation to chemical engineering. For options of possible interest, a faculty adviser should be consulted early in a student's career. The options program provides a student to consult the option adviser as well as a general adviser, and as a senior will often undertake project or seminar work supervised by the option adviser. The completion of an option program (normally five courses), which may require enrollment for an extra semester, will be acknowledged in writing by the college when the other requirements for the degree are satisfied. The options now available are: chemistry; applied physics; systems analysis and applied mathematics; materials constitutions and conversion; energy; applied biology; food resources and processing; business organization and science education. See the Announcement of the College of Chemistry for additional information.

Double Major Programs with the College of Engineering. In addition to the interdisciplinary options described above, two major curricula involving the Colleges of Engineering and Chemistry are offered. These are: (1) Chemical Engineering/Materials Sciences and Engineering, and (2) Chemical Engineering/Nuclear Engineering. These curricula include the core courses in both departments and require slightly more units than the single major degree in chemical engineering. Details on these curricula can be found in the announcements of the College of Chemistry and the College of Engineering.

Graduate Programs

Students interested in graduate study are invited to write to the Department of Chemical Engineering for information.

Upper Division Courses

140. Introduction to Chemical Process Analysis. (3) Three 1-hour lectures and one hour of discussion per week. Prerequisites: Chemistry 14 (may be taken concurrently). Material and energy balances applied to chemical process systems. Determination of thermodynamic properties needed for such calculations. Sources of data. Calculation procedures. (F,SP) Reimert, Foss

141. Chemical Engineering Thermodynamics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 140 with grade C- or higher. Thermodynamic behavior of pure substances and mixtures. Properties of solutions, phase equilibria. Thermodynamic cycles. Chemical equilibria for homogeneous and heterogeneous systems. (F,SP) Hees, Pratumsri

142. Chemical Kinetics and Reaction Engineering. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 141; Math 50A and 50B. Analysis and prediction of rates of chemical conversion in chemical processes. Determination of chemical kinetic and heterogeneous systems. (F,SP) Graves, Peterson

150A. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150A with grade C- or higher; Math 50B. Principles of fluid mechanics and heat transfer with application to chemical processes. Flow in ducts, around submerged objects, and in porous media. Flow measurements. Heat conduction and radiation; heat-transfer coefficients. (F,SP) Dinn, Radke

150B. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150A with grade of C- or higher. Principles of heat and mass transfer with application to chemical processes. Diffusion, Convective transport in boundary layers, analogies. Interphase transfer; Heat- and mass-transfer coefficients; correlations. (F,SP) Clark, Theodorou

152. Separation Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150A with a grade of C- or higher; 150B (which may be taken concurrently). Principles of equilibrium and transport-controlled separations. Design of staged and continuous separation processes including distillation, absorption, stripping, and extraction. Processes involving simultaneous heat and mass transfer including humidification and drying. (F,SP) Hansen, Michaels

154. Chemical Engineering Laboratory. (3) Three days of laboratory work per week. Prerequisites: 150B; Bios 2 or consent of instructor. Experiments in physical measurements, fluid mechanics, heat and mass transfer, kinetics, and separation processes. Emphasis on understanding of mass transfer and chemical reaction engineering. Practical design and evaluation of equipment; emphasis on chemical engineering. (SP) Rosenthal, Taylor

156. Reaction Engineering. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 141; Math 50A. Design of chemical reactor systems. Laboratory experiments in the design of reaction systems, reactor design. Laboratory experiments in reactor characterization, combustion, homogeneous kinetics, reactor design. (F,SP) Sullivan, Plouffe

170. Introduction to Biochemical Engineering. (2) Two hours of lecture per week. Prerequisites: 150B. Special methods and theory for design and operation of processes in the biochemical industries, with special emphasis on fermentation processes. (F,SP) Blanch

170L. Biochemical Engineering Laboratory. (1) One 3-hour laboratory per week. Prerequisites: 170 (may be taken concurrently), or consent of instructor. Laboratory techniques for microbial culture and enzymatic conversion of substrates. (SP) Williams

171. Transport Phenomena. (3) Three hours of class meetings per week. Prerequisites: 150B. Study of momentum, energy, and mass transfer in laminar and turbulent flow. (SP) Williams

173. Particle Systems. (3) Three hours of class meetings per week. Prerequisites: 150A. Production and separation of particulate systems in force and flow fields. Dust and mist collection, sedimentation, and coagulation processes. (F,SP) Tobias

174. Chemical Reactor Design and Catalysis. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: 142 or equivalent. Physical and chemical aspects of characterization of catalysts, catalytic kinetics, analysis of reaction systems, reactor design. Laboratory experiments in catalyst characterization, combustion, homogeneous kinetics, and reactor performance. (SP) Tobias

175. Selection and Evaluation of Chemical Process Equipment. (3) Three hours of laboratory per week. Prerequisites: 160 (may be taken concurrently). Development and discussion of cases involving engineering of chemical processes. Process selection and synthesis. Evaluation of process alternatives. (SP) Tobias, Lyon

176. Principles of Electrochemical Processes. (3) Three hours of lecture per week. Prerequisites: 141; 150B. Principles and application of electrochemical equilibria, kinetics, and transport processes. Technical electrolys and electrochemical energy conversion. (F) Tobias

178. Polymer Science and Technology. (3) Three hours of lecture per week. Prerequisites: 150A. Three hours of lecture per week. Prerequisites: 150A or equivalent fluid mechanics; one semester of organic chemistry and physics recommended. Introduction to physical aspects of the behavior of organic polymers. Properties of solutions, melts, glasses, elastomers, and crystals. Engineering applications, emphasizing processing technology. Experiments in polymerization and characterization. (F) Theodorou

179. Process Technology of Solid-State Materials Devices. (3) Three hours of class meetings per week. Prerequisites: Engineering 45; one course in electronic circuits recommended; senior standing. Chemical processing and properties of solid-state materials. Crystal growth and purification. Thin film technology. Application of chemical processing to the manufacture of semiconductor devices. (SP) Hesse

185. Technical Communication for Chemical Engineers. (2) Course may be repeated for credit with change of topic. Course may be taken on a pass/fail graded or pass/fail.ungraded basis. Three hours of lecture per week. Prerequisites: 140; satisfactory completion at UC of Subject A examination or obsolescence; satisfactory completion of O.E. English composition and satisfactory SAT writing and oral presentation skills as judged by instructor. Development of technical writing and oral presentation skills in formats commonly used by chemical engineers. (F,SP) Sullivan, Plouffe

H194. Research for Advanced Undergraduates. (2-3) Course may be repeated for credit. Individual concentration. Prerequisites: Honors and senior standing. Original research under direction of one of the members of the staff. (F,SP)

195. Special Topics. (2-3) Course may be repeated for credit. Individual concentration. Prerequisites: Consent of instructor. Lectures and/or tutorial instruction on special topics. (F,SP)
250. Process Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. This course emphasizes principles of fluid mechanics and numerical methods. Incidence may not receive credit for 250V. One 2-hour lecture per week. Prerequisites: Graduate standing or consent of instructor. This course focuses on theoretical aspects of fluid mechanics. Topics include: finite element methods for non-linear and time-dependent problems, approximation errors, solution of the incompressible Navier-Stokes equations, free and moving boundaries, stabilized finite element methods, and recent developments in the finite element modeling of viscoelastic (memory) fluids.

255. Mass Transfer. (2) Two hours of lecture per week. Prerequisites: Chemistry 172, Math 50A or equivalent; open to property qualified graduate students. The course covers mass transfer in laminar and turbulent flows. Transport analogies, simultaneous heat and mass transfer, with examples of drying and humidification processes. Mass transfer with chemical reactions, examples of slow, intermediate, and fast reactions with application to design of mass contacts. Interfacial mass transfer and mass transfer in two-phase flows. Design of packed beds and columns, gas spargers and rectifiers. (F)

263. Chemical Process Economics and Project Systems. (3) Three hours of lecture per week. Prerequisite: 244 or equivalent. This course is an introduction to the numerical solution of problems of the processing industries. Development of optimization of processing alternatives. Qualitative and quantitative application to design of mass transfer processes. Theory of diffusion in gases and liquids for single and multicomponent species. Mass transfer in laminar and turbulent flows. Transport analogies, simultaneous heat and mass transfer, with examples of drying and humidification processes. Mass transfer with chemical reactions. Examples of slow, intermediate, and fast reactions with application to design of mass contacts. Interfacial mass transfer and mass transfer in two-phase flows. Design of packed beds and columns, gas spargers and rectifiers. (SP) Staff

251. Separation Processes and Mass Transfer. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Methods for separating homogeneous and heterogeneous mixtures. Application of equilibrium and component separation, including computations for equilibrium and component separation and partial differential equations. (F) Newman

252. Computer Control of Chemical Processes. (3) Three hours of lecture per week. Prerequisites: 172, Math 50A and 50B (linear algebra) or equivalent; open to property qualified graduate students. The course covers control configurations, process modeling and identification, multivariable and adaptive controls. Applications to combustion, heat exchanger, and flow reactors. (F) Newman

260. Applied Chemical Thermodynamics and Process Analysis. (3) Three hours of lecture per week. Prerequisites: 142 and 230, or equivalent, or consent of instructor. An introduction to the thermodynamics of industrial processes. (F) Peterson

246. Principles of Electrochemical Engineering. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Electrode processes in electrolysis and in galvanic cells. Charge and mass transfer in electrolyte media. Critical scale-up.

285. Applied Chemical Kinetics and Reaction Analysis. (3) Three hours of lecture per week. Prerequisites: 150A and 150B or equivalent. An introduction to the numerical solution of chemical engineering applications. Detailed investigation of laminar flows. (F) Newman

249. Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: 244 or Chemistry 219, or consent of instructor. Adsorption and kinetics of surface reactions; catalyst preparation and characterization; poisoning, selectivity, and empirical activity patterns in catalysis; surface chemistry, catalytic mechanisms and modern experimental techniques in catalytic research; descriptive examples of industrial catalytic systems.

295. Mass Transfer. (2) Two hours of lecture per week. Prerequisites: 172, Math 50A and 50B (linear algebra) or equivalent; open to property qualified graduate students. The course focuses on theoretical aspects of fluid mechanics. Topics include: finite element methods for non-linear and time-dependent problems, approximation errors, solution of the incompressible Navier-Stokes equations, free and moving boundaries, stabilized finite element methods, and recent developments in the finite element modeling of viscoelastic (memory) fluids.

298. Seminar in Chemical Engineering. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: Consent of instructor. Special laboratory and theoretical studies.

259. Electrochemical, Hydrodynamic, and Interfacial Phenomena. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. The course covers electrochemical, hydrodynamic, and interfacial phenomena. (F) Newman

256. Design and Engineering of Integrated Chemical Process Systems. (3) Three hours of lecture per week. Prerequisites: A comprehensive background in chemical engineering. Consideration of specific, realistic cases involving the synthesis, evaluation, selection, and optimization of processing alternatives. Qualitative and quantitative studies. Criteria for engineering judgment and economic evaluation. (SP) Lynn, Tobias

295Y. Mass Transfer. (2) Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. This course covers mass transfer in laminar and turbulent flows. Transport analogies, simultaneous heat and mass transfer, with examples of drying and humidification processes. Mass transfer with chemical reactions. Examples of slow, intermediate, and fast reactions with application to design of mass contacts. Interfacial mass transfer and mass transfer in two-phase flows. Design of packed beds and columns, gas spargers and rectifiers. (F) Newman

296. Special Study for Graduate Students in Chemical Engineering. (1-6) Course may be repeated for credit. Sections 1-29: satisfactory/unsatisfactory grading; Sections 30 letter grade. Individual conferences. Prerequisites: Consent of instructor. Special laboratory and theoretical studies.

302. Individual Studies for Graduate Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: Graduate standing in Ph.D. program. Individual study in consultation with the major field adviser for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. degree. May not be used for unit or residence requirements for the doctoral degree. (F,SP)

Professional Courses

300. Professional Preparation: Supervised Teaching of Chemical Engineering. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences and participation in teaching activities. Prerequisites: Graduate standing, appointment as a graduate student instructor, or consent of instructor. Discussion, problem review and development, guidance of large scale laboratory experiments, course development, supervised practice teaching. (F,SP)

Interdepartmental Studies Courses

Upper Division Courses

IDS 124. Applied Chemical Thermodynamics. (3) Three hours of lecture per week. Prerequisites: Chemistry 120B or equivalent. Properties of real fluids and fluid mixtures, including chemical equilibria and phase equilibria.
Chemistry (College of Chemistry or College of Letters and Science)

Department Office: 419 Latimer Hall, 642-5882
Chalk, R.K., Ph.D.
Undergraduate Affair Office: 420 Latimer Hall, 642-0473

University Professors:
Melvin Calvin, Ph.D., Sc.D., L.L.D. (Emeritus) Organic chemistry
Eric Sabatini, Ph.D. Organic and biophysical chemistry

Professors:
Neil Bartlett, Ph.D., D.Sc. Inorganic chemistry, solid state, materials science
Ronald D. Bartlett, Ph.D. Organic chemistry
Robert G. Bergman, Ph.D. Organometallic chemistry
Leo Bremer, Ph.D. Physical chemistry
Joseph Emsley, Ph.D. Nuclear chemistry
David Chandler, Ph.D. Theoretical chemistry
William G. Dauben, Ph.D. Physical chemistry
Charles S. Herrick, Ph.D. Physical chemistry
Robert A. Hauri, Ph.D. Nuclear chemistry
John E. Hearn, Ph.D. (Associate Director, Lawrence Berkeley Laboratory) Physical chemistry
Clayton H. Heathcock, Ph.D. Organic chemistry
Daniel C. Hoffman, Ph.D. Nuclear chemistry
Harold K. Johnson, Ph.D. Physical chemistry
William J. Joly, Ph.D. Inorganic and physical chemistry
Sung-Kyu Jo, Ph.D. Physical chemistry
Judith P. Kliment, Ph.D. Biochemistry, biophysical chemistry
Yuan T. Lee, Ph.D. Physical chemistry
William A. Lester, Ph.D. Theoretical chemistry
Samuel S. Mockrinz, Ph.D. Nuclear and environmental chemistry
Richard A. Mathies, Ph.D. Biophysical and physical chemistry
William H. Miller, Ph.D. Theoretical chemistry
Bradley Moore, Ph.D. Physical chemistry
Ludovico G. Moreto, Ph.D. Nuclear chemistry
Rollie J. Nawi, Ph.D. Physical chemistry
Chaster T. O’Konski, Ph.D. Biophysical and structural chemistry
Norman E. Phillips, Ph.D. (Associate Director, Lawrence Berkeley Laboratory) Physical chemistry
George C. Pimentel, Ph.D. (Associate Director, Lawrence Berkeley Laboratory) Physical chemistry
Alexander H. Pines, Ph.D. Physical chemistry
Henry Rapoport, Ph.D. Organic chemistry
John O. Rasmussen, Ph.D. Nuclear and theoretical chemistry
Kenneth Raymond, Ph.D. Inorganic and biophysical chemistry
Kenneth Seager, Ph.D. Biophysical chemistry
Richard J. Saykally, Ph.D. (Vice Chair) Physical chemistry
David A. Shirley, Ph.D., D.Sc. (Director, Lawrence Berkeley Laboratory) Physical chemistry
Gabor A. Somorjai, Ph.D. Physical chemistry
Herbert G. Stein, Ph.D. Physical chemistry
Andrew Streitwieser, Jr., Ph.D. (Vice Chair) Physical chemistry
David H. Templeton, Ph.D., D.Sc. Physical chemistry
Ignacio Teoco, Jr., Ph.D., D.Sc. Biophysical chemistry
K. Peter Yven, Ph.D. Organic chemistry
James Cason, Jr., Ph.D. (Emeritus) Organic chemistry
Robert E. Coull, Ph.D. Physical chemistry
Donald J. Coker, Ph.D. Organic chemistry
Donna M. Dwyer, Ph.D. Nuclear chemistry
Kenneth S. Pitzer, Ph.D., D.Sc., LL.D. (Emeritus) Physical chemistry

Asoociate Professors:
Richard A. Andersen, Ph.D. (Vice Chair) Inorganic and organometallic chemistry
Peter G. Schultz, Ph.D. Biogeochemistry

Assistant Professors:
William H. Armstrong, Ph.D. Inorganic chemistry
Mark D. Boddie, Ph.D. Physical chemistry
Joel M. Hawkins, Ph.D. Organic and organometallic chemistry
Anthony D. Haymet, Ph.D. Theoretical physical chemistry
Masanori Meguro, Ph.D. Physical chemistry
David M. Neumark, Ph.D. Physical chemistry
Steven F. Pedersen, Ph.D. Inorganic and organic chemistry
John D. Pine, Ph.D. Physical chemistry
Angelica M. Stacy, Ph.D. Inorganic and physical chemistry
David E. Wemmer, Ph.D. Physical chemistry
K. Burgitta Whately, Ph.D. Theoretical chemistry

Lecturers:
Marjorie O. Fattens, Ph.D. Physical chemistry
Arlyn M. Myers, Ph.D. Organic chemistry

Choice of College

A student can complete a major in chemistry in either the College of Chemistry (B.S. degree) or the College of Letters and Science (A.B. degree). Both curricula are approved by the American Chemical Society if the student includes certain courses in the total program, and either is a satisfactory foundation for a career in chemistry. Students interested in the teaching of chemistry, or if, completed with high academic standing, for graduate work in chemistry.

Chemistry Major in the College of Chemistry

The requirements for a B.S. degree in the College of Chemistry, with a chemistry major, are: A total of 120 semester units; Mathematics 1A, 1B, and one of 50A, 50B, 51; Physics 7A, 7B, 7C; Chemistry 1A, 1B, and 5 (or 4A, 4B); 104A, 104B, 112A, 112B, 120A, 120B, 125, and a choice of 105, 108, 115, or 143 plus IDS 145. In addition to these specified courses, the B.S. chemistry major consists of 15 units of advanced study in chemistry and related fields, including at least one course in chemistry. These courses permit the student to emphasize chemistry in areas of personal interest; or to specialize in some related field, such as physics, biology, geology, mathematics, metallurgy, materials science, ceramic engineering, or environmental science; or to complete the premedical requirements (Biochemistry 102 and Zoology 105, for example). With the approval of the academic adviser these 15 units of advanced scientific courses may be replaced by an advanced course in breadth electives (see below) may be used for core courses in other interdisciplinary areas.

The following requirements must also be satisfied: Subject A: American History and Institutions; A reading knowledge of German equivalent to that provided by courses 1 and 2; and a program of 15 units in English composition, humanities, and social sciences, chosen from a list provided by the College of Chemistry.

See the Announcement of the College of Chemistry for additional information about the chemistry program.

Intercollegiate Transfers. Students may transfer to the junior level. If the work presented for transfer credit includes a minimum of two years of chemistry, one year of calculus, one year of physics, and one year of English composition, it is generally possible for the transfer student to complete the remaining requirements in two years.

Chemistry Major in the College of Letters and Science

Major Requirements

Mathematics: 1A, 1B.
Physics: 7A, 7B, 7C.
Chemistry: 1A, 1B, and 5 (or 4A, 4B); 104A, 104B, 112A, 112B, 120A, 120B, and a choice of one of 105, 108, 115, or 143 plus ILS 145. In addition to these specified courses, the B.S. chemistry major requires 15 units of advanced study in chemistry and related fields, including at least one course in chemistry. These courses permit the student to emphasize chemistry in areas of personal interest; or to specialize in some related field, such as physics, biology, geology, mathematics, metallurgy, materials science, ceramic engineering, or environmental science; or to complete the premedical requirements (Biochemistry 102 and Zoology 105, for example). With the approval of the academic adviser these 15 units of advanced scientific courses may be replaced by an advanced course in breadth electives (see below) may be used for core courses in other interdisciplinary areas.

Field Major in Physical Sciences

Students interested in this major should see Physical Science for the description of the major program.

California Teaching Credential

For information concerning the California Teaching Credential (Single or Multiple Subject), see the Announcement of the School of Education.

Graduate Programs

Students interested in graduate study are invited to write to the chair of the Department of Chemistry, 419 Latimer Hall, for information.

Lower Division Courses

1A-1B. General Chemistry. (4,4) Students with credit in 4A or 4B may not receive credit for the corresponding semesters of 1A-1B. Two 1-hour lectures, one half hour of discussion, and one 4-hour laboratory per week. Prerequisites: 1A: High school chemistry recommended. 1B: A or a score of 3, 4, or 5 on the chemistry AP test. Stoichiometry, ideal gases, equilibrium (solubility, acids, and bases), thermochromy, nuclear chemistry, electrical cells, imperfect gases, atomic structure, chemical bonding; periodic table, descriptive chemistry, transition metals, kinetics, introductory organic chemistry, qualitative analysis. Deficiency in 4A may be removed by successfully completing 1A. (F,SP) Pines, C. Harris; Markowitz, Fimental

4A-4B. General Chemistry and Quantitative Analysis. (5,5) Students with credit in 4A or 4B may not receive credit for the corresponding semesters of 4A-4B. Three 1-hour lectures and five hours of laboratory per week. Prerequisites: High school chemistry within past two years (high school physics is recommended), introductory calculus (may be taken concurrently), and a score of 710 or higher on the College Entrance Examination Board Achievement Test in Mathematics (Math, area 1 or 2). Highly motivated students with Math Acc scores between 670 and 710, and who have satisfied the other prerequisites, will also be considered; Instructor's approval required. 4A-4B covers the principles of general chemistry with a more quantitative emphasis than 1A-1B and with considerably more depth. Laboratory emphasizes quantitative work and includes an independent research project in 4B. Equivalent to 1A-1B plus 5 as prerequisites for further courses in chemistry. (F,SP) Moore; Stacy

5. Quantitative Analysis. (3) Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: 1B with grade of C- or higher. Acid-base, redox, complex formation equilibria and their application to volumetric analysis, spectrophotometry, potentiometry, coulometry, polarography, and ion exchange chromatography. Selected additional topics in instrumental analysis. (F,SP) Porter, Chief. Major

6. Organic Chemistry with Biological Emphasis. (3) Students with credit in 4A or 4B may not receive credit for 8A. Deficiency in 112A cannot be removed by successfully completing 8A. Three hours of lecture and one hour of discussion per week. Prerequisites: 1B or 4B. For students not majoring in chemistry and not planning to take additional courses in organic chemistry. A study of the important classes of organic compounds. (F,SP) P. Bartlett, Volhardt

8B. Organic Chemistry with Biological Emphasis. (4) Students with credit in 112B may not receive credit for 8B. Deficiency in 112B cannot be removed by successfully completing 8B. Three hours of lecture, one 1-hour laboratory lecture, and three hours of laboratory per week. Prerequisites: 8A. For students not majoring in chemistry and not planning to take additional courses in organic chemistry. (F,SP) Volhardt, P. Bartlett

14. Chemical Thermodynamics. (3) Students with 2 units in 130A may receive 1 unit of credit for 14. Deficiency in 130A may be removed by successfully completing 14. Two 1-hour lectures and one half hour of discussion per week. Prerequisites: 1B or 4B. Math: 18B; Physics 7B (may be taken concurrently). Introduction to chemical thermodynamics, colloidal properties and chemical equilibria. (F) Somorjai
Upper Division Courses

104A-104B. Advanced Inorganic Chemistry. (3,3) Formerly 104A. Three hours of lecture per week. Prerequisites: 221A or 43G. Theoretical chemistry of metals and non-metals including the application of physical chemical principles. (F,S,P) Staley, Jolly

105. Advanced Quantitative Analysis. (4) Two 1-hour lectures and two 4-hour laboratories per week. Prerequisites: 104A (may be taken concurrently). Instrumental analysis. Principles and applications of electrochemical and spectroscopic methods, including atomic absorption, fluorescence, controlled potential electrolysis, and spectrophotometry. (F) Discussion is for problem solving and the application of instrumental topics, (F,S,P) Mele.

108. Inorganic Synthesis and Reactions. (4) Two hours of lecture and eight hours of laboratory per week. Prerequisites: 104A and/or 104B with grade of C or higher. Multistep synthesis and the chemistry of polycyclic and complex reactions. (F,S,P) Keese, Sauer; Kim

112A-112B. Organic Chemistry. (5,5) Students with credit in 8A and/or 8B may receive 2 units of credit respectively for the corresponding semesters of 112A. Three hours of lecture; one 2-hour laboratory per week. Prerequisites: 1B or 4B with grade of C or higher. Deficiency in 112A may be removed by successfully completing 112B. Students with credit in 112A may receive 2 units of credit for 112B. (F,S,P) Rapoport, Raasch

112E. Organic Chemistry—Lecture Only. (3) Students with credit in 112B may receive credit for 112E. Three hours of lecture per week. Prerequisites: 1B or 4B with grade of C or higher, taken at UC Berkeley. Prerequisites: Students with credit in 112A and/or 112B may receive credit for 112E. Two hours of lecture per week. Prerequisites: 1B or 4B, and at least one semester course in calculus. Intended for students majoring in the biological sciences. The weekly one-hour discussion is for further problem solving and the application of calculus in physical chemistry. Students with secure backgrounds in mathematics and the quantitative aspects of chemistry may enroll in 1130A-1130B, which is lecture only. (F,S,P) Mathies, Sauer; Kim

130A-130B. Biophysical Chemistry. (3,3) Three hours of lecture per week. Prerequisites: 120A-120B, 125, or equivalent Current topics include spectroscopy, physical principles and theory in inorganic chemistry including discussion of the structure, bonding, and reactions of inorganic compounds. (F,S,P) Armstrong; Stacy

208. Structure Analysis by X-Ray Diffraction. (3) Must be taken on a satisfactory/unsatisfactory basis. Principles and practice of modern, single-crystal X-ray diffraction. Groups of four students each determine the crystal and molecular structure of newly synthesized materials from X-ray diffraction data. The laboratory work involves the mounting of crystals and initial evaluation by X-ray diffraction film techniques, the collection of Intensity data by automated diffractometer procedures, and structure analysis and refinement. (F,S,P) Rapoport

210A. Physical Organic Chemistry. (3) Three hours of lecture per week. Prerequisites: 112, 120, or consent of instructor. Fundamental bonding, energy, dynamical, and stereochemical concepts. (F) Bergman

210B. Physical Organic Chemistry. (2) Two 1-hour lectures per week. Prerequisites: 210A or consent of instructor. Mechanisms of organic chemical transformations. (SP) Streitwieser

211A. Synthetic Organic Chemistry. (3) Three 1-hour lectures per week. Prerequisites: 112B, 210A (must be taken concurrently), or consent of instructor. Application of chemical and spectroscopic methods, designed as a preparation for organic synthesis, oxidation and reduction reactions, modern synthetic methods. (SP) Dauben

213. Introduction to Organic Research. (2) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and three hours of laboratory per week. Prerequisites: 210A (may be taken concurrently) or consent of instructor. Application to organic synthesis, oxidation and reduction reactions, modern synthetic methods. (SP) Wedgewood

220A. Thermodynamics and Statistical Mechanics. (3) Three 1-hour lectures per week. Prerequisites: 120B. A rigorous presentation of classical thermodynamics followed by an introduction to statistical thermodynamics with the application to real systems. (F) Haymet

220B. Thermodynamics and Statistical Mechanics. (3) Three 1-hour lectures per week. Prerequisites: 220A. Principles of statistical mechanics, ensemble theory, and application to complex systems. (SP) Chandler

221A. Advanced Quantum Mechanics. (3) Three hours of lecture per week. Prerequisites: 220B and one additional introductory course. Discussion is for problem solving and the application of many-body quantum mechanics. (SP) Miller


Graduate Courses

203. Applied Molecular Orbital and Group Theory for Inorganic Chemistry. (3) Three hours of lecture per week. Prerequisites: Background in the use of matrices and linear algebra. The symmetry of molecules and ions; the application of group theory in molecular structure determination, chemical bond theory and spectroscopy for inorganic materials as molecular species and in crystal lattices. (F) (S,P) N. Bartlett

204A-204B. Advanced Topics in Inorganic Chemistry. (3,3) Three hours of lecture per week. Prerequisites: 104A-104B, 125, 126, or equivalent. Current topics and theory in inorganic chemistry including discussion of the structure, bonding, and reactions of inorganic compounds. (SP,P) Armstrong; Stacy

*On leave, spring
†Recipient of Distinguished Teaching Award
231. Advanced Biophysical Chemistry. (3) Three
hours of lecture per week. Prerequisites: Graduate
standing or consent of instructor. Topics dealing with
structural and dynamic aspects of RNA, DNA, and pro-
tein, and with bioenergetics, membrane organization,
and membrane protein structure. Physical-chemical
approaches to these topics will be emphasized. (F)

(3) Three hours of lecture per week. Prerequisites: 143
or equivalent and introductory quantum mechanics.
Selected topics on nuclear structure and nuclear reac-
tions. (SP)

255. Special Topics. (1-3) Course may be repeat-
ed for credit. Lecture series on topics of current
interest. Recently offered topics: inorganic compounds,
metal-organic chemistry, biomolecular spectroscopy,
resonance, the chemistry of air pollution, and natural
products. (F,SP)

269. Seminars for Graduate Students. (1-3) Course
may be repeated for credit. Must be taken on a sat-
factory/unsatisfactory basis. Seminars. Prerequisites:
Graduate standing. In addition to the weekly re-
search conference and weekly seminars on topics of
interest in biophysical, organic, physical, nuclear,
and inorganic chemistry, there are group seminars on
specific fields of research. Seminars will be announced at
the beginning of each semester. (F,SP)

299. Research for Graduate Students. (1-3) Course
may be repeated for credit. Laboratory. Prerequisites:
Graduate standing. The facilities of the laboratory are
available at all times to graduate students pursuing
original investigations toward an advanced degree at
this University. Such work is ordinarily in collaboration
with a member of the staff. (F,SP)

602. Individual Study for Doctoral Students. (1-6)
Course may be repeated for credit. Must be taken on a
satisfactory/unsatisfactory basis. Individual study in
consultation with the major field adviser, intended to
provide an opportunity for qualified students to shape
themselves for the various examinations required of
candidates for the Ph.D. degree. May not be used for
unit or residence requirements for the doctoral degree.
(F,SP)

300. Professional Preparation: Supervised Teaching
of Chemistry. (2) Course may be repeated for credit.
Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Graduate standing and appointment as a
graduate student instructor. Discussion, curriculum
development, class observation, and practice teaching
in chemistry. (F,SP)

310. Undergraduate Chemistry Instruction. (2) Course
may be repeated once for credit. Must be taken on a
pass/fail basis. One hour of lecture and 5
hours of laboratory per week. Prerequisite: Sophomore
standing; completion of 1A-1B with a grade of B-
or better. Tutoring of students in 1A-1B. Students will attend a weekly meeting on tutoring methods at the Student Learning Center and will attend 1A-1B lectures. (F,SP)

Chicano Studies

(Special Studies or College of Letters and Science)

Program Office: Special Studies, 3404 Dwinnelle Hall, 643-0240

Major Office: College of Letters and Science, 3410
Dwinnelle Hall, 642-0240

Associate Professors: Mario Barba, Ph.D.
Margaret Melville, Ph.D.
Carlos Muñoz, Ph.D.
Alex Saragosa, Ph.D.
Gary Soto, M.F.A.

Adjunct Lecturers: Yvette Flores-Ortiz, Ph.D.
Francisco Hernandez, Ph.D.
Larry Trujillo, D.Crim.

Visiting Lecturers: Rupert Garcia, M.F.A.

Undergraduate Major Adviser: Ms. Ybarra-Garcia

Choice of Program

A student can complete the major in Chicano Studies in the College of Letters and Science (A.B. degree) or in the Department of Ethnic Studies (A.B. degree). Students in each program are subject to the requirements of the respective college or department. The Chicano Studies major offers an interdisciplinary curriculum of academic study that critically examines the historical and contemporary experiences of people of Mexican descent in the context of American society and institutions. Moreover, in light of continuous immigration from Mexico, and now Central America, the Chicano Studies major curriculum includes the study of particular aspects of Mexican history, culture and politics as they bear upon the Chicano community, past and present. Emphasis is given in the major to the student developing a broad knowledge of the Chicano experience. Thus, the major stresses the analysis of the international-ships in the historical background, cultural patterns, and artistic expression of the Chicano community in order to acquire a well-rounded, in-depth understanding of the contemporary interface between Chicanos and American society. In this connection, the major strives to incorporate various disciplines in its approach, such as political science, sociology, anthropology, history, literary criticism, and art. Through the interdisciplinary nature of our curriculum, the major is aimed at preparing students for incorporation into the world of work and for a wide range of advanced work and/or professional training in various fields.

Chicano Studies Program Requirements

The Bachelor of Arts degree in Chicano Studies will be awarded upon fulfillment of the following re-

quirements:

1. Completion of the general University requirements regarding senior residence, Subject A, American and Institutional.

2. Completion of 120 units, at least 40 of which must be in upper division.

3. Maintenance of at least a C average in all courses undertaken at the University and a grade of C av-
erage in all courses in the major program.

Breadth Requirements—Special
Studies (for College of Letters and Science breadth requirements, see
the college announcement)

1. Demonstrate proficiency in Reading and Com-
position: Chicano Studies 1A and 1B or equivalents.

2. Completion of at least 6 units of courses in Ethnic Studies, Asian American Studies or Native American Studies.

3. Completion of one course in quantitative methods (e.g., statistics, mathematics, computer science).

Major Requirements

Lower Division. 1. Completion of three core courses from Chicano Studies 20, 40, 50, 70 or 80.

2. Demonstration of proficiency in Chicano Spanish through completion of 6A and 6B, Chicano Spanish (or by passing a proficiency examination given at the beginning of each semester).

3. Completion of at least 6 units of courses (may include upper division) outside the Ethnic Studies Department such as political science, social welfare, comparative literature, etc. (determined upon con-
sultation with the Chicano Studies adviser).

Upper Division. 1. Completion of Chicano Studies 101.

2. Completion of five additional upper division courses in Chicano Studies to include: (a) one course from 145, 155, 172, or 176; (b) one course from 150A, 150B 170 or 174; (c) one course from 141, 142 or 143; (d) two electives. It is recommended that majors take at least one upper division Chicano Studies course in Spanish.

3. One course in Ethnic Studies.

4. Four units of senior thesis work will be optional for all majors: 195.

Honors Program. The Chicano Studies Program provides a program leading to the A.B. degree with honors. A student must have junior standing: a 3.3 University GPA; and a 3.3 GPA in the major. The honors thesis will consist of a 6-unit research project. The faculty will establish criteria and grade the project. For more information, see the Chicano Studies ad-
viser in 3410 Dwinnelle.

The Minor in Chicano Studies

Required courses: Five upper division courses.

(1) Chicano Studies 101. (2) One course from 150A, 150B, 170, or 174. (3) One course from 141, 142, or 143. (4) One course from 145, 155, 172, or 176. (5) (Choose and 3 units upper division elective.

Lower Division Courses

1A. English Reading and Composition for Native
Speakers of Spanish. (4) Three hours of lecture and
three hours of discussion. Prerequisites: Subject A. To acquire Chicano and bilingual students with
methods of expository discourse. An introduction to
writing, beginning with sentence and paragraph structure, with an emphasis on unity, coherence, and overall or-
ganization of a full composition. (F)

Soto
1B. English Reading and Composition for Native Speakers of Spanish. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Subject A. Designed to acquaint bilingual students with the study of the research paper form of expository discourse. (SP) Soto

6A. Chicano Spanish. (4) Four hours of lecture per week. Designed and systematically structured to develop concepts and skills essential for effective communication in and facility with the Spanish language. Three hours of lecture and one hour of discussion per week. Prerequisites: 1A and the study of the research paper form of expository discourse. Designed to acquaint bilingual students with newly acquired confidence in and facility with Spanish through an emphasis on class discussions, weekly compositions, individual and group presentations, lectures, movies and selected readings. Newly acquired confidence in and facility with Spanish will be continually reinforced through class presentation, written and oral reports and researched topics. (F,SP)

6B. Chicano Spanish. (4) Four hours of lecture per week. Prerequisites: 6A. To expand upon the skills and concepts learned in 6A. This course is designed to introduce the Chicano student to representative Spanish authors and to critical analyses of a variety of their writings. (SP)

20. Introduction to Chicano Culture. (3) Three hours of lecture per week. An introduction to the cultural life of Chicanos emphasizing the period from 1900 to the present. A key theme will be the interaction between Chicanos and American society as expressed in Chicano literature, music, art, and folklore. Attention will be given to change and continuity in Chicano family life, gender roles and parent-child relations. (SP) Melville

30. Introduction to Mexican and Chicano Art History. (3) Three hours of lecture per week. An introductory course surveying the Mesoamerican art, the Mexican colonial period, and contemporary Chicano art. (SP) Garcia

40. Introduction to Chicano Literature In English. (4) Four hours of lecture per week. The course will introduce students to modern Chicano literature written in English, and will provide necessary background for understanding more specialized courses in the area. (SP) Alarcon

50. Introduction to Chicano History. (3) Three hours of lecture per week. A historical survey of the relationship between American society and the Mexican from the late eighteenth century to the present. Particular stress will be placed on the interpretation and analysis of the connections between the Chicano and the history of the United States. Emphasis will be placed on the diversity among Chicanos and its origins. (F) Saragossa

70. Political Institution and the Chicano. (4) Three hours of lecture and one hour of discussion per week. A critical introduction to dominant U.S. political institutions and their effect on Chicanos-Latinos. (F) Murillo

80. Identity and Assimilation in the Chicano Community. (3) Three hours of lecture per week. An examination of Chicano identity and assimilation from the perspectives of social science and the humanities. Topics include cultural nationalism and cultural pluralism, effects of social class, language patterns, the family, barrio, youth, and sexual identity. (F) Barrera

Upper Division Courses

101. Introduction to Chicano Studies Research. (4) Formerly 101A-101B. Three hours of lecture per week. Prerequisites: Upper division standing. This course is especially designed for Chicano studies majors, minors, and dual majors with junior or above class standing. The objective of the seminar is to offer the student a critical understanding of the origins of Chicano studies and its development in the context of the development of intellectuals of Mexican descent in the United States. Secondly, the seminar will undertake a comprehensive and critical review of both interdisciplinary and disciplinary fields of research in Chicano studies. In addition to regular class meetings, individual consultations with the instructor, research, and preparation totaling 10 to 12 hours per week are required. (F) Murillo

135. The U.S. Latino Experience as Seen Through Film. (3-4) New course. One lecture hour and one 2-hour optional laboratory per week. Prerequisites: Sophomore standing. A study of the experience of Latinos in the United States as seen through the medium of film. The course includes documentary and feature films, both historical and contemporary. Students receive 3 credit hours for assisting at the lectures and doing class reading and written assignments. They receive 4 credit hours for attending and participating in a 2-hour weekly laboratory. (SP) Barrera

141. Chicana Writings. (3) Three hours of lecture per week. Prerequisites: 1A-1B or equivalent. An exploration and analysis of works by Chicana writers and the vision they present of themselves. (SP) Alarcon

142. Major Chicano Authors. (3) Three hours of lecture per week. Prerequisite: Recommended. Critical analysis of the works of major Chicano poets, short story writers, and novelists. (SP) Alarcon

143. Chicano and Latin American Literature. (3) Three hours of lecture per week. Prerequisites: 40 recommended. A study of Chicano and Latin American literature. Emphasis on the literature of protest as a constant underlying current from the Conquest to the present. (SP) Melville

145. La Chicana. (3) Three hours of lecture per week. Prerequisites: 50 and/or 40 recommended. Psychological, socio-cultural aspects of Chicanas in the United States. The role of the Chicana will be examined within an historical context within the family. (SP) Melville

149. Creative Writing. (5) Three hours of lecture and three hours of writing workshop per week. Prerequisites: 40 and consent of instructor. Through the course is conducted in English, a reading knowledge of Spanish is required. The student enrolled will study intensively craft in Chicano literature, issues and problems encountered by Chicanos writers, and the role the Chicano artist in society. The student will also practice writing in the genre of the student's choice. (F) Alarcon

150A. History of the Southwest: Spanish and Mexican Period. (3) Three hours of lecture per week. Prerequisites: 50 and/or 145 recommended. A history of Spanish-speaking people in the Southwest from the latter part of the eighteenth century to approximately 1880. This Spanish background of the Southwest will be discussed, but emphasis will be placed on the forces and events that led to the war between Mexico and the U.S. from 1845 to 1848. The aftermath of the war and its consequences for Spanish-speaking people will also be examined. (SP) Saragossa

150B. History of the Southwest: Mexican-United States Period. (3) Three hours of lecture per week. Prerequisites: 50 and/or 150A recommended. A history of Chicanos from the late nineteenth century to approximately 1910. This Mexican antecedents. Historical documents, literature, music and film will be utilized to trace the development of and variation in Chicano male-female relations, concepts of sexuality, courtship, child-rearing and parent-child relations. (SP) Saragossa

151. Central American Peoples and Cultures. (3) New course. Three 1-hour lectures per week. A comparative survey of the peoples and cultures of the seven countries of the Central American Isthmus from a historical and contemporary perspective. (F) Melville

162. The U.S. Role In Central America. (3) New course. Three hours of lecture per week; one hour of discussion section. A critical examination of the role played by the United States in Central America from the 19th century to the present. The focus will be on trends in U.S. policy, including an assessment of current policy alternatives in Nicaragua, El Salvador, Guatemala, and Honduras, and the impact of those policies on Latinos in the United States. (SP) Muñoz

170. Chicanos and Political Change. (3) Three hours of lecture per week. Prerequisites: 70 recommended. A comparative analysis of Chicano social and political movements, organizations, ideologies, and their relationships to others in the U.S. and abroad. (SP) Muñoz

172. Chicanos and Educational System. (3) Three hours of lecture per week. Prerequisites: 70 recommended. An examination of the historical and contemporary relationship between the educational system and Chicano community by focusing on the mechanics of schooling practices within the Mexican population as a backdrop to an examination of the current educational conditions of the Chicano students; the different historical trends in the education of Chicanos include alternative schools, bilingual education, school segregation, and higher education. (SP) Hernandez

174. Chicanos, Law, and Criminal Justice. (3) Three hours of lecture per week. Prerequisites: 70 recommended. An examination of the development and function of the legal system and its administration of justice, and the effects of the Chicano community. (SP) Trujillo

176. Chicanas and Health Care. (3) Three hours of lecture per week. Prerequisites: 70 recommended. Relationship of the Mexican tradition to the health care of the Chicano community. To include an examination and understanding of the concept of mental health as defined by Chicanas. Analysis of program alternatives and the Chicano response to health care programs. (F) Flores-Oritz

180. Topics In Chicano Studies. (3) Course may be repeated for credit. Three hours of lecture per week; limited enrollment lecture course. Prerequisites: Consent of instructor. Designed primarily to permit students to deal with topics which are especially relevant, usually more restricted than the subject matter of a regular lecture course. (FSP)

190. Advanced Seminar in Chicano Studies. (3) Course may be repeated for credit. One 3-hour seminar per week. Prerequisites: Upper division standing, consent of instructor. Advanced seminar in Chicano Studies with topics to be announced at the beginning of each academic year. (F,SP)

195. Senior Thesis. (4) Must be taken on a passed/not passed basis. By arrangement. Prerequisites: Consent of instructor. Writing a thesis under the direction of the thesis advisor. (SP) Mufioz

H165A-H165B. Honors Thesis. (3-3) Credit and grade to be awarded upon completion of the sequence. To be arranged. Prerequisites: Junior standing; a 3.3 University GPA and a 3.3 GPA in the major. Independent study, preparation of an honors thesis under the supervision of a faculty member, (F,SP)

197. Field Work In Chicano Studies. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual arrangements. Prerequisites: Upper division standing; consent of instructor. Field work in Chicano Studies for advanced students. Regular meetings with faculty sponsor and written reports required. (F,SP)

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual arrangements. Prerequisites: Upper division standing; consent of instructor. Directed group study in Chicano Studies for advanced students. Regular meetings with faculty sponsor and written reports required. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual arrangements. Prerequisites: Upper division standing; consent of instructor. Supervised independent field experience in the community relevant to specific aspects of Chicano Studies. Regular meetings with faculty sponsor and written reports required. (F,SP)

*Not offered 1988-89
1On leave, spring
2On leave, fall
3Recipient of Distinguished Teaching Award
4On leave, spring
5Recalled to active service
City and Regional Planning
(Graduate Program in Environmental Design)

Department Office: 228 Wurster Hall, 942-2356
Chair: Edward Blakey, Ed.D

Professors:
- Edward Blakey, Ed.D. University of California at Los Angeles. Locational theory and transportation.
- Stephen A. Cohen, Ph.D. London School of Economics. Economic development theory.
- Leonardo C. de Mina, M.D. Albert Einstein College of Medicine. Social programs and policy.
- Peter F. Drucker, M.Arch. University of California at Berkeley. Metropolitan planning.
- Richard L. Mier, Ph.D. University of California at Los Angeles. International urbanism.
- Roger Montgomery, M.Arch. Harvard University. Urban design, public communication.
- Peter Hall, Ph.D. Cambridge University. Metropolitan planning.
- Stephen S. Cohen, Ph.D. London School of Economics. Urban studies.

Lecturers:
- Ted Gates, Ph.D. University of California at Berkeley. Public organizations, economic development.
- Raymond Brady, Ph.D. Engineering. Tuskegee University.
- Karen Christensen, California State at Berkeley. Planning theory, housing.
- Michael Otsuka, Ph.D. Massachusetts Institute of Technology. Urban design, environmental psychology.
- Assistant Professors:
  - Robert B. Cervero, M.C.P., Ph.D. University of California at Berkeley. Planning theory, social policy.
  - Peter Bossejmann, M.Arch. University of California at Los Angeles. Urban planning.
  - Elizabeth Deakin, M.S. Massachusetts Institute of Technology. Urban policy.

The Department of City and Regional Planning offers a two-year graduate program of professional education in the field of city and regional planning leading to the degree of Master of City Planning, which is a recognized degree by the American Planning Association Board accreditation system. The department also offers a Ph.D. degree in city and regional planning.

The programs of Architecture, Landscape Architecture, and City Planning have identified core current programs in Urban Design enabling students to take two master's degrees in less than two years. The department also offers a Ph.D. degree in city and regional planning.

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These programs reflect the expanding concern of city planners with a wide variety of urban and regional problems, and the search for the empirical and theoretical understanding necessary to attack those problems. Courses in planning theory and practice are supplemented both within and outside the department by courses in the basic structure and functioning of the urban system from many viewpoints. Some of these courses are open to qualified undergraduate and graduate students in related fields. For more information on any of these, consult the Announcement of the College of Environmental Design or the City and Regional Planning, 228 Wurster Hall.

Upper Division Courses

110. Introduction to City Planning. (3) Three hours of lecture and discussion per week. Prerequisites: Open to majors in all fields. This course provides an introduction to the field of city and regional planning. It covers the basic concepts and principles of city and regional planning, and introduces students to the planning process.

111. Introduction to Housing. (3) Three hours of lecture and discussion per week. Prerequisites: 110 or equivalent; open to majors in all fields. This course provides an introduction to the field of housing planning. It covers the basic concepts and principles of housing planning, and introduces students to the planning process.

112. The Idea of Planning. (3) Three hours of lecture and discussion per week. Prerequisites: City Planning 110 or equivalent. This course provides an introduction to the field of urban planning. It covers the basic concepts and principles of urban planning, and introduces students to the planning process.

113. Economic Analysis for Planning. (3) Three hours of lecture per week. Prerequisites: Open to majors in all fields. This course provides an introduction to the field of economic analysis for planning. It covers the basic concepts and principles of economic analysis for planning, and introduces students to the planning process.

116. Urban Planning Process. (3) Three hours of lecture and discussion per week. Prerequisites: Upper division standing; or consent of instructor. This intermediate course in the planning process with practical in using planning techniques. Lectures, readings, and field trips. (F, S, P)

127. Urbanism and the Future of Cities. (3) Three hours of lecture and discussion per week. Prerequisites: Upper division standing; or consent of instructor. This course provides an introduction to the field of urbanism and the future of cities. It covers the basic concepts and principles of urbanism and the future of cities, and introduces students to the planning process.

191A. Urban Economics and City Planning. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or equivalent; open to majors in all fields. This course provides an introduction to the field of urban economics and city planning. It covers the basic concepts and principles of urban economics and city planning, and introduces students to the planning process.

191D. The Planning and Economics of Public Enterprise. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or equivalent; open to majors in all fields. This course provides an introduction to the field of the planning and economics of public enterprise. It covers the basic concepts and principles of the planning and economics of public enterprise, and introduces students to the planning process.

191E. Women and Urban Living—Implications for Planning. (3) Three hours of lecture and discussion per week. Examination of the physical development implications for and justified by the social roles of women. Assessment of alternative future policies. (S, P)

198. Special Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Three hours of lecture and discussion per week. Group study groups directed toward specific needs of students. Enrollment restricted by regulations listed on pages 81 and 82 of this catalog. (F, S, P)

199. Special Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Flexible, at discretion of the instructor. Prerequisites: Consent of instructor. Regular meeting with faculty overseer. (F, S, P)

Graduate Courses

200. History of City Planning. (3) Three hours of lecture and discussion per week. The history of city planning and the city planning profession in the context of urban history. (S, P)

201. The Urban Planning Process. (1) One hour of lecture and discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: City Planning 110 or equivalent. Survey of the field of city planning in relation to the evolution of city; introduction to specialities within the planning practices. Core-required orientation course. (F, S, P)

202. Economics of Public Enterprise. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A or equivalent. Roles of governmental policies; the case of transportation; the role of international agreements; the World Bank; Third World energy problems. (S, P, F, S, P)

191B. Planning for Urban Economic Development. (3) Three hours of lecture and discussion per week. Prerequisites: Upper division standing; or consent of instructor. This course provides an introduction to the field of planning for urban economic development. It covers the basic concepts and principles of planning for urban economic development, and introduces students to the planning process.

191C. Urban Economics. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or equivalent; open to majors in all fields. This course provides an introduction to the field of urban economics. It covers the basic concepts and principles of urban economics, and introduces students to the planning process.

203. History of City Planning. (3) Three hours of lecture and discussion per week. The history of city planning and the city planning profession in the context of urban history. (S, P)

204. The Urban Planning Process. (1) One hour of lecture and discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: City Planning 110 or equivalent. Survey of the field of city planning in relation to the evolution of city; introduction to specialities within the planning practices. Core-required orientation course. (F, S, P)

205. Economics of Public Enterprise. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A or equivalent. Roles of governmental policies; the case of transportation; the role of international agreements; the World Bank; Third World energy problems. (S, P, F, S, P)
agencies as producers of urban services in nonmarket setting; local participation in research design; evaluation of benefits and costs; criteria and procedures for investment decisions concerning types and qualities of services and facilities. (SP) * Staff

204. Analytic and Research Methods for Planners. Course may be repeated for credit as modules vary. A series of modules in research design, evaluation, and budgeting. Each module will run for all or for a segment of a semester and will cover a cluster of methods. A student may take sequentially two or three modules and/or two or three semesters. Prerequisites: Consent of instructor. Context and role of data analysis in urban and regional planning. Computer programming and analysis of policy. Examination of techniques of cities of planning and budgeting, and bivariate and multivariate regression analysis. Emphasis on applying these techniques to real world planning problems. (F) * Lands

204B. Research Methods for Planners. (3) Four hours of lecture and discussion per week for 10 weeks. Field research methods and their applications. Uses include: experimental design and statistical techniques in planning. Topics include: exploratory data analysis, probability and sampling theory, hypothesis testing, table analysis, analysis of variance, and bivariate and multivariate regression analysis. Emphasis on applying these techniques to real world planning problems. (F) * Lands

20A. Introduction to Urban Planning Methods. (4) Four hours of lecture and discussion per week. Prerequisites: Introductory statistics course or equivalent or consent of instructor. Context and role of data analysis in urban and regional planning. Computer programming and analysis of policy. Examination of techniques of cities of planning and budgeting, and bivariate and multivariate regression analysis. Emphasis on applying these techniques to real world planning problems. (F) * Lands

204C. Survey Design and Analysis. (2) Two 1½-hour lectures plus one hour of discussion per week for 7½ weeks. Prerequisites: 204B. Students as a group design, conduct, and analyze a survey on a community planning issue. Topics include questionnaire writing, coding and formatting, sampling methods, survey administration methods, interviewing, survey analysis, and presentation techniques. (SP) * Bradshaw

204D. Multivariate Analysis in Planning. (3) Four hours of lecture/discussion per week for 10 weeks. Prerequisites: 204A or equivalent. Theory and application of advanced multivariate methods in planning. Topics include: multiple regression analysis, residual analysis, weighted least squares, non-linear models, path analysis, log-linear models, logit and probit analysis, principal component analysis, cluster analysis, factor analysis, and discriminant function analysis. Short reports. (SP) * Bradshaw

204E. Forecasting and Time-Series Analysis in Planning. (3) Four hours of lecture/discussion per week for 10 weeks. Prerequisites: 204A or equivalent; 204D recommended. Longitudinal data analysis in planning. Emphasis on building time series models for economic and demographic phenomena. Uses include: autoregressive moving average models; lagged equations structures; simultaneous equation modeling; economic simulations; single-equation modeling; (smoothing and ARIMA analysis); population models, including cohort-survival models; joint population-employment modeling. Completion of two computer assignments, using several microcomputer statistical packages, is required. (SP) * Bradshaw

204F. Modelling and Measurement Methods. (2) Four hours of lecture/discussion per week. Half-course. Prerequisites: 204A, 204C. 204D or equivalent. Methods of conceptualizing and modelling policy problems for research and analysis. Causal modelling, principles and techniques of measurement for hard-to-measure phenomena, data sources, design and application of surveys, and other research. Emphasis on working through examples pertinent to environmental, social and economic issues. (F) Staff

205. Planning and the Legal Process. (3) Three hours of lecture/discussion per week. Introduction to the American legal process and legal framework within which public policy and planning problems are addressed. The course stresses legal methodology, the basics of legal research and the common-law decisional method. Statutory analysis, administrative law, and constitutional interpretation are also covered. Case topics focus on the law of planning, property rights, land use regulation and access to height and density. (SP) * Staff

206. City Planning Legislation and Governmental Organization. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Duties and role of the physical planning agency in municipal and metropolitan governments; major alternative definitions of cities of planning and budgeting, and their relationship to long-range physical plan to urban development agencies; significance of city planning legislation in reorganization of local government. (F) * Christiansen

208. Citizen Involvement in the City Planning Process. (3) Three hours of lecture and discussion per week. An examination of the roles of the citizen and citizen organizations in the city planning process. Models for citizen involvement ranging from advising to community control. Examination of different organizational models in different situations. (F) * Staff

210. Introduction to Studio Laboratory: Plan Preparation. (4) Two hours of discussion per week. Prerequisites: Consent of instructor. Staff introduction to plan preparation for urban communities undergoing development. A and B Sections need not be taken sequentially. (SP) Staff, Dowall, Comerro

219. Advanced Seminar on Land Use and General Plan Topics. (3) Course may be repeated for credit. Three hours of seminars meetings per week. Prerequisites: 206, 212, and at least one studio. Seminar exploring some current land use and environmental issues confronting California communities, with topics falling from year to year. Efforts to develop remedies are made; student papers are required. (F) * Deakin

220. The Urban and Regional Economy. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A-100B or equivalent. Analysis of the urban, metropolitan, and regional economy for planning purposes and other macro models; impact analysis and projection of changing labor force and industrial structure; economic-demographic interaction; issues in growth, income distribution, planning controls, and inter-regional growth and population distribution issues. (F) * Staff

221. Rural Area and Small Town Planning and Policy. (3) One 3-hour seminar per week; one field session. Prerequisites: Graduate standing. Staff seminar focuses on rural areas and small towns as part of the regional economy. It will examine the contemporary, social, political, and particularly economic issues that face these areas. Participants will examine policy and planning implications through means of guest speakers, field trips, and readings. (SP) * Blakely, Bradshaw

222. Urban Futures Laboratory. (1) One 1-hour seminar per week. Prerequisites: Concurrent enrollment in 127. For graduate students only. Urban ecological field studies. Gaining simulations syntheses; simple computer models of urban dynamics. Will involve both individual and team projects. (F&S) * Staff

223. Economic Development Planning. (3) Three hours of lecture and discussion per week. Prerequisites: Economics 110A or 200A; 204A-204B or Statistics 131 or equivalent. Strategy and tools for developing employment and investment in regional, state, and local economies. Organization of economic development activities. Program and project analysis. (SP) * Teltz

224. Location Theory and Spatial Interaction Models. (2) Two hours of lecture per week. Prerequisites: Economics 100A or equivalent. Calculus. Density and interaction approaches to analysis of spatial distribution; optimal location, descriptive theory, and general theories of location and spatial structure; introduction to static and growth models of residential and industrial location; governmental influences on spatial distribution of urban activities. (F) Staff

225. Advanced Methods of Urban and Regional Analysis. (1-3) Three hours of lecture per week. Prerequisites: 204A-204B; 219 or 221. Covers regional accounting, economic base analysis, shift share techniques, input-output analysis, linear programming, regional economic development analysis, and alternative sector studies. In some semesters, optional five-week, one-unit modules may be offered. Check department for modules at start of semester. (F) * Brady

227. Studies In Regional Growth and Development. (3) Three hours of seminars per week. Prerequisites: 225. Intermediate seminar. Staff course focusing on theory and empirical evidence for regional growth and development, using reading and discussion, requiring short paper applying material to a region of the student's choice. (F) * Staff

232. Workshop Studio In Metropolitan and Regional Planning. (2) Two hours of lecture per week. Two hours of studio. Prerequisites: Relevant past course work and consent of instructor. Field project in major phases of metropolitan or regional planning work. A collaborative student-group effort in formulating policy or plan recommendations within specific government framework. (SP) * Staff

*208. Citizen Involvement in the City Planning Process. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Staff introduction to plan preparation for urban communities undergoing development. A and B Sections need not be taken sequentially. (SP) Staff, Dowall, Comerro

*219. Advanced Seminar on Land Use and General Plan Topics. (3) Course may be repeated for credit. Three hours of seminars meetings per week. Prerequisites: 206, 212, and at least one studio. Seminar exploring some current land use and environmental issues confronting California communities, with topics falling from year to year. Efforts to develop remedies are made; student papers are required. (F) * Deakin

*220. The Urban and Regional Economy. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A-100B or equivalent. Analysis of the urban, metropolitan, and regional economy for planning purposes and other macro models; impact analysis and projection of changing labor force and industrial structure; economic-demographic interaction; issues in growth, income distribution, planning controls, and inter-regional growth and population distribution issues. (F) * Staff

*221. Rural Area and Small Town Planning and Policy. (3) One 3-hour seminar per week; one field session. Prerequisites: Graduate standing. Staff seminar focuses on rural areas and small towns as part of the regional economy. It will examine the contemporary, social, political, and particularly economic issues that face these areas. Participants will examine policy and planning implications through means of guest speakers, field trips, and readings. (SP) * Blakely, Bradshaw

*222. Urban Futures Laboratory. (1) One 1-hour seminar per week. Prerequisites: Concurrent enrollment in 127. For graduate students only. Urban ecological field studies. Gaining simulations syntheses; simple computer models of urban dynamics. Will involve both individual and team projects. (F&S) * Staff

*223. Economic Development Planning. (3) Three hours of lecture and discussion per week. Prerequisites: Economics 110A or 200A; 204A-204B or Statistics 131 or equivalent. Strategy and tools for developing employment and investment in regional, state, and local economies. Organization of economic development activities. Program and project analysis. (SP) * Teltz

*224. Location Theory and Spatial Interaction Models. (2) Two hours of lecture per week. Prerequisites: Economics 100A or equivalent. Calculus. Density and interaction approaches to analysis of spatial distribution; optimal location, descriptive theory, and general theories of location and spatial structure; introduction to static and growth models of residential and industrial location; governmental influences on spatial distribution of urban activities. (F) Staff

*225. Advanced Methods of Urban and Regional Analysis. (1-3) Three hours of lecture per week. Prerequisites: 204A-204B; 219 or 221. Covers regional accounting, economic base analysis, shift share techniques, input-output analysis, linear programming, regional economic development analysis, and alternative sector studies. In some semesters, optional five-week, one-unit modules may be offered. Check department for modules at start of semester. (F) * Brady

*227. Studies In Regional Growth and Development. (3) Three hours of seminars per week. Prerequisites: 225. Intermediate seminar. Staff course focusing on theory and empirical evidence for regional growth and development, using reading and discussion, requiring short paper applying material to a region of the student's choice. (F) * Staff

*232. Workshop Studio In Metropolitan and Regional Planning. (2) Two hours of lecture per week. Two hours of studio. Prerequisites: Relevant past course work and consent of instructor. Field project in major phases of metropolitan or regional planning work. A collaborative student-group effort in formulating policy or plan recommendations within specific government framework. (SP) * Staff

*Not offered 1988-89
*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award
246. Field Observation and Diagnosis of Urban Environment. (3) Course may be repeated for credit. Three hours of seminar meetings per week. Prerequisites: 220 and consent of instructor. A close examination of selected issues in policy, methods, and patterns of regional development. Faculty research papers and class discussion. Designed primarily for Ph.D. candidates and Master's students writing professional reports and theses. (F) Dowell

247. The Educative City. (1.0-3) New course. Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Explores the potential role of the urban physical environment in learning and development. Topics include the process of environmental learning and the advantages of educative urban environments, techniques for promoting learning, and several case studies. See department's posted full course description for clarification of exact work required for each unit. (F) Southworth

248. Advanced Studio: Urban Design/Environmental Planning. (4) Two hours of seminar and four hours of studio per week. Prerequisites: 210 or 240. Advanced problems in urban design and land use and environmental planning. (SP) Jacobs

250. Planning and Governing. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Focus on the functions of the idea of community. Values, choice, and purposeful behavior; knowledge and social action; rationales for governmental intervention in self-regulating social systems. Alternative planning strategies for conditions of uncertainty and in the absence of science-based knowledge. (F) Webber

252. Theory and Practice of Implementation for Planners. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. The process of governmental institutions; systems for choice, change, and control. Focus on organizational behavior and capacity for change, and processes of intergovernmental and interinstitutional coordination. (SP) Etzel

253. Political Economy and Planning. (3) Three hours of seminar per week. A seminar for planning students investigating the interaction of political-economic forces and social outputs in the planning process. The French planning experience is used as a base for examining the literature from various social sciences for their relevance to development planning. (SP) Cohen

259. Advanced Topics in Planning Theory. (3) One 3-hour seminar meeting per week. Prerequisites: 250, 253, 202 or equivalent; 252 or equivalent. Selected advanced topics in planning theory. (SP) Webber

260. Introduction to Social Theory and Planning. (3) Three hours of lecture and discussion per week. Social and demographic patterns in metropolitan areas. Urban and suburban life styles and studies of different community types. Selected social planning issues and analytic techniques, including social indicators and social impact assessments. (SP) Landes

262. Comparative Analysis of Urban Policies. (3) Three hours of lecture and discussion per week. Prerequisites: 260 or 202, 252, or 214, 230, 220 or equivalent. Techniques and process of designing, simulating, and evaluating alternative scenarios of action to achieve objectives. Examination of broad range of methodologies using case studies. Organizational and political strategies for effective program planning. Cases drawn from social programs, municipal services, housing and urban development at federal and local levels. (SP) Greenspan

266. Community Development Theory and Practice. (3) Three hours of lecture and study per week plus field work. Prerequisites: 260 or 210 or 230. Basic theories and methods of community economic and social development. The course will examine neighborhood/community analysis as well as social change in the urban environment, the political and social contexts, and the amount of field work in local neighborhoods. (SP) Blakely

283. Introductory Graphics. (1.5) Three hours of studio-discussion meetings per week. Prerequisites: City Planning students or consent of instructor. Basic instruction in graphics for planners having no design background, or not expecting to become urban designers. Half-course. (SP) Rosen

300. Supervised Teaching in City and Regional Planning. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Regular meetings with faculty sponsor to be arranged. (SP) Cohen

301. A. Urban Services Planning and Financing. (3) Three hours of lecture and discussion per week. A survey of planning issues in urban services, with special attention to policy and technology alternatives, municipal budgeting and finance of services, project need, programming service delivery, physical facility and manpower requirements, linkages of service planning to land use and social planning. Course complements 214 on Physical Infrastructure.

265. Professional Planning and Presentation Evaluation. (4) Four hours of lecture and discussion per week. Prerequisites: Graduate standing. Discussion, analysis, and evaluation of urban policies in a variety of social and spatial contexts, with references to state-planned societies. Main topics include fiscal policies, social and financial differentiation in urban, regional, and national planning, development, transportation, urban renewal, citizen participation, social services, and decentralized urban management. (F) Goldsmith

291. A. Urban Services Planning and Financing. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. A close examination of selected issues in policy, methods, and patterns of regional development. Faculty research papers and class discussion. Designed primarily for Ph.D. candidates and Master's students writing professional reports and theses. (F) Dowell

291A. Urban Services Planning and Financing. (3) Three hours of lecture and discussion per week. A survey of planning issues in urban services, with special attention to policy and technology alternatives, municipal budgeting and finance of services, project need, programming service delivery, physical facility and manpower requirements, linkages of service planning to land use and social planning. Course complements 214 on Physical Infrastructure.

297. Supervised Field Study in City and Regional Planning. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Regular meeting to be arranged with faculty sponsor. Prerequisites: Graduate standing in department and consent of instructor. Supervised experience on a research project in urban or regional planning. Any combination of 295, 297, or 300 courses may be taken for a total of 8 units maximum toward the M.C.P. degree. A maximum of 3 units of 297 can be used for degree requirements. (F,SP)

298. Group Studies. (1-3) Course may be repeated for credit. Sections A-L: letter grading; sections M-Z: must be taken on a satisfactory/unsatisfactory basis. Group-oriented courses to be arranged by instructor. One to three hours of lecture per week. Prerequisites: Consent of instructor. Topics to be announced at beginning of each quarter. No more than 3 units may be taken in one section. (F,SP)

299. Individual Study or Research. (1-12) Course may be repeated for credit. Regular meetings to be arranged with faculty sponsor. Prerequisites: Consent of instructor and graduate standing. Individual study or research program; must be worked out with instructor in advance of signing up for credits. Maximum number of individual study units (295, 297, 299, 300) counted toward the M.C.P. degree credits is 9. (F,SP)

602. Individual Study for Doctoral Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Regular meetings with faculty sponsor to be arranged. Prerequisites: Ph.D. students only. Individual study in consultation with the major field advisor, intended to provide opportunities for students to prepare themselves for the various examinations required for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP)

Professional Courses

300. Supervised Teaching in City and Regional Planning. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Regular meetings to be arranged with faculty sponsor. Prerequisites: Graduate standing in department and appointment as a graduate student instructor. Supervised teaching experience in courses related to planning. Any combination of 295, 297, or 300 course may be taken
Civil Engineering (College of Engineering)

Department Office: 760 David Hall, 642-3281
Chair: Robert L. Taylor, Ph.D.

Professors:
James M. Anderson, Ph.D., Cornell University. Analytic geometry, surveying.
Vieelon Bortz, S.C.D., Massachusetts Institute of Technology. Inelastic behavior of structures.
Terry B. Brooks, M.S., University of Washington. Structural behavior, experimental methods.
Keith A. Crandall, Ph.D., Vice-Chair Stanford University. Geotechnical engineering.
Robert L. Taylor, Ph.D., Stanford University. Geotechnical engineering.

Assistant Professors:
Abhishek Astaneh-Asl, Ph.D., University of Michigan. Experimental analysis of steel structures.
Joseph Bradley, M.S., Drexel University. Computational fluid dynamics.
James A. Hart, Ph.D., University of California at Berkeley. Seismic engineering.
K. A. M. Sant, Ph.D., University of Florida. Structural dynamics.

Associate Professors:
Bruce A. Bolt, Ph.D.

Lecturers:
Clarence K. Chan, M.S.
Elizabeth A. Destin, M.S., J.D.
Eugene M. Hamburger, M.S.
William W. Hunsinger, M.S.
Aditi Kaneti, Ph.D., Director, Institute of Transportation Engineering, Washington State University. Transportation engineering.
James M. Kelly, Ph.D., (Acting Director, Earthquake Engineering Research Center, Stanford University. Structural mechanics.

John E. M. Hunsinger, Ph.D., University of Michigan. Theoretical soil mechanics, dynamics.
Robert S. Leman, M.S., University of California at Berkeley. Structural behavior, earthquake engineering.

Adolf D. May, Jr., Ph.D., Purdue University. Traffic operations and systems.
Hugh D. Motley, Ph.D., University of California at Berkeley. Geotechnical engineering.
Poncieer W. Morrow, Ph.D., University of Virginia. Mechanics of solids; earthquake structures.

Carl L. Montemich, S.C.D., University of California at Berkeley. Transportation engineering, pavement design.

Civil Engineering is concerned with the planning, design, and construction of public and private works for the improvement of services for people. The four-year undergraduate curriculum leading to the B.S. degree is designed to provide a basic and fairly comprehensive background in civil engineering and related fields. The latest technology in civil engineering, including high strength concrete, reinforced earth and rock, and composite materials for pavement construction and hazardous waste materials; modern computer-based analysis and design methods; and trends in advanced construction practices. A strong emphasis is placed on developing theoretical and technical skills for preparing graduates for direct entry to professional practice or admission to graduate study.

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Curriculum for the Bachelor's Degree

A total of 120 units is required. The program of study is described in detail in the Announcement of the College of Engineering, University of California at Berkeley, CA 94720. All students must complete a total of 18 units of humanities and social studies of which at least two must be upper division, and a minimum of two courses, at least one of which is in upper division, must be taken from a single department. Other courses include:

Lower Division.

Required: Mathematics 1A-1B and 54A-55B, Chemistry 1A-1B, Physics 7A-7B, Engineering 85 and 92, and Statistics 25. Electives: 15 units including at least three units of basic science and 10 units of humanities or social studies.

Upper Division.

Required: Mechanical Engineering 104; Civil Engineering 100, 111, 120, 130, 140, 150 or 151, 160, 167, 170, 175, and 192. Electives: 10 units of upper division civil engineering courses, seven units of humanities and social sciences, nine units (six upper division) of free upper division electives.

Graduate Study

The Department of Civil Engineering comprises the following graduate groups: Construction Engineering and Management; Geotechnical Engineering; Hydraulics and Coastal Engineering; Sanitary and Environmental Engineering; Structural Engineering Mechanics and Materials (SEM); Surveying and Photogrammetry; and Transportation Engineering. Within each group, specialized programs and interdisciplinary programs—including earthquake engineering, ocean engineering and water resources engineering—are also available. Students must pursue the academic degrees of M.S. and Ph.D., and the professional degrees of M.Eng. and D.Eng. The M.S. program is normally of one year's duration; the M.Eng. program of two years' duration; the doctoral programs require at least two years after the attainment of a master's degree, and include a dissertation or an equivalent design project. In addition, the department has constructed other programs for other departments leading to dual degrees: (1) M.S. in Engineering and Master of Architecture (SEMM and the Department of Architecture); (2) M.S. in Engineering and Master of City Planning (Transportation and the Department of City and Regional Planning). For more details, please consult the Announcement of the College of Engineering, or contact the Department or the appropriate graduate group.

Lower Division Courses

85. Engineering Survey Measurements. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Mathematics 1A-1B. Standards, units, surveying measurement of distance, elevation, angles, systematic and random error analysis; adjustment of measurements; weighing; principles of least squares.

*On leave, spring
**Recipient of Distinguished Teaching Award
86. Plane Surveying. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Trigonometry. Principles and practice of surveying, including use of tape, theodolite, levels, surveying calculations of area, volumes, curves; stadia and plane table mapping. (F) Anderson

92. Introduction to Civil Engineering. (1) Must be taken on a pass/no-credit basis. One hour of lecture per week. A course designed to familiarize the entering student with the nature and scope of civil engineering and its component specialty areas; to include study of actual projects and a field trip as appropriate. (F) Taylor

Upper Division Courses

100. Elementary Fluid Mechanics. (4) Three 1-hour lectures and one hour of recitation per week, plus individual laboratory experiments. Prerequisites: Engineering 36. Principles of mechanics as applied to the statics and dynamics of incompressible fluids; open channel flow, fluid measurements, forces on submerged objects, pumps, turbines. Individual laboratory experiment water-walled by the student. (F,SP) Staff

101. Hydraulics Laboratory. (2) One hour of lecture plus three 3-hour laboratory per week. Prerequisites: 100. Experiments in measuring, open channel flow, hydraulic machinery, hydraulic models; special experiments designed by the student. (F) Harder

102. Advanced Hydraulics. (3) Three hours of lectures and three 2-hour laboratory per week. 100. Energy and momentum in open channel flow, surface wave, uniform flow, transport, hydraulic models, flood propagation, flow through porous media, computer applications. (SP) Harder

103. Hydrology. (3) Three 1-hour lectures per week. Prerequisites: Consent of instructor. Hydrologic cycle, aspects of meteorology, circulation of air and water at the earth's surface, interaction between precipitation and runoff, groundwater flow, flood frequency and unit hydrograph, stochastic methods for streamflow data generation, applications of hydrology in engineering design. (F) Danton

111. Introduction to Sanitary/Environmental Engineering. (4) Three 1-hour lectures and one hour of discussion per week. Prerequisites: 100. The application of science and engineering to the study of water quality. Topics include provision of an adequate water supply, wastewater disposal and the use of physical, chemical and biological processes for the treatment of water and wastewater. (F,SP) Staff

112. Sanitary Engineering Design. (3) Three 1-hour lectures per week. Prerequisites: 111 may be taken concurrently. Lectures and discussions of the nature of engineering organizations; role of design in engineering practice, and concepts of process, design, and economic evaluation. Parallel problem assignments illustrating the application of design principles to typical units of water and wastewater systems. (F) Staff

113. Applied Limnology. (2) Two 1-hour lectures per week. Prerequisites: Upper division standing. Introduction to freshwater and saline lakes, reservoirs, streams, and estuaries; physical and chemical structure of aquatic ecosystems; plankton ecology; eutrophication and pollution. This course is the first part of a sequence including 210A-210B and Forestry 178. (F) Home

114. Fundamentals of Sanitary Engineering. (2) Two 1-hour lectures per week. Prerequisites: Upper division standing in Engineering Science or Public Health. Water supply and treatment; wastewater collection, treatment, and disposal; solid waste management; water pollution; advanced and appropriate technology for scope of systems. (F) Oswald

115. Chemistry of Waters. (2) Two 1-hour lectures per week. Prerequisites: Chemistry 1A. A consideration of the inorganic components in water in terms of water quality. Emphasis is placed on the application of chemical principles to the study of the composition of major anions, cations, and dissolved gases comprising the inorganic constituents. (F) Hermanowicz

116. Water Chemistry Laboratory. (2) One hour of lecture and three hours of laboratory/demonstration per week. Prerequisites: Chemistry 1A or consent of instructor. Practical laboratory aspects of important chemical measurements used in assessment of water quality and efficiency of water and waste treatment processes. Considers gravimetric, titrimetric, spectrofluorometric and electrochemical measurements. Laboratories on the determination of oxygen, chlorine residual, BOD, COD, nitrogen forms, hardness, alkalinity, chloride, fluoride, solids, conductivity. (F) Jenkins

117. Organic Chemistry of Water and Waste Water. (2) Two 1-hour lectures per week. Prerequisites: Chemistry 1A. A consideration of the organic components as a factor determining the quality of waste waters. Non-mercurate and reactions of pertinent organic compounds are emphasized. Included are special topics such as biological treatment processes as well as inorganic pollutants, detergent pollution, and air pollution fallout. (SP) Jenkins

120. Introduction to Structural Analysis. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 130. Analysis of statically determinate and indeterminate structures using statics, kinematics, virtual work, strain energy, forces, and displacement methods and moment distribution. (F,SP) Scordelis

121. Introduction to Dynamics of Structures and Earthquake Engineering. (2) Two 1-hour lectures per week. Prerequisites: 120, ME 104A (104). Analysis of response of structures to dynamic excitations with emphasis on response on earth quake ground motion. Basic concepts in earthquake resistant design of buildings. (SP) Chopra

122. Advanced Structural Analysis. (2) Two 1-hour lectures per week. Prerequisites: 120. Digital computer analysis of linear structural systems. Discussion of the theoretical bases for modern computer programs. Application of several standard programs to a variety of structures including two-dimensional buildings. Verification of results. (SP) Wilson

130. Mechanics of Materials I. (3) Three 1-hour lectures per week. Prerequisites: 130. Mechanics of the deformable solids; elastic and ultimate resistance of materials; stress and deformation analysis for bars, shafts, beams, and columns; combined stresses; energy methods; statically indeterminate systems; elastic stability and buckling. (F,SP) Sackman

131. Mechanics of Materials II. (3) Three 1-hour lectures per week. Prerequisites: 130. Mechanics of thin-walled structures for box girder, aircraft, and ship structures. Stress, strain, and deformation analysis of beam bending, buckling, and post-buckling strengths of thin sheet elements; stress and stability consideration of sandwich components; thermal stress, thermal buckling. (SP) Sackman

132. Introduction to Mechanics of Solids. (3) Three 1-hour lectures per week. Prerequisites: 130. Stress-strain relations for elastic and inelastic materials; plastic flow, creep, relaxation, thermal effects; solution of problems in elasticity and inelasticity. (F) Sackman

140. Fundamentals of Structural Design and Applications to Reinforced Concrete. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 180 and 120. Introduction to design of structural systems and elements. Design criteria; sources of loads; working stress design; plastic design methods; analysis and design of reinforced concrete elements, including beams, slabs, and columns. (F,SP) Bertoni, Moehle

141. Design of Steel Structures. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 140. Design of structural steel; working stress and plastic design methods; mechanical, architectural and structural properties of steel; bolted and welded connections; design of tension members, compression members, beams, and beam-columns. (F,SP) Bertoni, Moehle

142. Structural Design In Timber. (2) Two 1-hour lectures per week. Prerequisites: 120 (may be taken concurrently). Characteristics and properties of wood as a structural material; design and detailing of structural timber members; design of shear and moment connections. Topics include working stresses, design and detailing of plain and glued beams, columns, connections, plywood diaphragms, and framing systems. (F) Mahin

143. Reinforced Concrete Design. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 140. Design of structural systems in reinforced concrete. Floor systems, walls, columns, and footings. Design for service and ultimate loads. Detailing for fire-safe behavior. (SP) Mahin

144. Design of Structural Systems. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 140; 141 (may be taken concurrently). Conceptual design of structural systems to meet stated objectives. Action by which structural sections are selected. Characteristics of various systems and their approximate analysis. Shear systems in wood and concrete. Detailing for strength and economy. (SP) Harder

148A. Structural Systems I. (3) Three 1-hour lectures per week. Prerequisites: Architecture 150. Analysis of determinate structural systems, including: Design of beams and columns in steel, timber, reinforced concrete, and prestressed concrete. Sources of loading and design criteria. Not available to civil engineering students. (SP) Godden

148B. Structural Systems II. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 148A. Analysis of indeterminate structural systems. Sources of vertical and lateral loadings. Design of multi-story and long-span structures. Not available to civil engineering students. (SP) Godden

150. Introduction to Transportation Engineering. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Statistics 25. General characteristics of transportation systems: streets and highways, rail, transit, air. Water capacity considerations: time-space diagrams, queueing, Transport system design: horizontal and vertical alignments, cross-sections, earthwork, drainage, pavements. Economic analyses. Operations, maintenance, rehabilitation, energy, environmental considerations. (F,SP) Daganzo, May, Monismith

151. Introduction to Transportation Planning and Operations. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 150 or 151. Principles of transportation planning. Systems' control, human factors, traffic engineering. (SP) Godden

153. Design and Construction of Transportation Facilities. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 175; 150 or 151. Geometric, drainage, and guideway design for, and construction and rehabilitation of, transportation facilities, particularly streets and highways, railroads, and airfields. (F) Sullivan

152. Introduction to Transportation Operations. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 150 or 151. Principles of transportation operations. Systems' control, human factors, traffic engineering. (SP) Godden

160. Properties of Civil Engineering Materials. (2) One hour of lecture and one 3-hour laboratory per week. Prerequisites: 130 (may be taken concurrently); E45. Introduction to properties of civil engineering materials, such as aggregates, concrete, asphaltic concrete, wood, plastics, and structural steel. Experiments for evaluating behavior of these materials under simple conditions. (F,SP) Monismith

161. Concrete Materials. (2) New course. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 160 (may be taken concurrently). Characteristics and properties of materials required to make concrete. Portland cements, supplementary cementing materials such as fly ash, ground blast furnace slag, conditioned silica fume. Aggregated types including lightweight, expanded shale. Water reducing, set controlling and air entraining admixtures. Laboratory experiments on concrete materials evaluation and their effect on strength and durability characteristics of concrete. (F,SP) Monteiro

162. Properties of Civil Engineering Materials. (2) One hour of lecture and one 3-hour laboratory per week. Prerequisites: 130 (may be taken concurrently); E45. Introduction to properties of civil engineering materials, such as aggregates, concrete, asphaltic concrete, wood, plastics, and structural steel. Experiments for evaluating behavior of these materials under simple conditions. (F,SP) Monismith

161. Concrete Materials. (2) New course. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 160 (may be taken concurrently). Characteristics and properties of materials required to make concrete. Portland cements, supplementary cementing materials such as fly ash, ground blast furnace slag, conditioned silica fume. Aggregated types including lightweight, expanded shale. Water reducing, set controlling and air entraining admixtures. Laboratory experiments on concrete materials evaluation and their effect on strength and durability characteristics of concrete. (F,SP) Monteiro
165. Concrete Construction. (3) Two 1-hour lectures per week. Prerequisites: 160. Consideration of the broad aspects of use of concrete in construction; technical requirements; selection of materials; control of quality; types of concretes used for construction of buildings, highways, bridges, dams, and hydraulic structures. (SP) Mehta

166. Engineering Construction. (3) Two 1-hour lectures per week; field trips. Prerequisites: Upper division standing. Principles of economics, optimization, and management techniques applied to the planning, design, construction, and operation of civil engineering systems; professional relations; contracts and specifications. (F,SP) Hedrick

167. Economics and Management of Engineering Systems. (3) Students who have taken Engineering 120 will receive only 1 unit of credit for 167. Two 1½-hour lectures per week. Prerequisites: 160 and 130. Introduction to fire protection engineering which will give the students the framework for solving fire problems. Model building codes are introduced with emphasis on fire safety provisions. Relationships of these codes and construction is presented. (F) Williamson

168. Polymers In Construction. (2) Two 1-hour lectures per week. Prerequisites: Engineering 45. Consideration of broad aspects of polymers in construction, particularly urban housing structures; technical requirements and performance specifications; selection of materials; relationship of mechanical properties to microstructure; fire safety; weatherability; manufacturing techniques; use of sealants and coatings on structures. (SP) Lee

170. Engineering Geology. (2) Two 1½-hour lectures/ laboratory per week. Principles of physical and structural geology; the influence of geological factors on planning, design, and construction of engineering works. Field trips. (F,SP) Goodman, Sitar

171. Introduction to Geological Engineering. (3) Two 1¾-hour lectures per week. Prerequisites: 170 or an Introduction to Civil Engineering. Geologic and geophysical exploration for structures in rock; natural aggregates for construction; geological engineering of underground openings; evaluation of dam sites. (SP) Kleinberg

172. Introduction to Rock Mechanics. (3) Two 1½-hour lectures per week. Prerequisites: 130. Rock mechanics principles and their application in civil engineering. Strength and deformability of rocks and discontinuities. Stresses in the earth. Application to design of surface and underground excavations and foundations on rock. (F) Goodman

173. Groundwater and Seepage. (3) Two 1½-hour lectures per week. Prerequisites: Senior standing in engineering or science, CE 100 recommended. Introduction to principles of groundwater flow, including steady and transient flow through porous media, numerical methods, pumping tests, groundwater geology, contaminant transport, and design of waste containment systems. (F) Sitar

175. Soil and Foundation Engineering. (3) Two 1-hour lectures and one 3-hour discussion/laboratory demonstration period per week. Prerequisites: 100, 150, 170 (one of which may be taken concurrently). Soil formation and identification. Physical and mechanical properties of soils. Bearing capacities of soils and lateral earth pressures. Site investigations, design of structures, construction problems in foundation engineering. (F,SP) R. Seed, Mitchell

176. Soil Mechanics and Foundation Design. (2) Two 1-hour lectures per week. Prerequisites: 175. Principles of foundation design; ultimate bearing capacity of soils; theory of consolidation and its application in predicting settlements of structures; allowable bearing pressures; methods of minimizing settlements; radial drainage; lateral pressure on walls. (SP) Lysmer

177. Soil Properties and Their Engineering Application. (2) One hour of lecture and one 3-hour laboratory per week. Prerequisites: 175. Laboratory testing of soils and use of results in solving geotechnical problems. Students assume role of consultant to instructor assuming role of client. Soil test results are used to develop recommendations that are conveyed in four short engineering reports. (F) Chan, R. Seed

178. Asphalt and Asphalt Mixtures. (2) One hour of lecture and one 3-hour laboratory per week. Prerequisites: Senior standing in Civil Engineering. Physical properties of asphalts, aggregates, and their combinations; principles and practices in the design and construction of asphalt paving mixtures. Laboratory tests for asphalts, aggregates, and mixture design. (F,SP) Chen, Monismith

185. Control Surveys. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 85 or 88 with consent of instructor. Vertical control, precise leveling; horizontal control, triangulation, trilateration, traverse; electronic distance measurements; least squares adjustment of control survey observations; state coordinate system; astronomical observations for latitude and azimuth. (F) Anderson

186. Elementary Photogrammetry. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 85 or consent of instructor. Applications of photogrammetry: precision cameras; geometry of photography; ground control; flight planning; stereophotography and panarillas; radial line triangulation; map revision; mosaics; oblique photographs; stereoscopic plotting instruments. (SP) Anderson

187. Route Surveying. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 85 or consent of instructor. Surveying of straight and transition horizontal curves; vertical parabolic curves; reconnaisance, preliminary, and location surveys; computations of earthwork and related quantities; alignment studies. (SP) Anderson

188. Airphoto Analysis and Interpretation. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Senior standing in engineering, geology, or geography. Principles of photo reading, analysis, and interpretation applied to soils, slopes, geological forms, and structures; selection of materials for engineering construction. (SP) Anderson

191A. Use of Computers in Civil Engineering. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Computer Science 7. Extensive FORTRAN programming applied to civil engineering problems that involve numerical analysis, management, computer graphics, computer hardware, operating systems, higher level languages and interactive computing. (SP) Anderson

193. Probability Concepts in Engineering Analysis and Decision. (3) Three 1-hour lectures per week. Prerequisites: Statistics 25 and senior standing. Applications of probability at 100 in planning, analysis, and design of civil engineering systems. Development of probabilistic models for risk and reliability evaluation. Occurrence models; extreme value distributions. Analysis of probabilistic system reliability using Bayesian statistics and optimization theory and its application in engineering decision-making. (F) Der Kagrenian

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/fail/normal basis. Prerequisites: Senior standing in Engineering. Group study of a selected topic or topics in civil engineering. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a pass/normal basis. Individual conferences. Prerequisites: Consent of instructor and major adviser. Supervised independent study. A description and prerequisites may be found on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

201. Physical Oceanology. (2) Two hours of lecture per week. Prerequisites: 100. Applied fluid mechanics of the oceans, with emphasis on large scale waves and currents on the continental shelf and the deep ocean. Topics include hydrostatic stability, barotropic and baroclinic motions, free and forced long gravity wave, geostrophic effects, Ekman transport, astronomical tides, storm surge, coastal upwelling, Kelvin and continental shelf waves, ocean circulation and Western boundary currents. (F) Foda

203. Surface Water Hydrology. (3) Three hours of lecture per week. Prerequisites: Consent of the instructor. Occurrence and movement of water over the earth's surface, precipitation and streamflow measurement and characteristics, frequency analysis of precipitation and runoff, relationship between rainfall and runoff, flood routing, time series analysis, and stochastic data generation models. (SP) Harder

204. Wave Hydrodynamics. (3) Three hours of lecture per week. Prerequisites: Completion of short, surface gravity waves. Topics include linear wave theory, wave properties, shallow water transformations, higher-order theories, wave spectra and wave generation.

205A. Coastal Engineering. (3) Three 1-hour lectures and demonstration periods per week. Prerequisites: 100. Fundamental principles of the theory and realities of waves, tides, storm surges and currents, and the application of this information to some coastal and offshore engineering problems. (SP) Anderson

205B. Coastal Engineering. (3) Three 1-hour lectures and demonstration periods per week. Prerequisites: 100A. Application of the basic fundamentals of oscillatory fluid mechanics, physical oceanography and mixing theory to the problems of coastal engineering, such as beach erosion, harbor design, coastal offshore structures, and the mixing of waste heat and sewer discharge. (SP) Anderson

206. Computational Methods In Open Channel Flow. (3) Three 1-hour lectures per week. Prerequisites: Mathematics 21A or equivalent. Numerical methods applied to nonsteady flows in rivers and estuaries, flood wave propagation, automatic control of water supply systems. Computer applications.

207. Sediment Transport Mechanics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Sediment transport in rivers, estuaries, and closed conduits. Measurement techniques, modeling of river systems, river mechanics. (F) Shen

209A. Hydraulic Mixing Processes. (3) Three hours of lecture per week. Prerequisites: Concepts of hydrodynamics and transport; turbulent mixing; mixing in rivers, reservoirs, and estuaries. (SP) Denton

209B. Hydraulic Mixing Processes. (2) Two hours of lecture per week. Prerequisites: 209A. Numerical and physical modeling of dispersion in estuaries and reservoirs; mixing in stratified flows.

210A. Advanced Applied Limnology: Plankton Ecology. (3) Two 2-hour lectures and one 2-hour laboratory per week. Prerequisites: 113 (may be taken concurrently). Forestry 178, or equivalent. Physical, chemical, and biological factors governing algal and zooplankton abundance in lakes and ponds. Methods of measuring and control of plankton. This course is part of a sequence composed of CE 113, Forestry 176, CE 210A, 210B, and Forestry 278. (F) Home

210B. Seminar in Advanced Applied Limnology and Oceanography. (1) Two hours of lecture per week. Prerequisites: 113, 210A, Forestry 178. Lectures and group discussion on an interdisciplinary topic of current interest in lake, reservoir, river, estuarine, or ocean
ecology. The topic will change each year. Emphasis on global coverage of all toxic levels. This course is part of a sequence composed of CE 113, Forestry 178, CE 210A-210B, and Forest 278. (SP) Home

211. Water Treatment Engineering. (3) Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: 111 (may be taken concurrently) and 116. Water quality requirements for beneficial uses, standards, and regulations. Concepts of mass balance and chemical reaction. Applied to water quality improvement. Specific topics include gas transfer, particulate removal processes, chemical precipitation, ion exchange, adsorption, and disinfection. (F) Staff

212. Water Quality Engineering II. (3) Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: 211. Emphasis on microbial kinetics, disinfection, and nutrient removal. Aerobic and anaerobic processes occurring in suspended growth and fixed film reactors. The processing, management, and disposal of sludge. Water quality management in receiving waters, including discharge requirements to waters and land, waste reuse, eutrophication, and water quality modeling. (SP) Staff

213. Applied Ecology Laboratory. (1) One 3-hour laboratory/demonstration per week. Prerequisites: 113 or concurrent lecture and field experience with the major tests which form the basis of the course. Environmental regulations. Considerations bacteiological, chronic and acute fish toxicity, algal bioaccumulation, and freshwater toxicity tests. Some tests will be extended to cover state-of-the-art measurements which may form the basis of future regulations. (F) Home

214. Aquatic Chemistry. (2) Two 1-hour lectures per week. Prerequisites: 115 (may be taken concurrently) or consent of instructor. The application of equilibrium and kinetics models and physical, chemical, and biochemical principles applied to the description of the composition and behavior of natural waters, water and wastewater treatment processes, and water pollution control. A quantitative description of the circulation of important elements in natural water bodies and their significance in water quality. (F) Jenkins

215. Advanced Sanitary Engineering Laboratory. (3) One hour and six hours of laboratory per week. Prerequisites: 211; 212 (may be taken concurrently). Unit operations and processes for water and wastewater treatment. Lectures and laboratories on tracers, filtration, aeration, ion exchange, chemical treatment of wastewater, biological filters, activated sludge, and anaerobic digestion. (SP) Staff

216. Industrial Water and Wastewater Treatment. (3) Three 1-hour lectures per week. Prerequisites: 111, 211, 212 (may be taken concurrently). Theory and design of water and wastewater treatment processes for industrial applications. Emphasis will be placed on process technology that transacts conventional municipal water and wastewater treatment processes. In-design and design requirements are for compliance with current regulations for pretreatment as well as discharge of industrial wastes. (SP)

217. Process Kinetics in Environmental Engineering. (3) Three 1-hour lectures per week. Prerequisites: 211 (may be taken concurrently) or consent of instructor. Chemical reactor theory, mass transfer, homogeneous and heterogeneous reactions, as applied to sanitary/industrial environmental engineering processes. Packed and fluidized bed reactors, biological reactors. (F) Selleck; Hermanowicz

218. Air Pollution—Chemical Aspects of Combustion. (1) One hour of lecture per week. Prerequisites: Engineering 150 and 117 or concurrent 1-hour lectures per week. Prerequisites: 218A. Air Pollution—Chemical Aspects of Combustion. Practical aspects of Solid Waste Management with emphasis placed on state-of-the-art technology and inter-relationships of environmental, institutional, and resource recovery constraints.

220. Theory of Structures. (3) Three hours of lecture per week. Prerequisites: 210. Analysis of structures by force (flexibility) methods and by displacement (stiffness) methods: matrix methods suited for digital computer solution. Virtual work, real and complementary energy, and other classical theorems of structural analysis. (F) Cordes

221. Finite Element Methods. (3) Three hours of lecture per week. Prerequisites: 220 and 230. Finite element method as an extension of structural theory, coordinate systems, methods of numerical integration. 1-D, 2-D, and 3-D basic elements, axi-symmetric shells and solids. Plate bending elements. Organization of FEM computer programs. (SP) Wilson


224. Analytical Methods in Structural Engineering. (3) Three hours of lecture per week. Prerequisites: 130 or Mechanical Engineering 104A (104). Introduction to the solution of partial differential equation boundary value problems; method of characteristics; the method of separation of variables; Fourier series, Laplace, and Fourier transforms. Calculus of variations, optimization. (F) McIvor

225. Dynamics of Structures. (3) Three hours of lecture per week. Prerequisites: 220. Analysis of forces and deformations in structures, idealized as discrete parameter systems, due to dynamic forces, moving loads and earthquake ground motion. Exact and approximate methods. Analysis of linear and nonlinear response; response spectrum; linear and non-linear response; methods of maximum response; effects of inelastic behavior. Laboratory demonstrations. (F,SP) Chopra


227. Earthquake-Resistant Design. (3) Three hours of lecture per week. Prerequisites: 222 (may be taken concurrently) and 243. Design of structures to resist earthquakes and other dynamic excitation. Human sensitivity to vibration, Design Criteria. Elastic and inelastic response spectra. Site suitability analysis. Selection of structural configuration. Materials and non-structural elements. Preliminary design methods. (SP)

228. Earthquake Engineering Analysis. (3) Three hours of lecture per week. Prerequisites: 222. Graduate standing. (F,SP) Chopra

229. Experimental Dynamics and Modal Analysis. (3) Two 1-hour lectures and one 3-hour laboratory. Prerequisites: Graduate standing. Practical aspects of Solid Waste Management with emphasis placed on state-of-the-art technology and inter-relationships of environmental, institutional, and resource recovery constraints.

230. Advanced Mechanics of Materials, May not receive credit for 132. Three 1-hour lectures per week. Prerequisites: 130 or equivalent. Analysis of load-carrying structural members: stress, strain, compatibility. Stress-strain relations for elastic and elastic-plastic materials. Linear theory and virtual work. Bending of beams, beams on elastic foundations, torsion, elastic and plastic buckling of columns and plates. (F) Jackman

231A. Mechanics of Solids. (3) Formerly 230. Three hours of lecture per week. Prerequisites: 219A, Static and dynamic beam theories; thin plate theories; vibration and buckling of plates. Structural stability (equilibrium, stability, dynamic methods; nonconservative problems). (SP) Taylor


234A. Thermomechanics of Deformable Bodies I. (3) Three hours of lecture per week. Prerequisites: 224A. Mathematical preliminary (nonlinear vector spaces, differentation, vector and tensor fields); kinematics and physics of deformable bodies (balance principles, energy, elastodynamics). Offered according to student demand and faculty availability.

234B. Thermomechanics of Deformable Bodies II. (3) Three hours of lecture per week. Prerequisites: 234A. Equilibrium statistical mechanics and thermodynamics of materials; (Ginzburg theory, rubber elasticity); non-equilibrium thermomechanics, constitutive theory
235. Advanced Solid and Structural Mechanics. Sections may not be repeated for credit; however, sections may be taken concurrently. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics of current interest in solid and structural mechanics to be offered depending on student demand and faculty availability.

235A. Advanced Computational Mechanics. (3) Three hours of lecture per week.

235B. Plasticity. (3) Three hours of lecture per week.

235C. Viscoelasticity. (3) Three hours of lecture per week.

235D. Stability. (3) Three hours of lecture per week.

235E. Fracture Mechanics. (3) Three hours of lecture per week.

235F. Mechanics of Composites. (3) Hours of lecture per week.

240. Advanced Civil Engineering Materials. (3) Two hours of lecture per week. Prerequisites: 160 or equivalent. Study of existing experimental results including ultimate strength tests. Design problems involving shell structures.

241. Advanced Concrete Technology. (3) Three hours of lecture per week. Prerequisites: 160 or equivalent. Composition and properties of concrete-making materials such as aggregates and different types of hydraulic cements; properties of fresh and hardened concrete; mass concrete, lightweight concrete and heavyweight concretes, polymer-containing concretes, and fiber reinforced concrete. (F)

242. Concrete Behavior. (3) New course. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 160 or equivalent. Relationship between concrete microstructure and mechanical properties. Composite materials theory. Viscoelasticity; plasticity; fracture mechanics; thermal behavior and durability of concrete. Use of instrumentation, data acquisition, and modern experimental techniques employed in concrete research. (F)


244A. Advanced Reinforced Concrete I. (3) Three hours of lecture per week. Prerequisites: 140. Behavior and design of reinforced concrete elements. Design criteria. Material properties. Bond and cracking in reinforced concrete. Strength and deformation characteristics of reinforced concrete elements subjected to axial load, flexure, shear, and combined loads. Failure criteria. Length of hanger and evaluation of hanger history. (F) Maini

244B. Advanced Reinforced Concrete II. (3) Three hours of lecture per week. Prerequisites: 244A. Limit states design of reinforced concrete structures. Design for strength and ductility of ductile moment-resisting frames. Analysis of frames; first and second order theories. Behavior of beam-column joints. Design of slabs; recent advances in application of yielding theory and strip methods. (SP)

245. Prestressed Concrete Design. (3) Three hours of lecture per week. Prerequisites: 140. Structural behavior and design of prestressed concrete elements and systems—continuous beams, frames, slabs, bridges, buildings; partial prestress. (SP) Filipi

246. Design of Concrete Structures. (3) Three hours of lecture per week. Prerequisites: 140 and 146. Application of shell theory; approximate methods and computers to the design of shell and folded plate structures. Determination of reinforcement or prestressing requirements. Study of existing experimental results including ultimate strength tests. Design problems involving shell structures.

247. Advanced Steel Design. (3) Three hours of lecture per week. Prerequisites: 141. Advanced topics in steel design. Design of plate girders, composite construction, and hybrid beams. Strength, stiffness, stability and fatigue. Influence of high strength steel and modern welding techniques on design. Design considerations for connections with emphasis on tubular structures. (SP) Astaneh

248. Inelastic Design of Steel Structures. (3) Three hours of lecture per week. Prerequisites: 243. Inelastic analysis and design of steel members subjected to combined stesses due to bending, shear, axial loads, and torsion. Local and lateral buckling of members. Design of connections. Design for strength, ductility, and stability for arches, grids, plates and frames. (F)

249. Structural Reliability and Risk Analysis. (3) Three hours of lecture per week. Probability theory and random processes; structural reliability; idempotent risk analysis. First order, second-order, and full-distribution methods; structural component and system reliability; probabilistic design codes; loads and load combination; reliability against fatigue; seismic risk analysis of structural systems and lifeline networks.

250. Transportation Policy and Planning and Development. (2) Two 1-hour lectures per week. The evolution of the U.S. transportation system. Growth and decline of the railroads and mass transportation. The development of modern transportation and aviation issues in the regulation, financing, and planning of transportation. Policy analysis and program evaluation. (SP) Garrison

251. Operation of Transportation Facilities. (2) One 3-hour lecture per week. Prerequisites: Graduate standing or consent of instructor. Route, network, and bottleneck capacities. Flow, density, and speed; headways; queuing; technology. Planning, implementation, and operation of control technologies. (F)

252. Systems Analysis in Transportation. (2) Two 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. The systems approach and its application to transportation engineering and planning. The transportation planning system. Production optimization and cost analysis. Economic characteristics of selected transportation technologies. Systems analysis techniques including optimization, evaluation, and systems modeling. (F) Kanafani

252L. Computer Application in Transportation Analysis. (1) Three hours of lab per week. This laboratory course introduces fundamental principles of computer applications to transportation problems, by performing a variety of analyses using computer mainframe and departmental microcomputers. Exercises will be drawn from concepts covered in the core courses CE 251 and CE 252 which should be taken concurrently or previously. Students are expected to have prior computer experience and a background in probability and statistics. This course will not meet the laboratory course requirement for the M.S. degree in transportation. (SP) Garrison

253. Principles of Transportation System Design. (2) One 2-hour lecture per week. Prerequisites: 251, 252 (may be taken concurrently). Design parameters, including human factors and environmental constraints. Design of systems for transportation of material and passenger safety and efficiency; design for operations flexibility and for maintenance. (F) Homburger

254. Transportation Demand Analysis. (2) Two 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Theoretical foundations and analytical approaches to the study of the demand for transportation. Urban and regional travel analysis for passenger and commercial Behavior travel patterns. Methods of forecasting. (SP) Kanafani

254L. Transportation Planning Applications. (2) Two 1-hour lectures and two 1-hour laboratory sessions per week. Prerequisites: Consent of instructor. The analysis of land use and transportation models. The use of transportation demand models in urban transportation planning. The forecasting of demand, and the design and evaluation of multimodal transportation networks. Use of microcomputers in transportation planning and analysis. (SP) Sullivan

255. Highway Traffic Operations. (3) Three 1-hour lectures per week. Prerequisites: 251 or consent of instructor. Operational planning and management of the highway transportation system. The highway system is presented as a set of operating environments with each having its unique analytical framework. Major topics to be covered include policy and institutional issues, selection of strategies and tactics, evaluation of objectives and measures of effectiveness. (SP)

255L. Highway Traffic Operations Laboratory. (1) One 2-hour laboratory per week. Prerequisites: Consents of instructor. The systems approach and its application to transportation engineers and planning. The transportation planning system. The highway transportation system. Partial implementation of traffic models and computer simulation of traffic. (SP) Garrison

256. Freight Transportation. (3) Two 1-hour lectures per week. Analysis of the performance characteristics of the freight transportation modes. Railway and structures are examined and compared with other modes. Next, rail equipment is examined and equipment guideway interaction is considered and compared to other modes, along with the freight systems. (SP) Garrison

257. Applications of Queueing Theory to Transportation. (2) Two 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. The analysis of congestion and delay, and the design of capacity, and traffic. The application of queueing theory to transportation. (SP) Kanafani

258. Public Transportation Systems. (2) One 3-hour meeting per week. Prerequisites: 259 (may be taken concurrently). Analysis of classification terminal design and operations; optimization of sorting subject to train or truck/mass and blocking constraints; route design and operations analysis using train, truck, and lock/operation systems; and parametric analyses of new technology systems. (SP) Garrison

259. Public Transportation Systems. (2) One 2-hour lecture per week. Prerequisites: 258, 252, 252, 252. One hour lecture per week. Prerequisites: Graduate standing or consent of instructor. The analysis of congestion and delays, and the design of railway and public transportation systems. (SP) Garrison

260. Air Transportation. (3) Three 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Nature of civil aviation; aircraft characteristics and performance; aircraft noise; navigation and air traffic control; airport planning and design; airline operations; aviation system planning. (SP) Kanafani

260L. Air Transportation Planning. (1) One 3-hour studio per week. Prerequisites: 260. (may be taken concurrently). Design and evaluation project of a public transportation facility. (SP) Garrison

*Not offered 1988-89
On leave, spring
On leave, fall
266A. Construction Organization and Management. (3) Two 1/2-hour lectures per week. Prerequisites: 140 and 141. Evaluation of geotechnical, structural, and construction aspects of deep foundations for buildings, power plants, and underground structures such as subways, tunnels, and bridges, including compaction, drilled shafts, dewatering, heavy concrete construction, underpinning. Integration of engineering and construction practice in an urban environment.

267A. Advanced Foundation and Mass Concrete Construction. (3) Two 1/2-hour lectures per week. Prerequisites: 140 and 141. Utilization of concrete for construction; lightweight, high strength, and architectural concrete. Uses of admixtures and processes for resolving problems associated with field construction including application to buildings, bridges, pressure vessels, and pollution control structures.

267B. Advanced Concrete Construction. (3) Two 1/2-hour lectures per week. Prerequisites: 140 and 141. Construction methods and equipment for construction of concrete buildings, tunnels, wharves, marine terminals, off-shore sewers, power plant intakes and discharges, submarine oil and gas pipelines, dredging, offshore oil structures, subsea and deep ocean facilities. (SP) Gerwick

267C. Construction of Harbor, Coastal, and Ocean Structures. (3) Two 1/2-hour lectures per week. Prerequisites: 140 and 141. Design and construction of harbor, coastal, and ocean structures. Topics include legal, financial, labor, and environmental constraints; impact analysis. (SP) Hester

268A. Advanced Construction Estimating. (3) Two 1/2-hour lectures per week. Prerequisites: 166. Estimates used by heavy, engineering, building, and specialty contractors. Preparation of cost estimates including labor; pricing of materials; labor and equipment; subcontract and indirect costs. Rational assessment of risk and profit margins. Value engineering. (F) Ibeho

268C. Construction Scheduling, Resource Allocation, and Contract Administration. (3) Two 1/2-hour lectures and one 2-hour laboratory per week. Prerequisites: 166 or equivalent. Planning; scheduling and allocation of resources for construction projects; critical path methods; consideration of planning constraints and their impact on management; simulation methods and optimization techniques from an applications perspective. (SP) Crandall

270A. Advanced Soil Mechanics. (3) Two 1/2-hour lectures per week. Prerequisites: 175 and 177 or equivalents, or permission of the instructor. Advanced topics of soil mechanics, including shear strength, slope stability, and deep foundations, and applications to civil engineering projects. (F) H. Seed

270B. Advanced Soil Mechanics. (3) Three 1-hour lectures per week. Prerequisites: 270A or equivalent. Advanced topics of soil mechanics, including shear strength, slope stability, and deep foundations, and applications to civil engineering projects. (SP) R. Seed

270L. Advanced Soil Mechanics Laboratory. (3) One 1/2-hour lecture, one 3-hour laboratory per week, and project. Prerequisites: 270A or equivalent. Laboratory work in advanced aspects of soil mechanics. Application to analysis and design. Consolidation testing by load control and Janbu’s method, static and cyclic triaxial and simple shearing under stress-controlled and strain-controlled conditions. Pressure measurements, stress and strain measurements, sampling and sample handling, in-situ field testing, and related topics including advanced instrumentation, data acquisition, and measurement techniques. (SP) Johnson, Mao, and Lam

272. Soil and Site Improvement. (2) Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Soil stabilization using compaction and admixtures for use in foundations, embankments, dams, highways, and airfields; precompression; in-situ deep densification and strengthening of cohesionless and cohesive soils; grouting; earth reinforcement; development of marginal lands. (F) Mitchell

273. Soil Behavior. (3) Two 1-hour lectures and one 3-hour laboratory/demonstration per week. Prerequisites: Graduate standing or consent of instructor. Soil mineralogy, soil formation, and composition; influence of geological factors on properties; soil stability characteristics; analysis of in-situ phenomena; compressibility, strength, and deformation properties; stress-strain-time effects. (F) Mitchell

274. Introduction to Soil Dynamics. (3) Two 1/2-hour lectures per week. Prerequisites: Knowledge of FORTRAN programming. Dynamic analysis of single and multi-degree-of-freedom dynamic systems in a general purpose program for soils. Simulation of sediments, seismic waves, and soil-structure interaction analysis. Dynamic soil properties and their determination. (SP) H. Seed

275. Soil Dynamics-Earthquake Engineering. (2) Two 1-hour lectures per week. Causes of earthquakes; influence of soil conditions on ground motion characteristics; computation of ground response using wave propagation analysis and finite element methods; causes of soil liquefaction and settlement; soil-structure interaction effects; lateral pressures on earth retaining structures; analysis of slope stability during earthquakes. (SP) H. Seed

276. Earth Dam Engineering. (2) Two 1-hour lectures per week. Prerequisites: Knowledge of FORTRAN programming. Consolidation analysis by finite difference methods. Stress and deformation analysis by the finite element method. Limit analysis of bearing capacity and stability problems. (SP) H. Seed

277. Theoretical Soil Mechanics. (2) Two 1-hour lectures per week. Prerequisites: Knowledge of FORTRAN programming. Theory of elastic foundations, layered media, and dynamic problems. (SP) H. Seed

278. Seafloor Sediments: Origin, Properties, and Offshore Engineering Applications. (2) Two hours of lecture per week. Prerequisites: Introductory courses in geology and soil mechanics. Geophysical oceanography, including the evolution of ocean basins, plate tectonics, geology of the seafloor; hardware and techniques for sampling, laboratory and in-situ testing, summary of geotechnical properties with emphasis on cyclic loading behavior, case histories. (SP, odd years) Sitar

280. Rock Mechanics. (3) Two 1-hour lectures per week. Prerequisites: Knowledge of soil mechanics. Dynamic deformation and failure of earth dams; cracking in dams; causes of failure; slope protection; seepage control methods; methods of evaluating stability of earth dams; earthquake-resistant earth dams; rockfill dams. (SP, even years) Sitar

281. Engineering Geology. (3) Two 1-hour lectures per week and one 3-hour laboratory per week. Prerequisites: A course in Physical Geology. Influence of geologic origin and history on the engineering characteristics of soils and rocks. Application of geology in exploration, design, and construction of engineering works. (F) Sitar

283. Geological Engineering of Underground Openings. (3) Two 1/2-hour lectures per week. Prerequisites: Course in engineering geology or physical geology. Geophysical exploration for underground openings; methods of excavation, support, and lining; stability problems in hardrock, soft rock, and soil tunneling, monitoring instrumentation; large openings for special purposes; case histories. (SP) Breatke

287. Adjustment Computations. (4) Two 2-hour lectures per week. Prerequisites: 165 (may be taken concurrently). Statistics 25 or equivalent. Probability; algebra and computer programming; introduction to probability and variance and covariance propagation; derivation of the method of least squares adjustment with applications to problems in engineering; coordinate transformations with applications to coordinate refinement in analytical photogrammetry. (F) Anderson

288. Analytical Photogrammetry. (4) Two 2-hour lectures per week. Prerequisites: 186 or equivalent; 287 or equivalent. Comparator measurements; orientation matrices; analytical solutions for strips and blocks using
closely and colinearity conditions; constraints using auxiliary sensors; use of added parameters in the bundle adjustment. (SP)

289. Stereorestitution and Adjustment. (4) Three 1-hour lectures per week; Prerequisites: 100, Flow Kinematics, Strain analysis, stress tensor, Navier-Stokes Equations, exact solutions to Navier-Stokes Equations, Reynolds Number flow-boundary layer, oscillatory boundary layers, turbulence entrainment, wakes and plumes, computer graphics. (SP)

290A. Probabilistic Methods in Geotechnical Engineering. (1-2) New course. Students enrolled in 249 will receive 1 unit of credit for 290A. Two 1-hour lectures per week. Prerequisites: Graduate standing in civil engineering. Application of probability theory and random processes to statistical evaluation of data and random errors. Contents: statistical definition of properties of heterogeneous soil and rock media; stochastic formulation of stress; strain relations, seepage and consolidation problems in random media. Reliability of slopes, foundations and earth-retaining structures. Probabilistic analysis of subsidence and seawall soil response and liquefaction. (SP)

290P. Management of Large Scale Engineering Construction Projects. (2) One 2-hour lecture per week. To provide graduate engineering students an overview of present practices in management of engineering, procurement, construction, operation, and evaluation of major projects. To cover alternate methods of organization and contractual arrangements to implement a large-scale project. (F)

290Q. Heavy Construction Methods and Estimating. (2) Two 1-hour lectures per week. Reviews methods and estimating practices in heavy construction with emphasis on dams and tunnels. Students will prepare estimates and joint venture bids. The course also covers engineering practices from contractors' perspective. (F)

290R. Advanced Topics in Geological Engineering. (1-2) Course may be repeated for credit. Seminar meetings each week. Prerequisites: Consent of instructor. Recent applications of research in geological engineering and rock mechanics. Topics vary each term. (SP)

290T. Advanced Topics in Transportation Theory. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Selected topics in the mathematical analysis of transportation systems. (F.S.P) Dagan, Newell

290U. Transportation Planning for Developing Regions. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. The technique for, and the problems encountered in, conducting transportation planning studies in developing regions. Discussion of economic determinants, and the role played by transportation. Case studies of transportation planning in selected regions. (F)

290Z. Selected Topics in Air Transportation. (2) One 2-hour lecture per week. Prerequisites: 250 (may be taken concurrently). Current developments in air transportation. Topics of current interest, including methods of systems operation analysis, airport and airline planning, and issues of air transportation policy. (Kanafani)

291A. Numerical Methods in Hydraulic and Coastal Engineering. (3) Three 1-hour lectures per week. Prerequisites: 100, Mathematics 50A and 50B. Introduction to numerical methods in hydraulics and hydrology and in coastal and ocean engineering. Time series analysis, multidimensional implicit equations, one-dimensional flow, construction, boundary value problems (elliptic partial differential equation) and initial value problems (parabolic and hyperbolic partial differential equation), application in hydraulic and coastal engineering. (F.S.P)

291B. Advance Topics in Biological Wastewater Treatment. (3) Course may be repeated for credit. One 3-hour lecture per week. Prerequisites: 212 or consent of instructor. Discussion of selected aspects of biological wastewater treatment including: filamentous organisms, methods and mechanisms of bulking control, models of growth in activated sludge, dynamics of biological reactor performance, biological processes under transient condition, biological phosphorus removal, biofilm reactors. (F.S.P)

291C. Advanced Hydromechanics. (3) Three 1-hour lectures per week. Prerequisites: 100. Flow Kinematics, strain analysis, stress tensor, Navier-Stokes Equations, solutions to Navier-Stokes Equations, Reynolds Number flow-boundary layer, oscillatory boundary layers, turbulence entrapment, wakes and plumes, computer graphics. (SP)

291E. Contaminant Transport Processes. (3) May be taken on a satisfactory/unsatisfactory basis. Three hours of lecture per week. Prerequisites: 100 and 111 (173 recommended). Quantitative problems in the environment is controlled by transport processes within a single medium and between media. The similarities in contaminant dispersion within air, water surface, and groundwater will be emphasized. Interphase transport processes such as volatilization and advection will be considered from an equilibrium perspective followed by the kinetics of mass transfer across environmental interfaces. (SP)

291J. Computer Applications in Construction. (3) Two 1-hour lecture per week. Specific construction engineering and management problems are presented, and the use of commercial microcomputer packages in their solution is discussed in detail. Special emphasis given to project control and use of heavy construction equipment, cost, schedule control problems, and quality assurance techniques. (SP)

291K. Professional Courses. (1) Offered in fall and spring terms. (SP) 300. Workshop for Future Civil Engineering Teachers. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture per week. Prerequisites: Graduate standing. Advanced studies in various subjects through special seminars on annually selected topics, informal group studies of special problems, group participation in comprehensive design problems, or group research on contemporary problems for analysis and experimentation. (F.S.P)

291N. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Research or investigation in selected advanced subjects. (F.S.P) (Staff)

291P. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study for the comprehensive or language requirements in consultation with the major field adviser. Units may not be used to meet either unit or residence requirements. (F.S.P) (Staff)

291Q. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual consultation with the major field adviser, intended to provide an opportunity for qualified student to prepare for the various examination requirements for doctoral degrees. May not be used for unit or residence requirements. (F.S.P) (Staff)

*288. Not offered 1988-89
*289. On leave, spring
*290A. On leave, spring
*291A. Recipient of Distinguished Teaching Award

Classics (College of Letters and Science)

Department Office: 5199 Dwinelle Hall, 642-4218
Chair: Anthony A. Long, Ph.D.

Professors: John K. Anderson, M.A., F.S.A. Oxford University, Greek and Latin literature (Graduate Adviser, Classical Archaeology).

William A. Anderson, Ph.D. Yale University, Latin literature, French and Medieval Literature, Latin literature. Anthony W. Balch, Ph.D., Cambridge University, Greek literature, Latin literature, and religion (Graduate Adviser, Classics).

Crawford H. Greenwalt, Jr., Ph.D. University of Pennsylvania, Greek literature, Latin literature, and Roman art (Graduate Adviser, Classics).


Donald J. Maestretta, Ph.D. University of Toronto, Greek and Latin literature.

Steffen G. Miller, Ph.D. Princeton University, Greek and Roman art and archaeology.

Charles E. Murphy, Ph.D. Harvard University, Latin literature and textual criticism.

Thomas G. Rosenmeyer, Ph.D. Harvard University, Greek literature, Latin literature.

Ronald S. Stroud, Ph.D. University of California at Berkeley, Greek History and literature.

Leslie L. Theate, Ph.D. Harvard University, Greek epigraphy, literature, and comparative linguistics.

Arthur M. Gordon, Ph.D. (Emeritus)

W. Kendrick Pritchett, Ph.D. (Emeritus).

Associate Professors: Thomas N. Hasibip, Ph.D. Harvard University, Classical civilization; ancient rhetoric.

Michael N. Nagler, Ph.D. University of California at Berkeley, Greek and Latin literature.

W. Gerson Rabinowitz, Ph.D. University of California at Berkeley, Greek literature and philosophy.

Daniel C. Skeat, Ph.D. Harvard University, Classical literature, Late and Medieval Latin.

Florando Verdusco, Ph.D. University of California at Berkeley, Latin literature.

Sethers Professors: Claude Niccol (Fall)

Bernard Williams (Spring)

Major Advisers: (Greek, Latin, Classical Languages, Classical Civilization) Mr. Griffth, Mr. Habibine.

Major Graduate Advisers: (Classics) Mr. Bullock; (Classical Archaeology) Mr. Anderson.

The Department of Classics offers a complete undergraduate and graduate program in Greek and Latin languages, literature, and civilizations. It groups its courses of instruction under the headings of Greek, Latin, and Classics. The object of the Greek and Latin courses is to teach undergraduates to read major works of ancient literature in the original language, and to give a general understanding of the achievements of classical civilization. The purpose of the undergraduate courses called Classics is to provide instruction in Greek and Roman civilization in all its aspects—literature (read in translation), philosophy, mythology, religion, social and political life and archaeology. The latter courses require no knowledge of Greek and Latin. The graduate courses, all of which are designated Classics, are advanced courses in Greek, Latin, and classical archaeology, all requiring knowledge of one or both of the languages.

The Majors

The Department of Classics offers four undergraduate majors: Greek, Latin, Classical Languages, and Classical Civilization.

Major in Greek: Elementary Greek (either Greek 1-2 or Greek 10 or the Greek Workshop, offered during Summer Session); Greek 40A-40B (to be completed as early as possible; may be taken concurrently with upper division courses); Greek 100, 101, 102, or Greek 102 or 103; four courses chosen from Greek 115-123; one Classics course at any level (except 10A-10B); one course from the list of recommended courses (see below), excluding Greek language courses; Classics 190.

On leave, spring

Recruited to active service

*Not offered 1988-89

On leave, spring

On leave, fall

On leave, spring
Majors in Latin. Elementary Latin (either Latin 1-2 or Latin 14-2 or Latin 10 or the Latin Workshop, offered during intermediate Session); Greek Latin 195 (to be completed as early as possible; may be taken concurrently with upper division courses); Latin 100, 101; either Latin 102 or 103; four courses chosen from Classical Language courses (to be completed as early as possible; may be taken concurrently with upper division courses); Latin 100, 101, 102, 103, 115-123, 125, 146 / Classics.

Majors in Classical Languages. Elementary Greek (either Greek 115-123, Greek 10 or the Greek Workshop, offered during the Summer Session); Elementary Latin (either Latin 1-2 or Latin 14-2 or Latin 10 or the Latin Workshop, offered during Summer Session); either Greek 40A-40B or Latin 40A-40B (to be completed as early as possible; may be taken concurrently with upper division courses); Greek 100, 101 and either 102 or 103; Latin 100, 101 and either 102 or 103; two courses chosen from Greek 115-123, Latin 115-123, at least one of which must be in an author or genre omitted at the intermediate level (i.e. among Greek 102, 103, Latin 102, 103); Classics 190. Majors are encouraged to take additional courses from the list of recommended upper division courses.

Majors in Classical Civilization. An area of concentration must be chosen in either Greek or Roman Civilization. Greek Civilization: elementary Greek (either Greek 1-2 or Latin 10 or the Greek Workshop, offered during the Summer Session); Greek 100, 101 and either 102 or 103; one advanced course chosen from Greek 115-123. Roman Civilization: Elementary Latin (either Latin 1-2 or Latin 14-2 or Latin 10 or the Latin Workshop, offered during the Summer Session); Latin 100, 101 and either 102 or 103; one advanced course chosen from Latin 115-123. Both concentrations: any two additional lower division courses in Classics (excluding 10A-10B), Greek, or Latin; any four additional courses in Classics, Greek, or Latin or in related fields (from the list of recommended courses); Classics 190.

Recommended upper division courses for majors: additional courses in Greek and Latin; courses in Classics; Sanskrit (see South and Southeast Asian Studies); Art 140 (Aegean Art); Art 141A-141B (Greek Art); Art 141D (Studies in Greek Art); Art History 145 (Roman Art); History 106A-106B (Ancient Rome), History 107A-107B-107C (Topics in Ancient History), History 108 (Byzantium); Philosophy 160 (Plato), 161 (Aristotle), Philosophy 163 (Topics in Greek Philosophy). Undergraduates are also urged to enroll in Greek or Latin Advanced Prose Composition, Classics 250 (Greek), 260 (Latin). Students may count these courses as elective or additional upper division units within their major program.

Substitutions. Under exceptional circumstances the undergraduate advisor is empowered to authorize substitution of a more advanced reading course for any lower division course numbered 100 to 103, if such substitution is deemed necessary and advisable.

Honors Program. Restricted to majors with an overall University GPA of at least 3.3 and a GPA of at least 3.5 in the major. Consists of (a) one of the major programs, with the addition of or (b) at least one course from Greek 115-117 or Latin 115-117 (Greek for Greek majors, Latin for Latin majors); either for Classical Languages or Classical Civilization 115-123; one course of any Greek 120-123 or Latin 120-123 (Greek for Greek majors, Latin for Latin majors), either for Classical Languages or Classical Civilization majors, (b) two seminars numbered for Greek or Latin 195 for Greek majors, Latin for Latin majors, either for Classical Languages or Classical Civilization majors, (b) two seminars numbered for Greek or Latin 195 for Greek majors, Latin for Latin majors, either for Classical Languages or Classical Civilization majors, to be taken in the last two semesters preceding graduation: H185, D185, independent study over two semesters, including the writing of a thesis, which will be evaluated by an Honors Committee of three members. The written thesis is due on Monday of the 13th week of the second semester and the committee will agree upon the level of Honors (Honors, High Honors, Highest Honors) and the grade to be awarded no later than the Monday of examination week.

The Minors

The Department of Classics offers three under-graduate minors: Greek, Latin, and Classical Civilization.

Minor in Greek. Five courses from Greek 100, 101, 102, 103, 115-123, 125.

Minor in Latin. Five courses from Latin 100, 101, 102, 103, 115-123, 140, 155.

Minor in Classical Civilization. Five courses from Classics 100A, 100B, 120, 121, 122, 130, 155A, 155B, 170, 175, 176, Greek 100, 115-123, Latin 100-103, 115-123, 140, 155.

Intercollegiate Center for Classical Studies in Rome. There will be an opportunity for some Classics majors to attend the Intercollegiate Classical Center in Rome. This is an intercollegiate program for undergraduates in Classics. All students interested in this program should consult the major advisor.

Preparation for Graduate Study

To enter graduate study in Classics, students should complete the major in Classical Languages (or a satisfactory equivalent). For consideration of a candidate for the master's degree in Greek or Latin, the corresponding major in Greek or Latin may suffice, but some preparation in the other language is normally necessary. These programs should be regarded as minimum requirements. Students are urged to supplement the requirements for the major in Classical Languages with two or three senior reading courses (Greek 115-123, Latin 115-123). They are strongly advised also to have an adequate reading knowledge of French and German, since they must pass examinations in both for the Ph.D. degree, and in one of them for the M.A. degree. Prospective graduate students are also encouraged to take Advanced Prose Composition in Greek and Latin (Classics 250, 250) since the graduate programs require demonstration of competence in prose composition. Note that the major in Classical Civilization is not considered to be adequate preparation for graduate study.

The Graduate Program

The Master of Arts degree may be taken in Greek, Latin (each under Plan B: a program of 24 units in graduate and advanced undergraduate courses, and a series of examinations), or Classical Archaeology (under Plan A: a program of 20 units of graduate and advanced undergraduate courses, and a dissertation).

The Doctor of Philosophy degree may be taken in Classics or Classical Archaeology. Whatever the graduate students' principal interest—literature, history, philosophy, archaeology, or other subjects—they should take a broad program and acquaint themselves with every field of classical study. They must read widely in Greek and Latin authors of all kinds since both M.A. and Ph.D. regulations require an extensive knowledge of literature, history, and philosophy as a source of understanding of ancient and present cultures. (SP)

Undergraduate Courses

Classics

Courses that do not require a knowledge of Greek or Latin. Courses in this group are designated Classics 10A, 10B, etc.

Lower Division Courses

10A. The Golden Age of Greece. (4) Three 1-hour classes and one 1-hour discussion per week. Translations of the Greek classics studied in their political and social settings will illustrate the achievements of the Greeks in literature, philosophy, history, and art. (F) Long

10B. The Golden Age of Rome. (4) Three 1-hour classes and one 1-hour discussion per week. Prereq- uisites: 10A is not prerequisite to 10B. Translations of the Latin classics studied in their political and social settings will illustrate the achievements of the Romans in literature, history, and art. (SP) Habinek

17A-17B. Elementary Course in Classical Archaeology. (4) Three 1-hour lectures and one 1-hour discussion per week. (F) A. The Bronze Age to ca. 350 B.C. (F) J.K. Anderson

B. Ca. 350 B.C. to the Antonine Age. (SP) Grenewelt

28. The Classic Myths. (4) Three 1-hour classes and one 1-hour discussion per week. A study of Greek and Roman myths with emphasis on the universal meanings of myths. The interaction of myths, religion, and philosophy as a source of understanding of and present cultures. (SP)

34. Epic Poetry: Homer and Virgil. (4) Three 1-hour classes and one 1-hour discussion per week. Greek and Roman epics with readings of the Iliad, Odyssey, Aeneid. (F) Reddick

35. Greek Tragedy. (4) Three 1-hour classes or two 1½-hour lectures per week. Greek tragedies with readings of Aeschylus, Sophocles, and Euripides. (SP)

36. Ancient Philosophy. (4) Three 1-hour classes or two 1½-hour lectures per week. The form and content of Plato’s dialogues; readings in Aristotle. (SP)

39. Freshman Seminar. (3) Formerly 66. Two 1½-hour classes per week. Prerequisites: Freshman or sophomore status and permission of instructor. Intensive study of a major area or theme of classical literature or of a major aspect of classical civilization, including the interpretation and influence of the classics in later traditions. (SP)

Stroud

Upper Division Courses

100A. Greek Literature. (4) Three 1-hour or two 1½-hour lectures per week. Readings in Greek writers at the upper division level; enrollment limited. (SP) Rosenmeyer

100B. Latin Literature. (4) Three 1-hour or two 1½-hour lectures per week. Readings in Latin writers at the upper division level; enrollment limited. (F) Sharzer

110. Ancient Metrics. (2) Two 1-hour lectures per week. Prerequisites: Greek 2 or 10. The principles of ancient metre of all types. (SP)

120. Greek and Roman Historians. (4) Three 1-hour or two 1½-hour lectures per week. Readings in the major Greek and Roman historians.

121. Greek Religion. (4) Three hours of class per week. Study of the worship of the gods in the ancient Greek world: cult practices and religious ideas. (SP)

122. Roman Religion. (4) Three hours of class per week. History and development of Roman religion. (SP)

130. Undergraduate Seminar. (4) One 3-hour or two 1½-hour seminars per week. Prerequisites: Upper division status. Topic to vary from year to year. Extensive readings and written assignments. Enrollment limited.
Greek

Courses in this group are designated Greek 1, 2, etc.

Lower Division Courses

1. Elementary Greek. (4) Three hours of lectures per week. Beginners’ course. Extensive reading. (F,SP) Rabinowitz, Threatte

2. Elementary Greek. (4) Three hours of lectures per week. Beginners’ course. Extensive reading. (SP) Rabinowitz, Threatte

10. Intensive Elementary Greek. (8) Five 1-hour classes and one hour of discussion per week. Beginners’ course (intensive); equivalent to Greek 1-2. (SP)

40A-40B. Intermediate Greek Composition. (4-4) Two 1-hour classes per week and one consultation. Prerequisites: 2, 10, or 15. Intermediate Greek: Composition, grammar, and sight reading. Development of skills in writing Attic prose and sight reading; grammar review. (F) Stroud

Upper Division Courses

100. Xenophon and Attic Prose. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 2 or 10. Selected readings from Xenophon’s Anabasis; some review of grammar. (F)

101. Homer. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 1 and 2 or 10. Selected readings in the Iliad or Odyssey. (SP) Negler

102. Plato. (4) Must be taken on a passed/not passed basis. Three 1-hour or two 1½-hour lectures per week. Prerequisites: 100. The Apology and other readings in Plato. (SP)

103. Greek Drama. (4) Must be taken on a passed/not passed basis. Three 1-hour or two 1½-hour classes per week. Prerequisites: 100. Readings in Euripides and/or other dramatists. (SP) Griffin

115. Archaic Poetry. (4) Formerly Greek 115B. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in various Greek poets. (F) Rosenneyer

116. Greek Drama. (4) Formerly Greek 115B. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Selected readings from Greek tragedy and/or comedy. (F) Rabinowitz

117. Hellenistic Poets. (4) Formerly Greek 115C. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in various Hellenistic poets.

120. Herodotus. (4) Formerly Greek 120C. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Herodotus.

121. Thucydides. (4) Formerly Greek 120A. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Thucydides. (F) Stroud

122. Attic Oratory. (4) Formerly Greek 120B. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in oratory.

123. Plato and Aristotle. (4) Formerly Greek 120D. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Plato and Aristotle. (SP) Long

125. The Greek New Testament. (4) Three hours of lecture per week. Prerequisites: 100. Readings in the Gospels and Epistles in Greek.

H195A-H195B. Honors Course in Greek. (3,3) Credit and grade to be awarded upon completion of the sequence. Prerequisites: Appropriate language preparation and eligibility for admission to the honors program. Largely independent study over two semesters, including the writing of a thesis, to be evaluated by an Honors Committee of three members. Written thesis due Monday of the 15th week of the second semester. (F,SP)

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Restricted to senior honors students. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Restricted to senior honors students. (F,SP)

Latins

Courses in this group are designated Latin 1, 2, 40, etc.

Lower Division Courses

The college is planning to implement the following policy beginning fall semester 1990:

Duplication of credit. Students first admitted to the College of Letters and Science in fall semester 1990 and thereafter will not be allowed baccalaureate credit (unit credit) for Letters and Science courses in lower division foreign language that duplicate courses completed previously in high school or at another college. In addition, students will, however, be allowed study list credit in the semester in which they take a course that duplicates such work. High school equivalencies are evaluated as follows: the first two years of high school foreign language are considered equivalent to one semester in college; each successive year in high school is equivalent to an additional semester in college. College-level equivalencies are determined on a course-by-course basis.

1. Elementary Latin. (4) Three hours of lecture per week. Beginners’ course. Extensive reading. (F,SP)

2. Elementary Latin. (4) Three hours of lecture per week. Beginners’ course. Extensive reading. (F,SP)

10. Intensive Elementary Latin. (8) Five hours of classes and one hour of discussion per week. Beginners’ course (intensive); equivalent to Latin 1-2. (F,SP)


40A-40B. Intermediate Latin Composition. (4-4) Two one-hour classes per week plus one consultation. Prerequisites: 2, 10 or 15. Intermediate Latin: composition, grammar, and sight reading. Development of skills in written Latin prose and sight reading; review of grammar. (Shanzer, (F); J.K. Anderson, (SP)

Upper Division Courses

100. Caesar and Sallust. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 2, 10, or 14B. Selected readings in Caesar and Sallust. (F,SP) Murgis

101. Vergil. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 100. Selected readings from Vergil. (F,SP)

102. Cicero. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 100. Selected readings from Cicero. (F,SP) Verdulco

103. Horace and the Lyric. (4) Three 1-hour or two 1½-hour lectures per week. Prerequisites: 100. Readings in Horace and other Latin lyric poets. (SP)

115. Roman Comedy. (4) Formerly Latin 115A. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101. Readings in Plautus and Terence. (SP)

116. Lucan. (4) Formerly Latin 115C. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in the De Rerum Natura and the Georgics. (SP)

117. Latin Lyric. (4) Formerly Latin 115B. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101. Readings in Latin lyric poets. (SP)

118. Satire. (4) New course. Three 1-hour or two 1½-hour classes per week. Prerequisites: Latin 101. Readings from Roman satirists. (SP)

120. Livy. (4) Formerly Latin 120C. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Livy. (SP) Knapp

121. Tacitus. (4) Formerly Latin 120A. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Tacitus. (SP)

22. Augustan Prose. (4) Formerly Latin 120B. Course may be repeated for credit with consent of instructor. Two 1½-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Petronius and Apuleius. (F) Murgis

*Not offered 1988-89
^On leave, spring, fall
*On leave, fall
^Recipient of Distinguished Teaching Award
Classics

The prosenium (Classics 200) is prerequisite to all graduate seminars; this requirement does not apply to graduate courses that are not seminars proper (namely Classics 210A-210B, 211A-211B, 212A-212B, 213A, 215A, 250, 260), and it may be waived only with special permission of the graduate adviser.

Courses vary from year to year and are not necessarily given in alternate years.

Graduate Courses

200. Prosenium. (4) Two 1½-hour or one 3-hour class per week. An introduction to the general literature of classical philology, to methods of research, and to textual criticism. (F) Murgia

201A-201B. Survey of Greek Literature. (4-4) Two 1½-hour classes per week. A sequence of readings and lectures on Greek literature. (F) Griffith

202A-202B. Survey of Latin Literature. (4-4) Two 1½-hour classes per week. A sequence of readings and lectures on Latin literature. (F) Griffith

210. Greek Poetry. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: Graduate status. (SP)

210A. Homer

210B. Hesiod (SP)

210C. Earlier Lyric Poetry

210D. Later Lyric Poetry

210E. Hellenistic Poetry

215. Greek Dramatists. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

215A. Aeschylus

215B. Sophocles

215C. Euripides

215D. Aristophanes

215E. Menander

216. Greek Historians. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

216A. Herodotus

216B. Thucydides

216C. Aristotle's Constitution of Athens (SP) Stroud

216D. Xenophon

216E. Polybius

216F. Plutarch

217. Greek Oratory. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200. Greek oratory.

218. Greek Philosophers. (2 or 4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

218A. Pre-Socratics

218B. Plato (F) Rabinowitcz

218C. Aristotle

218D. Post-Aristotelian Philosophy

219. Greek and Latin romance. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200. Study of the Greek romances.

220A-220B. Greek and Latin Epigraphy. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

220A. Pre-Biblical

220B. Plato (F) Rabinowicz

221. Greek Psychology. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200. Ancient reflections on the soul, consciousness, and various aspects of mental life, especially constructs of the self. (SP) Williams

222. Comparative Grammar of Greek and Latin. (2 or 4) Formerly 222A-222B. Two 1½-hour classes per week. Prerequisites: Greek 102 and Latin 103 or graduate status. Open to undergraduates. Introduction to the phonology, morphology, and syntax of Ancient Greek and of Latin with special attention to study of the development from Indo-European to the classical period of each language.

223. Comparative Grammar of Greek and Latin. (Advanced Topics). (2 or 4) Two 1½-hour classes per week. Prerequisites: Open only to students who have completed Classics 222. Advanced topics in comparative grammar of Greek and Latin. (F) Thraette

224. Classical Poetics and Rhetoric. (2 or 4) New course. Two 1½-hour or one 3-hour class per week. Prerequisites: 200. Ancient views of literature; theories and practice of criticism, scholarship, and education, from Homer to Byzantium. (Precise topics will vary from year to year.) (SP) Murgia

225. Greek Religion. (2 or 4) New course. Two 1½-hour or one 3-hour meetings per week. Prerequisites: 200. Ancient views of literature; theories and practice of criticism, scholarship, and education, from Homer to Byzantium. (Precise topics will vary from year to year.) (SP) Murgia

226. Latin Religion. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

230A. Lucretius

230B. Vergil

230C. Post-Vergilian Epic Poets

230D. Catullus

230E. Horace

230F. Tibullus, Propertius, and Ovid

230G. Persius and Juvenal

235. Roman Dramatists. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

235A. Plautus

235B. Terence

235C. Seneca

236. Roman Historians. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

238A. Sallust

238B. Caesar

238C. Livy

238D. Tacitus

238E. Suetonius

237. Roman Prose Writers. (2 or 4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

237A. Roman Philosophers and Rhetoricians (F) Habinek

237B. Pliny the Younger

237C. Petronius

237D. Apuleius

238. Roman Society and Law. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200. The social, legal, and administrative background to the sources for the Roman Empire. (SP) Cohen

239. Roman Politics and Administration. (2 or 4) Two 1½-hour or one 3-hour class per week. Prerequisites: 200. Select problems in Roman imperial history from 69-235 A.D. (F) Nicolet

240. Topics in Latin and Byzantine Literature. (2 or 4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour meeting per week. Prerequisites: Graduate status. Investigation of a topic in late antique or Byzantine literature.

245A-245B. Latin Literature of the Middle Ages. (2 or 4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour class per week. Prerequisites: 200.

237A. Latin literature 500-900 A.D. (SP) Shanzer

B. Latin literature 900-1300 A.D.

250. Advanced Greek Composition. (2 or 4) Course may be repeated for credit. Two 1½-hour or one 3-hour class per week. Prerequisites: Greek 408 or equivalent. Advanced instruction in the writing of Greek prose. (F) Bulloch

250A. Advanced Latin Composition. (4) Course may be repeated for credit. Two 1½-hour or one 3-hour class per week. Prerequisites: Latin 408 or equivalent. Advanced instruction in the writing of Latin prose. (F) Shanzer

260. Seminar in Classical Archaeology. (2 or 4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour class per week. Advanced study of ancient Greek art objects and sites. (SP) Groenewalt

275. Pan-Hellenism and Nemea. (4) Course may be repeated for credit as topic varies. Two 1½-hour or one 3-hour class per week. Study of the Pan-Hellenic centers with particular emphasis on Nemea.

297. Field Study in Archaeology. (2-12) Course may be repeated for credit up to a maximum of 15 units. Supervised study in archaeology. (F,SP)

299. Special Study. (2-4) Course may be repeated for credit. Prerequisites: Completion of qualifying examination for the Ph.D. degree. Normally reserved for students writing the doctoral dissertation. (F,SP)

299. Special Study. (1-4) Course may be repeated for credit. Special individual study for qualified graduate students. (F,SP)

601. Individual Study for Master's Candidates. (1-12) Course may be repeated for credit. Must be taken only on a passed/pass basis. Individual study for the comprehensive or language requirements in consultation with the graduate adviser or personal adviser. Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP)
Comparative Literature (College of Natural Resources, Interdepartmental Graduate Groups)

Office: 2535 Life Sciences Building, 642-3313
Chair: Lester Peck, Ph.D.

Professors:
Bruce Ames, Ph.D. (Biochemistry)
Giovanna Bertolani, Ph.D. (Biochemistry)
Clement E. Ballou, Ph.D. (Biochemistry)
John E. Hearst, Ph.D. (Chemistry)
Robert A. Jaffe, Ph.D. (Biochemistry)
Sung-Hou Kim, Ph.D. (Chemistry)
John J. Kelly, Ph.D. (Comparative Literature)
Sheldon Margen, M.D. (Social and Administrative Health Sciences)
Thomas G. Rosenmeyer, Ph.D. (Greek)
George Chang, Ph.D. (Nutritional Sciences)

Associate Professors:
Bruce Ames, Ph.D. (Biochemistry)
John E. Hearst, Ph.D. (Chemistry)
Sung-Hou Kim, Ph.D. (Chemistry)
John J. Kelly, Ph.D. (Comparative Literature)
Sheldon Margen, M.D. (Social and Administrative Health Sciences)

Assistant Professors:
Kathy C. Amy, Ph.D. (Nutritional Sciences) Ana Maria, Ph.D. (Biochemistry)

Comparative Literature (College of Letters and Science)

Department Office: 4408 Dwinelle Hall, 642-1202
Chair: Kenneth Weisinger, Ph.D.

Professors:
Paul J. Alpers, Ph.D. (English)
Robert Alter, Ph.D. (English)
William S. Anderson, Ph.D. (Latin, Comparative Literature)
Thaddeus M. Amiotto, Ph.D. (French, Comparative Literature)
Michael Andre Berdell, Ph.D. (English)
Cyril Birch, Ph.D. (Chinese, Comparative Literature)
Carol J. Clove, Ph.D. (Scandinavian)
Louise George Glickman, Ph.D. (Italian, Comparative Literature)
Phillip W. Damon, Ph.D. (English)
Joseph J. Duggan, Ph.D. (French)
Robert P. Hughes, Ph.D. (Italian)
Eric C. Johansen, Ph.D. (Scandinavian)
David A. Miller, Ph.D. (English)
James T. Monroe, Ph.D. (Arabic)
L. Janette Richardson, Ph.D. (French, Comparative Literature)
Thomas G. Rosenmeyer, Ph.D. (Greek)
Blake L. Spain, Ph.D. (German

Associate Professors:
Paul M. Bertrand August, Ph.D. (French, Comparative Literature)
Anthony J. Cascara, Ph.D. (Spanish)
Francois R. Massalski, Ph.D. (French)
Michael N. Nagler, Ph.D. (Comparative Literature)
William Neefield, Ph.D. (English)
Avital Ronell, Ph.D.
Florence Verdug-Gonzalez, Ph.D. (Latin)
Kenneth Weisinger, Ph.D. (German, Comparative Literature)

The Department of Comparative Literature offers students an opportunity to develop their ability to read literary texts responsibly and critically to study one literature in depth and another selectively; to acquire a broader sense of literary history and of literary practice; and to enjoy and study of a single literature, to explore the contexts between writing and other pursuits; to acquaint themselves with some of the significant writings in the history of literature; and to prepare students for the teaching and research of issues involving more than one literature.

The Major

The emphasis of the undergraduate major is on a broad understanding of literary phenomena rather than on specialized skills, although some specialized courses are among the options open to students. Recent graduates have entered graduate programs in a variety of disciplines, including medicine, law, and the social sciences. Others have gone on to jobs in a wide spectrum of activities.

The graduate program consists of two parts and is designed to develop knowledge and research skills in ancient and modern languages and literatures and is especially designed to encourage interdisciplinary research in the study of literary and theoretical traditions. The program is composed of two parts and is designed to provide students with the maximum of flexibility compatible with a rigorous course of study. During the first two years, emphasis is on historical coverage of one literature and on the study of a minor literature in one area. In subsequent years, students design an individual program of study.
1A-1B. English Composition in Connection with the Reading of World Literature. (4,4) Three 1-hour lectures and one 1-hour discussion period per week. Literature chosen to illustrate diverse attitudes of American, English, and French writers. Students are expected to complete these examinations not later than the fourth year of study and to devote the following two years to the development of a prospectus and the completion of a doctoral dissertation. Discussion committees are ordinarily composed of members of the Department of Comparative Literature and other related departments. A final examination on the dissertation and its immediate area may be required.

Lower Division Courses

150. The Reading of World Literature. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Exploration, in seminar format, of a topic in World Literature with round-table discussions and individual assignments. Limited to 15 students with fresh- man standing. (SP, Caccarelli)

41. Introduction to Literary Forms. (3) Two 1½-hour lectures per week. Comparative study of major literary works in world literature. (F,SP)

41A. Forms of the Epic. (3)

41B. Forms of the Lyric. (3) (F)

41C. Forms of the Novel. (3)

41D. Forms of the Drama. (3)

41E. Forms of the Cinema. (3) (SP)

Upper Division Courses

100. Introduction to Comparative Literature. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Selected literary, critical, and theoretical texts from classical antiquity to the present, in English and one foreign language. Emphasis on principles of comparative methods and analysis. (F,SP)

111A-111B. Modern Greek Language and Literature. (4,4) Three 1-hour lectures and one 1-hour discussion period per week. Modern Greek pronunciation, vocabulary, grammar and syntax studied. The forms of writing (prose, poetry, drama) and the reading of literary texts as auxiliary to the acquisition of compositional skills. (F,SP)

Kotzamanidou

112A-112B. Modern Greek Language and Literature. (3-4) Three 1-hour lectures and one 1-hour discussion period per week. Modern Greek pronunciation, vocabulary, grammar and syntax studied. The forms of writing (prose, poetry, drama) and the reading of literary texts as auxiliary to the acquisition of compositional skills. (F,SP)

113A-113B. Welsh Language and Literature. (4,4) Three 1-hour lectures and one 1-hour discussion period per week. Welsh pronunciation, vocabulary, forms, and syntax, studied in conjunction with the reading and analysis of prose texts (including the Mabinogion) supplemented by poetry and drama. (F,SP)

120. The Biblical Tradition in Western Literature. (3) Three 1-hour lectures per week. Examination of selected biblical tradition and its relevance to the study of later literature. (SP)

Ben-Porat

125. The Mystical Tradition in Literature. (3) Two 1½-hour lectures per week. A survey of the major concepts in the philosophy of mysticism and their expression in literary form. Examples drawn from at least one Eastern and one Western tradition; emphasis on problems such as love and sex, social justice and individual fulfillment. (SP)

Nagler

151. The Ancient Mediterranean World. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. The literature of Greece, Rome, the Biblical lands, and other ancient civilizations of the Mediterranean basin. (SP)

Goldstein

152. The Middle Ages. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. The literature of the European Middle Ages. (SP)

153. The Renaissance. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. European literature of the Renaissance. (SP)

Clubb

154. Enlightenment and Romanticism. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. Literature of the eighteenth century and of the Romantic period. (SP)

155. The Modern Period. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing or permission of the instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. Literature of the nineteenth and twentieth centuries. (F,SP)

Nestrick

156. Fiction of the Americas. (3) Three 1-hour lectures per week. Comparative study of recent American, Native-American, Spanish-American, and Brazilian fiction. Readings chosen to illustrate diverse attitudes of Americans toward their Western Hemisphere environment. (F)

Masilei

157. Modern Literature and the Arts. (4) Three 1-hour lecture and discussion periods per week. Prerequisites: Three semesters of one foreign language and two semesters of lower or upper division literature. Comparative investigation of the interrelationships between modern poetry and fiction and modern painting, sculpture, music, and film, with particular emphasis on the period from 1885 to the present. Discussion of the methods used in this type of comparative analysis. (F,SP)

160. Western Literary Cross-Currents in Twentieth-Century China. (3) Three 1-hour lectures per week. The impact of Western literature on modern China and China's response in literary theory, movements, and criticism. When not given see Oriental Languages 206.

165. Myth and Literature. (3) Two 1½-hour lecture and discussion periods per week. Study of the earliest myth texts and of the progressive growth of literature out of myth to the present day. Myth and oral composition. Emphasis on the meanings of myth as reflected in varying idioms.

166. Literature of War and Peace. (3) Two 1½-hour lectures and discussion periods per week. Exploration of important literary works which neither glorify war nor sentimentalize peace but illuminate the problem. Works from ancient and modern, fiction and non-fiction, from Western and Eastern traditions will be canvassed.

170. Special Topics in Comparative Literature. (1-4) Course may be repeated for credit when topic changes. To be arranged. Prerequisites: Restricted to majors in Comparative Literature or by consent of instructor. Independent courses designed to fulfill a need intrinsic to the undergraduate major's program which cannot otherwise be satisfied because it involves either a literature not covered in regularly scheduled course offerings or a special methodological framework or bias of selection. (F,SP)

185. Women's Perspective in Literature. (3) Course may be repeated for credit with the consent of the instructor. Two 1½-hour lecture and discussion per week. Comparative study of women writers or the portrayal of women in the literature of various national cultures. Topics will vary from year to year. (SP)

Masilei

190. Comparison of Authors. (3) Three 1-hour lectures per week. Prerequisites: 100 or equivalent and at least four semesters in upper division literature, including at least one semester in a literature other than English. Only open to three of major authors in different languages. One foreign author must be read in the original language. Examination and substantial comparative paper required. (F,SP)

Goldstein

H195. Honors Course. (1-3) Course may be repeated for credit. To be arranged. Prerequisites: Honors standing or permission of the instructor. 8 units in upper division literature courses, including 100 or the equivalent, and knowledge of a vernacular language and either Greek or Latin. Preparation and
writing of an honors thesis under the supervision of a member of the faculty. (F,SP)

196. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. To be arranged. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

Graduate Courses
The following graduate courses numbered 200 through 260 require at least 16 hours per week of effort, including time spent in class and in outside reading and preparation.

200. Introduction to Comparative Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Admission to graduate standing in Comparative Literature. Required of all candidates for the M.A. degree, to be taken during the first year of residence. Lectures on literary theory, on the history of criticism, and on the methods of comparative literary study. (F,SP) Ronel, Rosenmeyer

202. Approaches to Genre. (4) Two 1-hour lectures and discussion periods per week. Prerequisites: Admission to graduate standing in Comparative Literature. Required of all candidates for the M.A. degree, to be taken during the first year of residence. Lectures on literary theory, on the history of criticism, and on the methods of comparative literary study. (F,SP) Ronel, Rosenmeyer

209. Approaches to Genre. (4) Two 1-hour lectures and discussion periods per week. Prerequisites: Admission to graduate standing in Comparative Literature. Advanced undergraduates may be admitted with the consent of the instructor. Application of the methods of Comparative Literature to the study of genres. (F,SP) Ronel, Rosenmeyer

212. Studies in Medieval Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Completion of 200 and one semester of 202, and admission to the Ph.D. program. The methods and subject matter of Comparative Literature. Readings and discussion of representative theoretical and analytical works. Survey of bibliographical resources. (SP) Dopman

215. Studies in Renaissance Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in Western literature between the 16th and the 17th centuries. (F) Alpers

216. Studies in Neoclassical Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in Western literature between the 18th and the 19th centuries. (F,SP) Alpers

220. Studies in Romanistic. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of major themes in European Romanticism. (SP) M. Zuloagaga

224. Studies in Realism. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in nineteenth- and early-twentieth-century European Realism, with attention to historical, theoretical, and methodological problems. (F) Alter

225. Studies in Symbolist and Modern Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in European literature between 1840 and the beginning of the contemporary period. (SP) Miller

227. Studies in Contemporary Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in contemporary Western literature. (SP) Miller

230. Studies in Oriental-Western Literary Relations. One 3-hour lecture and discussion period per week. Prerequisites: Preparation in an Oriental and one other foreign language. Comparative investigation of a literary topic requiring the study of both Oriental and Western literary documents. When not given see Oriental Language courses. (SP) Birley

232. Studies in Near Eastern-Western Literary Relations. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in a Near Eastern or a European language. Undergraduates may be admitted with consent of the instructor. Comparative investigation of a literary topic requiring the study of both Near Eastern and Western documents. (F) Monroe

235. Studies in the Relations Between Classical and Later Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages, at least one of which must be either Greek or Latin. Comparative investigation of a topic in Western literature involving the study of classical and post-classical documents. (F) Bernstein

240. Studies in the Relations Between Literature and the Other Arts. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of the historical and systematic relations between literature and other arts such as the visual arts, music, and film. (F) Bernstein

250. Studies in Literary Theory. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in the theory of literary history. (F) Bernstein

253. Studies in Literary Criticism. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in descriptive poetics. (F) Bernstein

256. The Craft of Critical Writing. (4) New course. Course may be repeated for credit. One-hour seminar and discussion period per week. The class will deal with the minute details that made for lucidity and facility of style and will also consider larger issues of organization, critical focus, and audience. Through the working assumption of the course will be that good critical writing is not just a matter of mechanics but is an integral part of critical thinking, of discovering meaning through language, and thus is inextricably related to the theoretical and interpretative questions pursued elsewhere in the graduate program. Registration will be limited to 10 students. (F,SP) Verducci

258. Studies in Philosophy and Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topi in the relationship between philosophy and literature. (SP) Johannesson

260. Problems in Literary Translation. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages or permission of the instructor. Theory and practice of translation. Students will complete a project in literary translation. (F) Verducci

267. Comparative Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in Western literature. (SP) Miller

270. Continuing Seminars: Classical World. (3) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion period per week. Prerequisites: restricted to students who have completed the M.A. and are studying for their qualifying examination in Comparative Literature. Discussion on problems of the literature of the period. (F,SP)

282. Special Study. (1-4) Course may be repeated for credit. To be arranged. Prerequisites: Gradate standing. Primarily for students engaged in preliminary exploration of a restricted field, involving the writing of a report. May be substituted for available seminars. (F,SP)

299. Directed Research. (4-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Satisfactory completion of the masters examination. Individual study for the comprehensive or language requirements in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for the master's degree. (F,SP)

301. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Satisfactory completion of the masters examination. Individual study for the comprehensive or language requirements in consultation with the graduate adviser. Units may not be used for unit or residence requirements for the doctoral degree. (F,SP)

Professional Courses
360A-360B. Methods of Teaching Literature and English Composition. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion period and three 1-hour laboratory sessions per week. Prerequisites: Appointment as graduate student by the chairman of the Department of English. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Satisfactory completion of the masters examination. Individual study in consultation with the graduate adviser intended to provide opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP)

361A-361B. Pedagogical Practice. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Teaching appointment. Supervised classroom teaching. (F,SP)

Computer Science
(Choice of College)
Computer Science Division Office: 571 Evans Hall
Faculty and Courses
Computer Science faculty and courses are listed under the Department of Electrical Engineering and Computer Sciences.

Choice of College
Undergraduates who wish to major in computer science may do so either through the College of Letters and Science (A.B. degree) or through the College of Engineering (B.S. degree). Details about the computer science and engineering program in the Department of Electrical Engineering and Computer Sciences may be found under Electrical Engineering and Computer Sciences.

Computer Science Major in the College of Letters and Science
The major in computer science offers undergraduates a background in software, computer architecture, and theoretical computer science and prepares stu-
Minimum Scholarship: A GPA of 2.0 in the upper division major courses is required for graduation. The division monitors the progress of majors and expects them to maintain a 2.0 GPA from semester to semester.

Honors Program: To be eligible to participate in the program, a student must:
1. Attend a 3.5 GPA in all courses that will be counted toward the major.
2. Attend a 3.5 GPA overall.

Once admitted to the honors program, a student must:
1. Maintain an overall 3.5 GPA in all courses (lower and upper division) applied toward the major.
2. Maintain a 3.5 GPA overall.

In order to graduate with honors, a student must:
1. Have an overall 3.5 GPA in all courses (lower and upper division) applied toward the major.
2. Be financially able to continue in the program.

A list of technical electives for the major is available from the department advising office or by telephone 542-7214.

Requirements for the Major

Lower Division Requirements: The following lower division courses are required for entry into the major. The following lower division courses are required:
1. One year of college-level calculus and one course in linear algebra (Math 1A, 1B, 50A or Math 2A, 2B).
2. One course in discrete mathematics (Math 55).
3. One course in probability theory and statistics (Statistics 20 or 25).
4. Two courses in electronics (EECS 42 and EECS 43).
5. Completion of the three-semester sequence in computer science (CS 60A, CS 60B, and CS 60C).

Upper Division Requirements: Students are required to complete 27 units of upper division courses in the major. The following courses are required:
1. One core course:
   a. Hardware (either CS 152 or CS 154).
   b. Software (either CS 162 or 164).
   c. Theory (either CS 172 or 174).
2. Complete one term of CS H196 in the senior year. Admission to H196 is limited; only students who have a 3.5 GPA will be admitted to the course.

For graduation with high honors or highest honors, see the Announcement of the College of Letters and Science.

Graduate Program

Graduate degree programs are available as preparation for research and teaching (Master of Science and Doctor of Philosophy in Computer Science Engineering) and for careers in design, development, and management (Master of Engineering and Doctor of Engineering). For details on graduate programs and procedures, see the Engineering section of this catalog.

Conservation and Resource Studies

(College of Natural Resources)

Department Office: 112 Gillan Hall, 642-7370
Chair: Carolyn Merchant, Ph.D.

Professors:
Fields W. Cobb, Jr., Ph.D. Pennsylvania State University. Forest pathology
Donald L. Dahlin, Ph.D. University of California at Berkeley, Forest entomology, biological control
Sally K. Fairchild, Ph.D. Duke University, Resource policy and law
Joseph G. Hancock, Ph.D. Cornell University. Microbial ecology, environmental education
Carolyn Merchant, Ph.D. University of Wisconsin. Environmental history, philosophy, ethics
John R. Parmenter, Jr., Ph.D. University of Wisconsin. Forest pathology
Robert D. Raab, Ph.D. University of Wisconsin. Fungal ecology, ornamental pathology
Arnold M. Schultz, Ph.D. University of Nebraska. Systems ecology
David L. Wood, Ph.D. University of California at Berkeley. Forest entomology, insect physiology
Angela C. Little, Ph.D. (Emerita) University of California at Berkeley. Psychological responses to food
Ebert T. Schlingier, Ph.D. (Emeritus) University of California at Davis. Systematics and ecosystem entomology
Associates Professors:
Miguel A. Attau, Ph.D. University of Florida. Biological control, agro-ecology
Claudia J. Cien, Ph.D. University of Chicago. International and rural resource development
Oene C. Huismann, Ph.D. University of California at Davis. Forest pathology, pathogen physiology

Lecturers:
Alan S. Miller, D.Min. San Francisco Theological Seminary. Graduate Theological Union. Environmental science, bioethics
Jonas E. Richardson, Ph.D. University of Rochester. Biomedical sciences, community health

Academic Coordinator:
Alan S. Miller, D.Min. (see listing above)

The Conservation and Resource Studies major is an interdisciplinary program designed for those who are interested in environmental, cultural, and natural resource issues. The major comprises three areas of interaction among natural resources, population, energy, technology, societal institutions, and cultural values. Students draw on the course offerings of different academic areas, and their combined expertise to design and develop the major.

Requirements:

1. Have an overall 3.5 GPA in all courses (lower and upper division) applied toward the major.
2. Maintain a 3.5 GPA overall.

In order to graduate with honors, a student must:
1. Have an overall 3.5 GPA in all courses (lower and upper division) applied toward the major.
2. Have a 3.5 GPA overall.

For graduation with high honors or highest honors, see the Announcement of the College of Letters and Science.

Lower Division Courses

1. Environmental Issues. (4) Two 1/2-hour lectures and one 1/2-hour discussion per week. Relationship between human society and the natural environment; case studies of ecosystem maintenance and disruption. Issues of economic development, population, energy, resources, technology, and alternative systems. (F,SP) Miller

10L. Environmental Issues: Special Projects. (1) Course may be repeated for credit with consent of instructor. One 1/2-hour discussion per week. Prerequisites: 10 (to be taken concurrently) or consent of instructor. Group projects related to the CRS 10 lecture series. (F)

40. Environmental Chemistry. (2-3) Students with credit in Chemistry 1A or equivalent are eligible to receive only 2 units of credit. Two hours of lecture per week; additional 2/3-hour discussion for those students enrolling for 3 units. Physical and chemical properties of the environment; their role in pollution and environmental degradation. Students with weak backgrounds in chemistry should enroll for 3 units instead of 2. (SP) Hutslman

50. Environmental Biology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: One course in introductory college biology is recommended. Intended for nonscience majors. Basic biological and ecological principles discussed in relation to environmental disruption. Human interactions with the environment; their meaning for animals and plants. Discussion of basic ecological processes as a basis for understanding environmental problems and formulating strategies for their solution. (F) Dahlen

98. Introduction to Conservation and Resource Studies. (3) Must be taken on a pass/no pass basis. One 2-hour seminar per week for eight weeks. Introduction to the major, emphasizing each student's educational goals. Overview of ecological problems and containing approaches to solving them through institutional and community-based efforts. One field trip is normally required. Required of CRS majors entering with fewer than 60 units. (F) Millar

98. Directed Group Study in CRS. (1-3) New course. Course may be repeated for credit. Must be taken on
a passed/not passed basis. Prerequisites: Lower division standing; consent of instructor, adviser, and department chair. One hour of lecture/discussion per week per unit. Students must complete a topic that is not covered in depth in regular courses in the department. (F)

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual meetings. Prerequisites: Consent of instructor, 3.3 GPA or better, and consent of instructor, adviser, and department chair. Usually restricted to CRS majors. Intended for exceptional students. Supervised independent study or research on topics relevant to CRS that are not covered in depth by other courses. Open to students in good standing who in consultation with a faculty sponsor present a proposal with formally detailed objectives and means of implementation. (F,SP)

Staff

Upper Division Courses

100. Environmental Problems: Principles and Methods of Analysis. (4) Two 1-hour lectures and one 1/2-hour discussion per week. Prerequisites: One course in biology; one course in mathematics or statistics; one course in a social science or economics. Analysis and comparison of frameworks that integrate natural and social science explanations of environmental problems. Concepts of holistic, ecological, technical, social-economic, and value dimensions in the identification of causes and approaches to solutions. Required of CRS majors. (SP)

101. Urban Garden Ecosystems. (4) Three hours of lecture and one hour of discussion per week. Study of urban garden and recreation ecosystems, with emphasis on basic ecological concepts and techniques for managing plants and animal systems. Average of two hours per week field work in gardens. (F)

101L. Urban Garden Ecosystems Laboratory. (1) Must be taken on a passed/not passed basis. One 3-hour supervised laboratory project per week. Prerequisites: 101L. Special projects. (SP)

102. Agricultural Ecology. (3) Two 1/2-hour lectures per week. Prerequisites: Consent of instructor. Experiments in a holistic framework: fundamental biological, technical, socio-economic and political processes that govern agro-ecosystem productivity and stability. Management techniques and farming systems' designs that sustain long term production and are emphasized. One Saturday field trip and one optional field trip. (SP)

Altieri

110. Ecosystemology. (4) Three hours of lecture and 1 1/2 hours of discussion per week. Prerequisites: An ecology course or CRS 100 or consent of instructor. Qualitative methods for studying large, complex ecosystems in which we are dependent components, planning agents, indifferent observers; how to deal with complexity; the systems approach to problem solving; determining systems boundaries; ecological concepts; ecosystem management. A weekend field trip is required. (SP)

Raabe

115. Environmental Philosophy and Ethics. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 100 or consent of instructor; A critical analysis of the historical development of the relationship between the individual and the social and technological environment. (F)

Schultz

116. Bioethics. (3) Two hours of lecture and one hour of discussion per week. Exploration of the ethical dilemmas arising from recent advances in the biological sciences, with special emphasis on biotechnology, health care delivery, behavior modification, patients' rights, social or private control of research. (F)

Staff

130. Environmental Policy, Administration, and Law. (4) Students who have completed 131 prior to fall 1983 may not receive credit for 130. Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or consent of instructor; at least one course in political science, public policy; or environmental issues. Introduces American political process affecting development and implementation of environmental and resource policy. Emphasizes national institutions and exercise of administrative discretion. Reviews key management programs: air or water quality, public forests, pesticide regulation, coastal zone protection. (F,SP)

131. Legal Aspects of Resource and Environmental Administration. (3) Students who have taken 130 prior to fall 1983 may not receive credit for 131. Two hours of lecture and 1 1/2 hours of discussion per week. Prerequisites: Upper division standing; consent of instructor. Introduces CRS students to legal concepts which structure public resources discussions. Reviews history and institutional setting, discusses constitutional principles (property, federalism). Focuses on selected resources: Forests, wildlife, water, energy and non-energy minerals. Evaluate strengths and limits of legal concepts. (SP)

Fairfax

132. Environmental Analysis. (4) Three hours of lecture, one hour of discussion and two hours of project group per week. Prerequisites: 130 or consent of instructor. Methods for describing and assessing human induced changes on environmental systems. Provides skills in the collection and evaluation of data on physical, ecological and social impacts as they relate to environmental planning and problem solving. Includes group environmental impact report writing. One required field trip. (SP)

Staff

140. Environmental Health and Development. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Analysis of environmental behaviors resulting from development programs and other human activities which affect the health of people in developed and less developed parts of the world. Case studies and mitigation measures of diseases associated with water storage utilization. (F)

Garcia

150. American Environmental and Natural Resource History. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Consent of instructor. History of the natural and human environments as interconnected systems from precolonial to the present. Human factors—demographic, economic, social, technological, intellectual—promoting the exploitation or conservation of natural ecosystems and their associated resource bases. (F)

Merchant

151. U.S. Agricultural Development in the 20th Century. (4) Three hours of lectures and one hour of discussion per week. An examination of economic and political forces that have shaped U.S. agriculture since 1920 with special attention to impacts of agricultural policies on land, water, and energy resource development and on the environment, particularly in California. (SP)

LeVeen

163. International Rural Development: Comparative Systems. (4) Three hours of lecture and one hour of discussion per week. Comparative analysis of policy systems governing natural resource development in rural Third World countries. (SP)

Carr

166. Political Ecology. (4) Three hours of lecture and one hour of discussion per week. Analysis of ecological problems in the U.S. from the standpoint of their roots in contemporary political and economic processes and their potential solutions within the present political system. Special emphasis on U.S. policy regarding energy and agricultural development, considered within the global context. (SP)

Carr

168. Natural Resource Policy and Indigenous Peoples, (4) Three hours of lecture and one hour of discussion per week. Critical analysis of the historical transformation of indigenous peoples and their environments in North America and the Third World. The origins and specific patterns of socio-economic problems in these areas, existing and alternative future development policies and their effects. (SP)

Staff

180. Seminar in Environmental Issues. (3) Course may be repeated for credit. Five to ten hours per week. Prerequisites: Upper division standing and consent of instructor. Interdisciplinary study of issues for advanced students. Designed to develop skills in critical analysis of specific issues. Different topics will be available each semester reflecting faculty and student interest. Major research project required. (F,SP)

194. Senior Seminar in Conservation and Resource Studies. (2) One 2-hour seminar per week. Prerequisites: Senior standing in CRS. Seminar in which students synthesize their knowledge, skills, and interests into a holistic perspective. A one-hour oral presentation in the area of interest and a senior thesis synthesizing the area selected. Required for final semester for all CRS majors. (F,SP)

195. Senior Thesis. (3-4) Students who have successfully completed CRS 195 may petition for exemption from CRS 194. Three hours of laboratory/research work per week per unit. Prerequisites: Senior standing in CRS; 3.0 GPA. Subject must be approved by faculty sponsor during final semester of the junior year and course initiated in the first semester of the senior year. (F,SP)

196A. Internship in CRS—Field Module. (3-6) Must be taken on a passed/not passed basis. Fifteen to forty hours per week at placement location for 10 weeks. Prerequisites: Upper division standing; consent of adviser, faculty sponsor, and CRS department; normally restricted to CRS majors. Intern placement relevant to student's academic interests and career objectives. Must be approved by department early in preceding semester. See "Internship Guidelines," available in department office. (F,SP)

196B. Internship in CRS—Research/Seminar Module. (2-4) Two hours of seminar per week; variable hours research/analysis for five weeks. Prerequisites: Upper division standing; consent of adviser, faculty sponsor, and department chair. Internship placement relevant to student's academic interests and career objectives. Must be approved by department early in preceding semester. See "Internship Guidelines," available in department office. (F,SP)

197. Field Study in CRS. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Approximately three hours of field study per week per unit. Prerequisites: Consent of instructor, adviser and department chair. Upper division standing. Usually restricted to CRS majors. Supervised experience in off-campus organizations relevant to specific aspects of CRS. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

198. Directed Group Studies for Advanced Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour of lecture/discussion per week per unit. Prerequisites: Upper division standing; consent of instructor, adviser and department chair. Upper division standing. Usually restricted to CRS majors. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. Supervised independent study and research specific to aspects of conservation and resource studies. (F,SP)

Interdepartmental Studies Courses

Lower Division Courses

IDS 80. Environmental Physics. (3) Three hours of lecture and one hour of discussion per week. Elementary concepts of physics with application to problems of environment, energy, pollution, biology, geology. Specific examples of the role of physics in contemporary social issues. Sponsoring departments: Conservation and Resource Studies and Physics.

Upper Division Courses

IDS 121A-121B. Educational Environment. (3) Must be taken on a passed/not passed basis. Five and one half hours of lecture/discussion and six hours of field work per week. Prerequisites: 121A is prerequisite to
Students already enrolled in another graduate program at Berkeley who wish to earn a degree in demography may apply by executing a change of major or addition of minor. Students not already enrolled in the University who wish to enter the degree program as an undergraduate must have completed at least one year of college and have a sound background of at least one year of college and have a sound background in college-level mathematics and statistics, and be admitted to the University. Current students with a bachelor's degree who wish to add a minor in demography may do so by filing a petition with the Graduate Division. For specific degree requirements, please inquire of the chair.

Note: Demography undergraduate courses are given under the auspices of the Special Program in Population Studies in the College of Letters and Science.

**Minor in Demography**

Students must complete, with a minimum grade-point average of 2.0, a total of five upper division courses. All courses applied to the minor must be taken on a letter-graded basis. At least three of the five upper division courses must be completed at Berkeley.

**Requirements:** One general introductory course in population, consisting of one of the following: Anthropology 194, Economics 75, Population Studies 100, or Sociology 128; one course in demographic methodology, which may be an approved course in statistical methods or vital statistics, consisting of one of the following: Public Health 121, Public Health 122, Statistics 131F, or Statistics 134; two courses in social science dealing with demographic factors, consisting of one of the following: Economics 105, Economics 112, Economics 113, Economics 175, History 139B, History 159, Population Studies 105 or Sociology 111.

The faculty in the demography major may add additional or substitute courses within the subfields, depending on the courses available on the campus. With the permission of the faculty, substitutions may include graduate-level courses covering the same area that qualified seniors may choose to take.

**Graduate Courses**

200. Seminar in Introductory Population Theory. (1) One 1-hour seminar per week. Prerequisites: Consent of instructor and prior or concurrent enrollment in Population Studies 100, Sociology 128 or Economics 175. Required of graduate students in the M.A. or Ph.D. program in Demography. (SP) Lee

211. Advanced Demographic Analysis. (4) Two 3-hour lectures per week. This course aims to provide students with a comprehensive understanding of demographic analysis and its applications. (SP) Staff

220. Human Fertility. (2) Two 1-hour lectures per week for seven weeks. Prerequisites: Consent of instructor. This course provides an introduction to the study of human fertility, with a focus on demographic analysis and its applications. (SP) Staff

230. Human Mortality. (2) Two 1-hour lectures per week for seven weeks. Prerequisites: 210 or 211, or consent of instructor. This course is designed to provide an introduction to the study of human mortality, with a focus on demographic analysis and its applications. (SP) Staff

240. Migration. (2) Two 1-hour lectures per week. Human populations move from one place to another, and the study of migration is a key component of the field of demography. This course provides an introduction to the study of migration, with a focus on demographic analysis and its applications. (SP) Staff

260. Mathematical Demography. (4) Two 1-hour lectures per week. This course is designed to provide an introduction to the mathematical tools used in the field of demography, with a focus on demographic analysis and its applications. (SP) Staff

270. Topics in the History of Population. (4) Two 1-hour seminars per week. This course is designed to provide an introduction to the history of population, with a focus on demographic analysis and its applications. (SP) Staff

280. Advanced Research Seminar I. (2) Course may be repeated for credit. One 1-hour seminar per week for seven weeks. Special research topics in advanced areas, by lectures or seminar conferences on foci to be announced. (F) Wachter

281. Advanced Research Seminar II. (2) Course may be repeated for credit. One 1-hour seminar per week for seven weeks. Special research topics in advanced areas, by lectures or seminar conferences on foci to be announced. (F) Wachter

290. Proseminar in Research. (4) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 293 and 294. Introduction to demographic research. (SP) Hammel

291. Directed Reading. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Intended to provide directed reading in subject matter not covered in available course offerings. (F,SP) Staff

292. Directed Research. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Intended to provide supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

293. Advanced Research Seminar I. (2) Course may be repeated for credit. One 1-hour seminar per week for seven weeks. Special research topics in advanced areas, by lectures or seminar conferences on foci to be announced. (F) Wachter

294. Advanced Research Seminar II. (2) Course may be repeated for credit. One 1-hour seminar per week for seven weeks. Special research topics in advanced areas, by lectures or seminar conferences on foci to be announced. (F) Wachter

295. Directed Reading. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Intended to provide directed reading in subject matter not covered in available course offerings. (F,SP) Staff

296. Directed Research. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Intended to provide supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

601. Individual Study. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Individual study in consultation with the graduate adviser, intended for qualified students to do necessary work to prepare themselves for language examinations, and the comprehensive examination. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For qualified graduate students. Individual study in consultation with the major field adviser, intended to provide...
Development Studies

Development Studies (College of Letters and Science)

Group Major Office: Institute of International Studies, 209 Moses Hall, 642-4468

Major Advisers: Carl G. Rosberg (Director, IIS); Michael J. Walls (Geography, Head Adviser); Irma Adelman (Agricultural Economics); Miguel A. Alteri (Entomological Sciences); James N. Anderson (Anthropology); Kalapani Bardhan (Economics); Pranab K. Bardhan (Economics); David Coller (Political Sciences); Ruth B. Coller (IS); Jyotirindra Das Gupta (Political Science); Alan de Janvry (Agricultural Economics); Lowell Dittmer (Political Science); Louise P. Fortmann (Forestry and Resource Management); Thomas B. Gold (Sociology); John J. Gurpuser (Anthropology); Irma M. Lapisius (History); David Leonard (Political Science); Thomas R. Metcalfe (History); Robert R. Reed (Geography); Jeff Romm (Forestry and Resource Management); Z.I. Sabry (Public Health Nutrition).

Group Major in Development Studies

The program in Development Studies offers an opportunity for qualified students to participate in the study of the problems, processes, and prospects of the developing areas of the world. The problems of development are urgent, massive, and enormously complex, and they transcend the boundaries of conventional academic disciplines. The study of development as social transformation further necessitates a blending of knowledge and perspectives from political science, economics, sociology, psychology, anthropology, geography, history, and the natural and environmental sciences.

Through the program in Development Studies, a coordinated and comprehensive plan for interdisciplinary study of political, economic, and social development issues can be devised by setting up a schedule of relevant courses from the various academic departments and programs on the Berkeley campus. The courses available are listed and described briefly in the brochure available at the Group Major Office. From the rich variety of offerings within and across departments, there is a wide range of potential programs of study to suit the interests of students within terms of appropriately selected criteria. Students are aided in combining courses in a systematic way by members of the faculty committee and by representatives from several academic departments, and, on a more regular basis, by the major adviser, also a member of the faculty committee. The program is under the supervision of an interdepartmental committee of faculty members organized through the Institute of International Studies.

Students participating in the program follow a plan of study organized as an interdisciplinary group major leading to a Bachelor of Arts degree in Development Studies. They are required to take courses in two or more disciplines and to pursue detailed study of at least one special topic. In the procedural aspects of organizing an undergraduate plan of study, students in the program are assisted by the staff in the Group Major Office, participating faculty members, the student's faculty adviser, and teaching associates working in the program.

Lower Division Courses

Anthropology 3; Political Science 2; Economics 1.

Recommended Courses. Sociology 1; Geography 4, 18; Environmental Design 4; Statistics 2.

Upper Division Courses

A total of nine (30-36 units) upper division (1) core courses, (2) research methods, and (3) area courses. Course additions and deletions are frequently made within fields. Please consult the program brochure for updated information.

Core Courses. Four courses in two or more disciplines. One of the courses must be DS 100: Anthropology 144, 150, 156, 164; City and Regional Planning 110, 118; Conservation and Resource Studies 168; Development Studies 100; Economics 171, 172; Geography 130, 131; History 198B, 160; PENER 100, 101, 102, 105; Political Science 128A, 128B, 182; Public Policy 184; Sociology 172.

Research Methods. Two courses on research methods. One course should be selected from the following list, the second chosen in consultation with an academic adviser:

Anthropology 168 or 169A or 169B or Economics 141 or History 101 or Political Science 151 or 153A, 153B, or Sociology 105. Note: Those students wishing to complete the research methods in the Department of Economics must also take Economics 100A-100B and Statistics 2. Students should check with the Anthropology Department for current prerequisites.

Area Courses. Three courses. These are to be selected with the approval of the major adviser. For the entire course list and descriptions, please consult Development Studies brochure available in the Group Major Office. Students will be encouraged to take area courses in more than one discipline. Related language training will be recommended but not required.)

Up to two substitutions of courses may be permitted in the major with the approval of the adviser.

No course not officially approved by the Executive Committee of the College of Letters and Science for use in the Group Major Program is considered a substitution. See the Development Studies brochure for the listing of approved courses.

A maximum of three courses outside the College of Letters and Science may be included in the major, e.g., courses in forestry, visual design, entomological sciences, genetics, engineering, journalism, social welfare, public health, business, and regional planning.

No course taken to fulfill major requirements may be taken passed/not passed.

Honors Program. Students accepted into the honors program will enroll in Development Studies H195A-H195B. Senior Honors Seminar (4-4), the topic of which will be expressly designated for the student in the group major. The topic may change from year to year. Honors students will write a thesis under the supervision of the seminar instructor. Please consult with the Group Major Office concerning current eligibility requirements.

Lower Division Courses

10. Land, Labor, and Work. (4) New course. Three 1-hour lectures and one 1-hour discussion per week. This course is designed as an introduction to comparative development. The course will be a general service course, as well as a prerequisite for the upper division DS 100 series. It is assumed that students enrolled in DS 100 know little about life in the Third World countries and are unfamiliar with the relevant theory in political economy and development and underdevelopment. The course will be structured around three critical concepts: land, labor, and work. This will permit the students to be grounded in the lived (micro) experiences of productive activities on and off the land, and with the macro-variables of national development and historical change. The first part of the course covers the historical patterns of incorporation into an expanding world system and the different theories associated with it. The second part deals with a variety of micro and macro phenomena organized around land, labor, and work. This would embrace peasant, rural labor migration, the informal sector, multinationals, new industrialization, the role of women, the role of the state, and ideological institutions. (SP)

Staff

Upper Division Courses

100. History of Development and Underdevelopment. (4) Two 1-hour lectures and one 1-hour discussion per week. Historical review of the development of world economic systems and the impact of these developments on less advanced countries. Course objective is to provide background against which theoretical interpretations of development and underdevelopment. (F)

Staff

150. Advanced Studies in Development. (3) New course. Course may be repeated for credit with permission of instructor. One semester. Prerequisites: Consent of instructor and background in developments of related social sciences. Advanced multidisciplinary research in current issues and topics of development. Seminars will focus on specific geographic areas with appropriate comparative materials included. A major research project is required as well as class presentations.

Staff

194. Seminar in Development Studies. (4) Two 2-hour seminars per week. This course will provide students of development with an opportunity to synthesize widely dispersed material in a variety of disciplines as well as enable them to cover certain aspects of development not available in other departments. A major paper on a topic of special interest to individuals will be required of all participants. (SP)

H195A/H195B. Senior Honors Thesis. (4) Credit and grade to be awarded upon completion of the sequence. Two 2-hour seminars per week. Prerequisite: Check with the Group Major office for current requirements. Must be conducted by an instructor who will also supervise the thesis projects of honors students. The honors student is required to write a thesis on research performed in the H195A/H195B course. The thesis will be supervised by a faculty member from the faculty committee. Approved by a selected group of the same committee. (F,SP)

Coller

197. Field Studies. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual meetings. Prerequisites: Upper division standing and consent of instructor. Supervised experience relevant to specific aspects of Development Studies in off-campus organizations. Regular individual meetings with faculty advisor and written report. (F,SP)

Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group meetings to be announced. Prerequisites: Upper division standing and consent of instructor. Directed group study (upper division). Staff

199. Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual meetings. Prerequisites: Written proposal must be approved by faculty adviser. Enrollment is restricted to regulations listed on pages 81 and 62 of this catalog. (F,SP)

Staff

"On leave, spring
"On leave, fall

209 Mosed Hall, 642-4466

Recruited to active service

Recipient of Distinguished Teaching Award

"Not offered 1966-89
The University Dance Theatre presents an annual concert of works choreographed by the faculty and performed by the students. Student works are presented each semester at choreographic workshops. The Bay Area Repertory/Dance Company, an in-residence dance group, gives concerts and demonstrations throughout the year in schools and community centers on the West Coast.

Unit credit may be earned for work in drama and dance production. For further information contact the office of the Department of Dramatic Art.

Tryout Regulations

Tryouts for faculty and student-directed productions are held throughout each semester. All registered students may attend. Students not performing the productions are announced on the department's bulletin boards.

Dramatic Art—Dance

Lower Division Courses

40A-40B. Beginning Modern Dance Technique. (1-1) Must be taken on a passed/not passed basis. Seven and one-half hours of studio per week. Prerequisites: Audition and consent of instructor. Study of musical structure with emphasis on note values, rhythm, and phrasing. All work will be activated through structural improvisation. (F,SP) M. Wood

41. Rhythmic Analysis for Dancers. (2) Three hours of lecture and studio per week. Prerequisites: 40A-40B (may be taken concurrently) or consent of instructor. The study of musical structure with emphasis placed on rhythm, dynamics, and style. (F,SP) Egan

41A-41B. Intermediate Modern Dance Technique. (1-1) Course may be repeated for credit. Must be taken on a passed/not passed basis. Seven and one-half hours of studio per week. Prerequisites: 40A-40B, audition, or consent of instructor. Development of physical control through off-center movement and its utilization in spatial exploration. (F,SP) M. Wood

412A-412B. Advanced Modern Dance Technique. (1-1) Course may be repeated for credit. Must be taken on a passed/not passed basis. Seven and one-half hours of studio per week. Prerequisites: 41A-41B, audition, or consent of instructor. Refinement of movement techniques and qualitative analysis of movement with regard to rhythm, dynamics, and style. (F,SP) M. Wood

43A-43B. Company Class. (1-1) Course may be repeated for credit. Must be taken on a passed/not passed basis. Seven and one-half hours of studio per week. Prerequisites: 41A-41B, audition, or consent of instructor. Exploration of existing styles and forms of movement and their musical relationship using both individual and group awareness. (F,SP) M. Wood

144. Sources of Movement. (3) Four and one-half hours of lecture and studio per week. Prerequisites: 142A-142B, audition, or consent of instructor. Exploration of existing styles and forms of movement and their musical relationship using both individual and group awareness. (SP) Egan

145. Music Resources for Dancers. (2) Three hours of lecture and studio per week. Prerequisites: 144, or consent of instructor. An historical overview of the different periods of music in specific relation to dance. Methods of research, analysis of choreographic values of music, and experimentation in their usage. (F) Marcus

146A-146B. Choreography. (3) Five and one-half hours of lecture and studio per week. Prerequisites: 144, or consent of instructor. Analysis of theories of form and structure and their practical application in relation to content. (SP) Rogers
**Dramatic Art**

### Undergraduate Studies

#### Acting and Speech

**Lower Division Courses**

10. **Introduction to Acting.** (3) Five hours of studio sessions per week plus preparation and rehearsals to be arranged. Prerequisites: Consent of instructor. Instruction of elementary acting. (F,SP)

11. **Advanced Acting.** (3) Course may be repeated for credit. Two 3-hour sessions per week plus preparation and rehearsal time. Prerequisites: Audition; two years of undergraduate work in acting or consent of instructor. (F,SP)

**Graduate Courses**

210. **Advanced Acting: Company Class.** (3) Course may be repeated for credit. Two 3-hour studio sessions per week, plus preparation and rehearsals as arranged. Prerequisites: Three years of undergraduate work in acting; voice and speech training; or consent of instructor. Advanced work in acting. (F,SP)

### Directing

**Upper Division Courses**

162. **Fundamentals of Stage Directing.** (3) Two 2-hour lecture/discussions per week plus preparation and rehearsals to be arranged. Prerequisites: 10; 45A or 45B; 20A-20B; 120; junior standing and consent of instructor. Beginning study of principles of stage composition, blocking, and analysis of dramatic texts for the director. (SP)

163. **Company Class for Directors.** (3) Three hours of lecture and discussion per week. Prerequisites: Junior standing, two years of acting, or consent of instructor.

**Honors Courses**

**Upper Division Courses**

H195A. **Honors Course.** (4) To be arranged. Prerequisites: Honors status in the Department of Dramatic Art. Independent study and conferences with faculty sponsor leading to the preparation of a major research paper on a single aspect of dramatic art or dance. (F,SP)

H195B. **Honors Course.** (4) To be arranged. Prerequisites: Honors status in the Department of Dramatic Art; successful completion of H195A and consent of production chair if performance is involved. Development of subject studied in H195A, either as a bachelor's thesis or a laboratory project in acting, directing, playwriting, design, or dance. (F,SP)

### Literature

**Lower Division Courses**

1A-1B. **Introduction to Dramatic Literature.** (4,4) Three hours of lecture and discussion per week. Prerequisites: Subject A, examination or course. Dramatic Art 1A or its equivalent is prerequisite to 1B. Reading and composition in connection with the study of dramatic literature. (F,SP)

20A-20B. **Survey of World Drama.** (3,3) Three 1-hour lectures per week. Prerequisites: Consent of instructor. A. Aeschylus to Shakespeare (F) Ogden B. Shakespeare to Beckett (SP) Ogden

50A-50B. **Filmed Survey of Performing Arts.** (4) One hour of lecture; one 2-hour lab and one hour of discussion per week. Prerequisites: Consent of instructor. Devoted to the study of plays, opera and dance on film. (F,SP)

**Upper Division Courses**

120. **Dramatic Theory.** (3) Three hours of lecture per week. Prerequisites: 1A-1B and Dramatic Art 20A-20B, or consent of instructor. Study of major documents in dramatic theory and criticism, to focus on: Aristotle, Commedia, Lessing, Ibsen, Brecht, and modern performance analysis and theory. (SP)

122. **Drama and Theatre in Ancient Greece and Rome.** (3) Three hours of lecture per week. Prerequisites: 1A-1B and Dramatic Art 20A-20B, or consent of instructor. Drama and the theatre of ancient Greece and Rome. (F)

123. **Drama and Theatre in Europe: Middle Ages to 1600.** (4) Three hours of lecture per week. Prerequisites: 1A-1B and Dramatic Art 20A-20B, or consent of instructor. Dramatic Literature of England and Europe from church drama to the High Renaissance. (SP)

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*124. Drama and Theatre in 17th Century Europe: Including Spanish Golden Age. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 20A-20B, or consent of instructor. English and continental dramas, 1600-1700. (SP)

*125. Drama and Theatre in Europe: 1700-1850. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 20A-20B, or consent of instructor. Eighteenth-century comedy and tragedy, Romantic drama; drama of the Victorian age; the early modern period. (SP)

*126. Drama and Theatre in Europe and United States: 1850-1918. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 20A-20B, or consent of instructor. Masterworks of the late 19th and early 20th century drama.

127. **Drama and Theatre: 1918 to Present.** (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 20A-20B, or consent of instructor. Contemporary drama. (F,SP)

129. **Senior Proseminar.** (3) Course may be repeated for credit subject to acceptance of petition. Three 1-hour lectures per week. Prerequisites: 120, senior standing, or consent of instructor; enrollment is restricted to 15. Studies of the works of a major playwright, choreographer, or designer or a major period of dramatic activity in the theatre. (F,SP)

**Playwriting**

**Lower Division Courses**

*39. Introduction to Playwriting.** (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Instruction and practice in composing dramatic concepts.

**Upper Division Courses**

139A-139B. **Playwriting.** (3,3) Credit and grade to be awarded upon completion of the sequence. Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Practice in the fundamentals of dramatic composition. Group readings and discussion of written work.

### Production

**Lower Division Courses**

45A-45B. **Theatre in Production: Beginning Study.** (4) Three hours of lecture per week plus laboratory to be arranged. Prerequisites: Consent of instructor. (F,SP)

45A. **Basics of stagecraft and production management, including set and costume construction, props, makeup, sound, stage management, theatre operations. Related to department's productions.**

45B. **Basics of production concept. A study of the roles of the producer, director, choreographer, and designer in the making of a theatrical production. Related to department's productions.**

**Upper Division Courses**

170. **Theatre Laboratory.** (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. To be arranged. Prerequisites: Consent of instructor. Non-performing participation in the University Theatre to include: Stage management, crew assistance in lighting, sound, properties, costumes, make-up, back-stage technical assistance in scene or costume shop. (F,SP)

171. **Theatre Performance.** (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. To be arranged. Prerequisites: Consent of instructor. Practice in acting and/or dance in Dramatic Art production. (F,SP)

172A-172B. **Theatre in Production: Intermediate Study.** (3,3) Two 1-hour lecture/semesters per week and laboratory to be arranged. Prerequisites: 45A-45B and consent of instructor.
172A. Problems in concept management; intermediate study of production techniques and procedures. (F,SP)
172B. Dynamics of production management; intermediate study of theatre business and administration. (SP)
180. Advanced Production Study. (3) Course may be repeated for credit. To be arranged. Prerequisites: 145A-145B and one or more of the following department courses: 172A-172B, 172A-172B, 174A-174B, 175A-175B and consent of instructor. Supervised internship in department-approved major productions to include production research, management and design. (F,SP)
181. Theatrical Realization of Dramatic Texts. (3) Course may be repeated for credit. Six hours of lecture and 12 hours of laboratory per week. Prerequisites: Admission or consent of instructor. This course relates dramatic text to the theatrical presentation. The lectures are based on the analysis of the work being presented. Laboratory hours are spent in attendance at rehearsal, coaching sessions, and the performance of the play or concert. The course will be taught by faculty involved in the major productions. (F,SP)
196. University Theatre Workshop. (4) To be arranged. Prerequisites: Senior standing; 162 or 183 or equivalent and consent of instructor. Individual directing projects to include research, audits, casting and rehearsal; culminating in public performances as scheduled by the department. (F,SP)

Scenography and Design

Upper Division Courses

173A-173B. Scenography: Scene Design for the Theatre. (3;3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. (F,SP) May
174A-174B. Scenography: Costume Design for the Theatre. (3;3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. (F,SP) Travis
175A-175B. Scenography: Lighting Design for the Theatre. (4;4) Three hours of lecture per week and lab to be arranged. Prerequisites: Consent of instructor; restricted enrollment of 18. An introduction to theatrical lighting, including practical application through Dramatic Art productions. (F,SP)

*177. Visual Arts in Theatre. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Survey of visual arts as components of style in theatre. (F)

178. History of Fashion and Theatrical Design. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor, History of costume in relation to social change. Laboratory Instruction in conservation and restoration of costumes. (F) Travis

Special Studies

Upper Division Courses

198. Directed Group Study for Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a pass/no credit basis. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. Supervised group study of special topics, subject to approval by the chair. (F,SP)
199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no credit basis. Individual study. Prerequisites: Eight or more units in the Department of Dramatic Art, with an average grade of B. Restricted to honors students. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. Reading and conferences with an instructor in an area not corresponding with any regular course. (F,SP)

Theatre History

Lower Division Courses

49. Twentieth-Century World Theatre. (3) Two 1-hour lectures per week. Prerequisites: Specially designed for nonmajors. Consent of instructor. Survey of the characteristic forms of the major contemporary theatrical modes; topics may include dance, film, television, opera, and others.

Upper Division Courses

151A-151B. Theatre History. (3;3) Three hours of lecture per week. Prerequisites: Consent of instructor. The development of theatrical production in its cultural contexts, including theatre architecture, the stage, scenic and costume design, staging, acting, and directing. (F,SP) Ogden
151B. The Renaissance to the Present (SP) Ogden

Graduate Courses

222. Studies in Classical Theatre. (3) Three hours of seminar per week. Prerequisites: Graduate standing. Drama of Greece and Rome. (F,SP) Ogden
223. Studies in Tudor and Stuart Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. British drama 1550-1654. (SP) McCandless
224. Studies in Continental Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. Seventeenth, eighteenth and early nineteenth century European Drama. (F,SP)
225. Studies in Twentieth Century Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. European and American drama since 1900. (SP) Buchanan
226A-226B. Critical Approaches to Theatre. (4;4) Three hours of seminar per week. Prerequisites: Graduate standing. Through study of selected critical approaches to drama and of performance, students evaluate analytical approaches to the drama and to the theatrical event. (F) Buchanan
228. Advanced Playwriting. (4) Four and one-half hours of lecture and discussion per week. Prerequisites: 139 or consent of instructor. (F,SP)
260A-260B. Directing. (6;6) Six hours of lecture and discussion and laboratory to be arranged. Prerequisites: Graduate standing and consent of instructor. Directing for first-year graduate students. (F,SP) Travis
261A-261B. Advanced Directing. (6;6) Six hours of lecture and discussion and laboratory per week to be arranged. Prerequisites: 260A-260B and consent of instructor. Directing for second-year graduate students. (F,SP) Oliver

Graduate Special Courses

270. Theatre Laboratory. (1) Formerly 271. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Advanced practice in play reading, design for the advanced student. (F,SP) Buchman
271A-271B. Advanced Lighting for the Theatre. (4;4) Three hours of lecture per week. Consent of instructor. Advanced lighting for the department. (F,SP) Travis
272A-273B. Scenography: Advanced Stage, Costume, and Lighting Design. (4;4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 173, 174, 175A-175B and consent of instructor. Instruction in stage, costume, and lighting design for the advanced student. (F,SP) May
274. Theory of Technique of Play Production. (4) New course. Two 3-hour lectures. Prerequisites: Graduate standing in dramatic art and consent of instructor. Study in relation to production concepts expressive of theme, mood and character and their relationship to production elements, ground plans and scenic metaphors. (F) May
277. Special Studies in Directing. (1-4) Formerly 293. Course may be repeated for credit. To be arranged. Prerequisites: Achievement to candidacy for the Ph.D. and consent of instructor; Advanced practice in play direction. (F,SP) Staff
294. Directed Research. (1-12) Course may be repeated for credit. Meetings to be arranged, either individually or as a group. Prerequisites: Graduate standing in Dramatic Art and consent of instructor. Exploring fields not covered in courses listed elsewhere in Dramatic Arts offerings. May be taken by students engaged in writing dissertations. A maximum of 12 units may be divided among several instructors during a semester. (F,SP)
300. Professional Preparation: Supervised Teaching in Dramatic Art. (2-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Graduate standing, appointment as a graduate student instructor or consent of instructor. Discussion, problem review and development, course development, supervised practice of teaching. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used toward unit or residence requirements for the doctorate degree. (F,SP)

Dutch Studies

(College of Letters and Science)

Group Major in Dutch Studies: 5329 Dwinnell Hall, 842-3010
Professors: Svetlana Alpers, Ph.D. (History of Art)
William J. Bouwsma, Ph.D. (Sather Professor, History)
Ann C. Curtis, Ph.D. (Modern Languages and Literature)
James Morrow, Ph.D. (History of Art)
Staci Lee Steinhardt, Ph.D. (German, Comparative Literature) John F. Visscher, Ph.D. (History)
Associate Professors:
Unsatisfactory
Jeanne van Oosten, Ph.D. (Modern Languages and Literature) Thomas F. Shannon, Ph.D. (German) Johan P. Snapper, Ph.D. (German, Queen Beatrix Professor)
Lecturer: Jeanne van Oosten, Ph.D.

Peter Paul Rubens Professor:
Stefani W. de Bruijn, Ph.D. (16th and 17th Century Dutch art, Literature)

Group Major in Dutch Studies

The group major in Dutch studies is designed to present a balanced curriculum of the language, literature, history, and culture of The Netherlands. Since the program is both specialized (in dealing with one country) and broad (in its many-sided approach to the subject), it is recommended that the student also prepare a strong related discipline so that the group major in Dutch studies may constitute the focal point to a larger area of interest. Suggested related fields of concentration are Comparative Literature, German, History, History of Art, Linguistics, and South and Southeast Asian Studies (e.g., Indonesian). See Department of German for a list of courses.

The Major

Lower Division. Dutch 1, 2, 3, or equivalent.
Upper Division. The student is expected to complete a minimum of 30 upper division units, but no more than 36 from those courses listed below. Of these the following are required:

Language courses: Dutch 107, 110 and 130. Literature: Dutch 150 plus 3 units in either the Dutch 140 series, or Dutch 160. Culture courses: Dutch 170 or one History of Art course (186A-186B)

Additional courses are to be selected from the following list to complete the major: Dutch (see German Department for complete description of these courses). 107, 110, 118, 120, 129, 135, 180, 198, 199; German 276; Comparative Literature 180, 190UL; 170; Linguistics 165, 244; History 183A-183B.

Honors Program. Students accepted in the honors program will enroll in Dutch H196 (1-4 units) for a total of four units and will be expected to write a senior thesis (Dutch 190) with distinction.

For additional information, consult the adviser for the group major in Dutch studies, 5329 Dwinelle Hall.

The Minor

Required courses: Five upper-division courses: 1) Dutch 110 (Advanced Dutch); Dutch 130 (Advanced Composition); Dutch 170 (Culture and Institutions) 2) Two additional upper-division courses from the following: Dutch 107 (Structure of Modern Dutch); Dutch 120 (Conversational Dutch); Dutch 140 (Dutch Literature); Dutch 150 (Introduction to Literature); Dutch 160 (Middle Dutch).

A letter grade of C or better is required for each upper division course applied to the minor.

East European Studies

(College of Letters and Science)

Office: Slavic Languages and Literatures, 5416 Dwinelle Hall, 642-2979

The Department of Slavic Languages and Literatures offers courses in several Slavic and non-Slavic languages and literatures, both for those pursuing the department's own degree and for interested students from other departments. There is no undergraduate major or graduate program in East European Studies. Languages taught have included Hungarian, Lithuanian, Armenian, and Georgian as staffing permits. For further information, see East European Studies course listings following Slavic Languages and Literatures.

Economics

(College of Letters and Science)

Department Office: 250 Barrows Hall, 642-0822


Professors:

Irmis Adelman, Ph.D. University of California. Development
George A. Akertof, Ph.D. M.I.T. Macroeconomics
Robert M. Anderson, Ph.D. Yale University. Mathematical economics
Pranab K. Bardhan, Ph.D. Cambridge. Development, International economics
George F. Break, Ph.D. University of California. Public finance
Carlo Cipolla, Laureus University of Pavia. Economic history
Jan Van Deven, Ph.D. Economic history
Barry Eichengreen, Ph.D. Yale University. Economic history, International economics
Anthony C. Fisher, Ph.D. Columbia University. Natural resources
Albert Fishlow, Ph.D. Harvard University. Development
Jeffrey A. Frankel, Ph.D. M.I.T. International economics, Macroeconomics
David Gale, Ph.D. Princeton University. Mathematical economics
Richard J. Gilbert, Ph.D. Stanford University. Industrial organization
Steven M. Goldman, Ph.D. Stanford University. Economic theory
Gregory Grossman, Ph.D. Harvard University. Economic systems
John H. Harris, Ph.D. Stanford University. Utilitarianism, philosophy of science
Theodore Hesburgh, Ph.D. M.I.T. Industrial organization
Ronald D. Lee, Ph.D. Harvard University. Demography
John M. Leitch, Ph.D. University of Chicago. International economics
James L. Pierse, Ph.D. University of California. Monetary economics
John Guigley, Ph.D. Harvard University. Public policy


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Jan Van Deven, Ph.D. Economic history
Barry Eichengreen, Ph.D. Yale University. Economic history, International economics
Anthony C. Fisher, Ph.D. Columbia University. Natural resources
Albert Fishlow, Ph.D. Harvard University. Development
Jeffrey A. Frankel, Ph.D. M.I.T. International economics, Macroeconomics
David Gale, Ph.D. Princeton University. Mathematical economics
Richard J. Gilbert, Ph.D. Stanford University. Industrial organization
Steven M. Goldman, Ph.D. Stanford University. Economic theory
Gregory Grossman, Ph.D. Harvard University. Economic systems
John H. Harris, Ph.D. Stanford University. Utilitarianism, philosophy of science
Theodore Hesburgh, Ph.D. M.I.T. Industrial organization
Ronald D. Lee, Ph.D. Harvard University. Demography
John M. Leitch, Ph.D. University of Chicago. International economics
James L. Pierse, Ph.D. University of California. Monetary economics
John Guigley, Ph.D. Harvard University. Public policy

Thomas J. Rothenberg, Ph.D. M.I.T. Econometrics
Daniel Rubinfeld, Ph.D. M.I.T. Law and economics, public finance
Stephen Smale, Ph.D. University of Michigan. Mathematical economics
Richard C. Dutsch, Ph.D. M.I.T. Economic history, Macroeconomics
Lloyd Utman, Ph.D. Harvard University. Labor economics
Pravin Varitya, Ph.D. University of California. Urban, control systems
Benjamin N. Ward, Ph.D. University of California. Economic systems
Joe S. Bain, Jr. Ph.D. (Emeritus)
Malcolm M. Davidson, J.D. Ph.D. (Emeritus)
Howard S. Ellis, Ph.D., LL.D. (Flour Professor, Emeritus)
Ewald T. Grether, Ph.D., LL.D., econ. dr. (hon.) (Flour Professor, Emeritus)
Bent Hansen, Fk. Dr. (Emeritus)
Charles J. Hitch, Ph.D. D.Sc. (hon.) (Emeritus)
Clark Kerr, Ph.D., LL.D. (Emeritus)
Earl R. Rojstaczer, Ph.D. (Emeritus)
Associate Professors:

R. Clair Brown, Ph.D. University of Maryland. Labor economics
Roger Crane, Ph.D. University of Maryland. Macroeconomics
William T. Dickens, Ph.D. M.I.T. Labor economics
Michael Reich, Ph.D. Harvard University. Political economics
Paul Ruud, Ph.D. M.I.T. Econometrics
Leo Simon, Ph.D. (acting) Princeton University. Economic theory
Laura Tyson, Ph.D. M.I.T. Economic systems
Michael I. Weidman, Ph.D. University of Wisconsin. Public finance, urban economics
Asstant Professors:

Alessandra Capella, Ph.D. M.I.T. Macroeconomics
Brownyn H. Hall, Ph.D. Stanford University. Applied econometrics

Admission to the Major

The major may be declared in the sophomore or junior year, and students are admitted in either semester. A departmental application is required. Berkeley students are asked to file an application for admission in 250 Barrows Hall the semester before admission is desired. Although many factors are considered in determining admission to the Economics Major, the student's academic performance is measured as a GPA. A prerequisite course. Applications will be accepted only from students who have completed the prerequisites listed below, which proves necessary to restrict the number of economics majors. Prospective majors are encouraged to read the most current edition of the Economics Major's Handbook which gives more up-to-date information about economics courses and requirements. Handbooks are available for 50 cents in 250 Barrows Hall.

Transfer Students

Transfer students interested in the economics major should be aware that the admissions process requires evidence of academic performance at Berkeley, and that this may delay and in some cases prohibit admission to the economics major. Transfer students with more than 54 semester units of college credit must receive provisional acceptance to the major from the Office of Admissions and Records before arriving at Berkeley. Once on campus, the records of the specially-designated students will be reviewed by the department. Acceptance is not guaranteed, and students admitted under these conditions should make plans for an alternative major or a new departmental application. Provisional acceptance to the major is given to students who did not receive provisional acceptance to the major, eventual admission to the Economics Department is essentially prohibited.

All transfer students need at least one semester to complete the economic theory requirement at Berkeley before they can apply to the major. One or two semesters at Berkeley may be necessary before the Economics Department has enough information to evaluate a transfer student's academic performance relative to that of other applicants.
1. Introduction to Economics. (4) Two hours of lecture and two hours of discussion per week. A survey of economics, designed to give an overview of the field. (F,SP) Staff, Pierce

20. Law and Economics. (3) Three hours of lecture per week. Prerequisites: 1. An analysis of the law and the legal process, emphasizing the impact of law on economic behavior and economic institutions.

75. World Population and Economics. (3) May be taken on a pass/fail, pass-grading, or graded basis. Three hours of lecture per week. Prerequisites: 1. A survey course covering basic population analysis and an outline of the history of world population. The problems of “overpopulation,” urbanization, public health, and environmental quality are emphasized.

90. Freshman Seminar. (3) New course. Three hours of seminar per week. Prerequisites: Consent of instructor. Topics, experimental in nature, will vary from year to year. (F) Letcher

98. Directed Group Study. (1-4) New course. Course may be repeated for credit. Number of class hours per week to be announced. Written proposal must be approved by department chair. Seminars for the group study of selected topics, which will vary from year to year. Topics may be initiated by students. (F,SP) Staff

Upper Division Courses

100A. Economics Analysis—Micro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1. Resource allocation and price determination. (F,SP) Keeler, Staff

100B. Economics Analysis—Macro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1. A study of the factors which determine national income, employment, and price levels, with attention to the effects of monetary and fiscal policy. (F,SP) Staff

101A. Economic Theory—Micro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 101A and 101B. A survey of the theories of major economists from Adam Smith to Keynes. (F) Reich

101B. Economic Theory—Macro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 101A and 101B. Basic topics in macroeconomics. In the past the course has covered such topics as theoretical challenges to the Keynesian model and determinants of productivity growth. (SP) Staff

105. History of Economic Thought. (3) Three hours of lecture per week for two years. Prerequisites: 100A-100B or 101A-101B. A survey of the theories of major economists since the eighteenth century. (F) Staff

106. Economics of Marxism. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The economic thought of Marx and his followers, emphasizing the contemporary relevance of the analyses. (F) Staff

107. Political Economy and History of Economic Thought Seminar. (4) Three hours per semester. Prerequisites: 105 or 106 or 108 or 109 and consent of instructor. Enrollment will be limited. A seminar paper is required.

108. Critique of Modern Economic Theory. (1-5) One 1/2-hour lecture per week. Prerequisites: 100A-100B or 101A-101B. A critical analysis of contemporary economic theories with emphasis on nonconventional approaches to economics.

109. Introduction to Political Economy. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. A survey of major issues involving the relationship between power and the economy. (F) Ward

111A. European Economy and Society from the Fall of the Roman Empire to the Industrial Revolution. (3) Credit will not be given to students who have previously taken History 159A. Three hours of lecture per week. Prerequisites: 1. Survey of the economic and social developments in Western Europe from 500 A.D. to 1750 A.D. For economics majors, this course is interchangeable with History 159A. (F) Cipolla

111B. The Industrial Revolution and the Origins of the Modern Economic System. (3) Credit will not be given to students who have previously taken History 159B. Three hours of lecture per week. Prerequisites: 1. The rise of the European economy to world dominance in the period 1750-1914. For economics majors, this course is interchangeable with History 159B. (SP) Staff

112. European Economic History Seminar. (4) Credit will not be given to students who have previously taken History 135. Two hours of lecture and one hour section per week. Prerequisites: 111A or 111B or 115 and consent of instructor. Seminar paper is required. (F,SP) Cipolla

113. American Economic History. (3) Credit will not be given to students who have previously taken History 135. Two hours of lecture and one hour section per week. Prerequisites: 1. A survey of trends in the American economy, emphasis on factors explaining economic growth and on the changing distribution of the gains and losses associated with growth. For economics majors this course is interchangeable with History 135. (F) Sturch

114. American Economic History Seminar. (4) Three hours of seminar per week. Prerequisites: 113 and consent of instructor. Enrollment will be limited. Seminar paper is required. (SP) Staff

115. The World Economy in the Twentieth Century. (3) Credit will not be given to students who have previously taken History 160. Three hours of lecture per week. Prerequisites: 1. Development of the world economic system with particular reference to worldwide trading relationships. For economics majors, this course is interchangeable with History 160. (SP) Eichengreen

121. Industrial Organization and Public Policy. (3) Three hours of lecture per week. Prerequisites: 100A or 101A. The organization and structure of production in the U.S. economy. Determinants of market structure, business behavior, and economic performance. Implications for antitrust policy. (F) Keeler

122. Industrial Organization Seminar. (4) Three hours of seminar per week. Prerequisites: 121 and consent of instructor. Seminar on problems in the field of industrial organization. Seminar paper is required. (SP) Staff

123. Government Regulation of Industry. (3) Three hours of lecture per week. Prerequisites: 121. Problems of public policy in the field of industrial organization. Analysis of regulatory consequences with particular attention to economic performance.

124. Special Topics in Industrial Organization. (3) Three hours of lecture per week. Prerequisites: 121. Problems of public policy in the field of industrial organization. Analysis of regulatory consequences with particular attention to economic performance.

125. Economics of the Environment. (3) Three hours of lecture per week. Prerequisites: 100A or 101A or 101B. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations. (SP) Staff

126. Seminar in Public Sector Economics. (4) Three hours of seminar per week. Prerequisites: 125 and consent of instructor. Enrollment will be limited. A seminar paper is required.

130. Monetary Theory and the Banking System. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 100B or 101B. Survey of monetary, interest, and income determination. Federal Reserve institutions, other financial institutions, the Federal Reserve System and the supply of money. (F) Pierce

137. Aggregate Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 102 or 136 and consent of instructor. Enrollment will be limited. A seminar paper is required. (F,SP) Staff, Akarofu

140. Economic Statistics and Econometrics. (3) Two hours of lecture and one and one-half hours of section per week. Prerequisites: 100A-100B or 101A-101B and Statistics 20, 21, or 131A. Introduction to problems of observation, estimation, and hypothesis testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical economic research and exercises in applied econometrics. (SP) Staff

151. Economics of Trade Unions and Collective Bargaining. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B or consent of instructor. The social and economic background of labor legislation and the economics of collective bargaining. (F) Ulman

152. Wage Theory and Policy. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The theory and the determination of wages and employment. Application of the theory to policy analysis. (SP) Brown

153. Labor Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 151 or 152 and consent
of Instructor. Topics in labor economics. Seminar paper required. (SP) 

Ulman

154. Women in the Labor Force. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. An analysis of the changing role of women in the U.S. economy. (F) Brown *155. Urban Economics. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. Applications of economic theory to urban problems. Topics covered include location theory, housing, transportation, and the fiscal problems of city governments.

156. Urban Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 155 and consent of instructor. Seminar on problems of the urban economy. A seminar paper is required.

161. Economic Systems. (3) Three hours of lecture per week. Prerequisites: 1. Economic organizations and institutions, and their impact on economic variables. Models of economic systems; studies of actual economies. (F,SP) Tyson, Ward

162. Economics of the Soviet Union. (3) Three hours of lecture per week. Prerequisites: 1. The Soviet economy, its growth, institutions, problems; other Soviet-type economies. (SP) Grossman

*163. Special Topics in Economic Systems. (1-5) One and one-half hours of lecture per week. Prerequisites: 1. Enrollment limited: 161 or 162. As announced in the department course descriptions.

164. Economic Systems Seminar. (4) Three hours of seminar per week. Prerequisites: 161 or 162 or 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required. (SP)

171. Economic Development. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. Problems of underdevelopment and poverty, policy issues, and development strategies. (F) Bardhan

172. Case Studies in Economic Development. (3) Course may be repeated for credit with consent of instructor. One hour of lecture per week. Prerequisites: 1. A detailed study of the problems of development in a selected geographical area in Asia or Africa or Latin America. (SP) Staff

173. Economic Development Seminar. (4) Three hours of seminar per week. Prerequisites: 171 or 172 and consent of instructor. Enrollment will be limited. A seminar paper will be required. (SP) Staff

175. Economic Demography. (3) Three hours of lecture per week. Prerequisites: Econ 1. A general introduction to economic demography, emphasizing the economic determinants of mortality, fertility, and labor force participation. Focus on population growth and economic development in the Third World and of the role of demographic factors such as the Baby Boom and Baby Bust in the economies of developing countries, including such topics as fertility and mortality and the place of the Baby Boom into the labor market. (SP) Lee

181. International Economic Relations. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The theory of international trade and its applications to tariff protection. (F) 

Elchinger

182. International Economic Policies. (3) Three hours of lecture per week. Prerequisites: 181 or consent of instructor. The international mechanism of adjustment; current international monetary institutions, common markets; foreign trade agencies; terms of trade; international factor and agriculture; trade agreements and the oil problem; trade with centrally planned economies and institutions on trade development; GATT, IMF, IBRD. (SP) Lelchle

183. International Economic Seminar. (4) Three hours of seminar per week. Prerequisites: 181 or 182 and consent of instructor. Enrollment will be limited. A seminar paper will be required. (F,SP) Staff

190. Seminar on Topics in Economics. (4) New course.

Three hours of seminar per week. Prerequisites: Consent of Instructor. A seminar focusing on current research in the field of the instructor. The topic and prerequisites will be announced before registration. Enrollment will be limited. A seminar paper is required. (F,SP) Staff

H195A-H195B. Senior Honors Thesis. (1-3-3) Must be taken on a pass/credit basis. Prerequisites: Senior honors candidates only (i.e. students with a major G.P.A. of 3.5 or better). Preparation and writing of an honors thesis under the supervision of a member of the faculty. One or two semesters, at the instructor's option; if two semesters, credit and grade to be awarded upon completion of the sequence. Application and details through Undergraduate Office. (F,SP) Goldman

197. Field Studies. (1-4) Course may be repeated for credit. Must be taken on a pass/credit basis. Number of hours to be announced. Prerequisites: Upper division standing and consent of instructor. Written proposal must be approved by department chair. Supervised field studies in economics. Projects may be initiated by the students. (F,SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/credit basis. Number of hours to be announced. Prerequisites: Upper division standing and consent of instructor. Written proposal must be approved by department chair. Seminars for the group study of selected topics, which will vary from year to year. Topics may be initiated by students. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Must be taken on a pass/credit basis. Number of hours to be announced. Prerequisites: Upper division standing and consent of instructor. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

*200A. Fundamentals of Economic Theory. (3) Two hours of lecture per week. Prerequisites: Primarily for graduate students outside the Department of Economics. Students with a strong background in economics and mathematics should enroll in 201A-201B and 202A-202B rather than 200A-200B. Microeconomics—the behavior of firms and households and the determination of prices and resource allocation in a market economy.

200B. Fundamentals of Economic Theory. (2) Two hours of lecture per week. Prerequisites: Primarily for graduate students outside the Department of Economics. Students with strong background in economics and mathematics should enroll in Economics 201A-201B and 202A-202B rather than 200A-200B. Macroeconomics—determination of national income, employment, price level, growth, and inflation. (SP) Staff

201A-201B. Economic Theory. (4;4) Three hours of lecture and two hours of discussion section per week. Prerequisites: 100A-100B or 101A-101B or equivalent; Mathematics 50A or equivalent. Basic preparation for the Ph.D. program including: theory of the firm and the consumer, general equilibrium, capital theory, and welfare economics. (F,SP) Goldman, Katz

*202C. Linear Economic Models. (3) Two hours of lecture per week. Prerequisites: 201A-201B. Linear economic models, linear programming, activity analysis, introduction to non-linear programming.

202A-202B. Microeconomic Theory. (4;4) Three hours of lecture and two hours of discussion section per week. Prerequisites: 100A-100B or 101A-101B or equivalent; Mathematics 50A or equivalent. Basic preparation for the Ph.D. program including aggregation theory, national accounting and index problems, survey of major short- and long-term models, implications of constant returns to scale, wage price determination, the role of money and financial assets, theories of consumption and investment, disequilibrium theory, dynamic systems, and international considerations. (F,SP) Akerman, Casella, 

*202C. Capital and Economic Growth. (3) Two hours of lecture per week. Prerequisites: 201A-201B and 200A-200B. An examination of the roles of time and capital in the processes of individual choice and the theories of production and distribution. The course will discuss the nature of capital and consider the role of capital accumulation in modern theories of economic growth and planning.

203. Advanced Topics in Economic Theory. (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. See department course description each semester. (F,SP) Staff

204. Mathematical Tools for Economics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: To be taken concurrently with 201A or consent of instructor. A review and discussion of the basic math tools needed for graduate work in economics. (F)

205. History of Economic Thought. (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. Topics in the history of economic analysis.

208. Seminar in Mathematical Economics and Advanced Economic Theory. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Staff

209A. Theory and Application of Non-cooperative Games. (3) Formerly 209. Two hours of lecture per week. Prerequisites: Consent of Instructor. This course will study both pure game theory and its applications to such problems as oligopoly pricing, non-cooperative bargaining, predatory pricing, and optimal auctions. The focus will be on game theory as a modelling process, as opposed to a body of known results. (F)

209B. Mechanism Design and Agency Theory. (3) Two hours of lecture per week. Prerequisites: Economics 201A and 204A or consent of instructor. This course will cover some of the most important problems in the presence of incomplete information and imperfect observability. The course will begin with the classic principal-agent problem and will then develop its applications to the implicit contracts theory of agency and to the choice of government policies for regulated industries. The second half of the course will treat the design of auctions, regulation with costly or imperfect monitoring, mechanism design with limited contracts, and other topics to be chosen by instructor. (SP) Staff

210A. Introduction to Economic History. (3) Two hours of lecture per week. Survey of some central themes in world economic history. Required of all Ph.D. candidates in economics. (F) 

*210B: Topics in European Economic History. (3) Two hours of lecture per week. Prerequisites: Economics 201A and 204A or consent of instructor. A survey of some central themes in European economic history. (SP) Staff

210C. Topics in American Economic History. (3) Two hours of lecture per week. Prerequisites: Economics 201A and 204A or consent of instructor. A survey of some central themes in American economic history. (SP) Staff

211. Seminar in Economic History. (3) Two hours of seminar per week. Prerequisites: Consent of Instructor. 

215A-215B. Political Economy. (3,3) Two hours of lecture per week. Prerequisites: Economics 200A and 215A must be taken concurrently with 215B. A survey of some central themes in European economic history. (SP) Staff

215C. Selected Topics in Political Economy. (3) Two hours of lecture per week. Special topics, varying from year to year. (SP) Staff

*216. Seminar in Political Economy. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. 

220A. Industrial Organization. (3) Three hours of lecture per week. Prerequisites: 201A. Market structure, conduct and performance in the regulated sector of the American economy. Public policies related to the promotion or restriction of competition. (F) Gilbert

220B. Industrial Organization. (3) Two hours of lecture per week. Prerequisites: 220A. The characteristics of regulated industries and the consequences of regulation and deregulation. (SP) Frank

*220C. Special Topics in Industrial Organization. (3) Two hours of lecture per week. See course announcement for current topics and prerequisites.

221. Seminar in Industrial Organization, Regulation and Public Enterprise. (3) Course may be repeated for credit. Special topics, varying from year to year. (SP) Ward

*Not offered 1988-89

1On leave, spring

2On leave, fall

3Recalled to active service

4Recipient of Distinguished Teaching Award
for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Staff

230A. Public Sector Microeconometrics. (3) Two hours of lecture per week. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations. 230A is not a prerequisite for 230B. (F)

230B. Public Sector Microeconometrics. (1-3) Two hours of lecture per week. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations. The course is divided into three 5-week segments covering (1) welfare economics of government finance, (2) the property tax and other local revenue sources, and (3) analysis of local government expenditures. Students may take any or all of the individual segments, with one unit of credit for each. (SP) Quigley

*230C. Public Sector Microeconometrics. (3) Two hours of lecture per week. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations.

231. Seminar in Public Sector Economics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Staff

236A-236B. Aggregate Econometrics. (3-3) Two hours of lecture per week. Prerequisites: For 236A: 210A-210B and 232A-232B or 236A. Macroeconomic models; theory and practice of aggregate econometrics; rational expectations models; finance theory. Interworks with macro. (F,SP) Crane, Pierce

*236C. Aggregate Econometrics. (3) Two hours of lecture per week. Prerequisites: 236B. See department course description each semester.

237. Seminar In Advanced Macroeconomics and Money. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. This course requires at least 12 hours of work per week including class time and outside preparation. (F,SP) Staff

240. Introduction to Econometrics. (4) Three hours of lecture and 1½ hours of discussion section per week. Prerequisites: Statistics 200A or equivalent and a course in linear algebra. A survey course designed for students in economics and related disciplines. Problems in the applications of statistical methods of econometrics, illustrated by a representative selection of empirical studies. (SP) Staff

241A. Econometrics. (4) Three hours of lecture and 1½ hours of discussion section per week. Prerequisites: Statistics 200A-200B or equivalent and a course in linear algebra. Recommended: Mathematics 112. Introduction to econometric modeling and analysis of economic systems. Applications to macroeconomics, monetary and fiscal policy, and labor market analysis. (SP) Staff

241B. Econometrics. (4) Three hours of lecture and 1½ hours of discussion section per week. Prerequisites: 241A. Simultaneous equations and time-series models. (SP) Staff

242. Seminar In Econometrics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Staff

*243. Special Topics In Econometric Theory. (3) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 241A or equivalent and a course in econometrics. Content will vary from year to year. (F,SP) Staff

244. Applied Econometrics. (3) Three hours of lecture per week. Prerequisites: Economics 240. Methods of applied econometrics, with emphasis on alternative modeling strategies and problems met in practice. Intended for doctoral students conducting empirical research. (SP) Staff

250A-250B. Labor Econometrics. (3,3) Two hours of lecture per week. Prerequisites: Consent of instructor. 250A is a prerequisite to 250B. Analysis of labor market behavior. (F,SP) Staff

250C. Labor Econometrics. (3) Two hours of lecture per week. Prerequisites: 250B. Analysis of labor market behavior. (F) Dickens

251. Seminar in Labor Econometrics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. Seminar for students at the doctoral dissertation level. (F,SP) Staff

255, Urban Econometrics. (3) Formerly 255A. Two hours of lecture per week. Prerequisites: 210A or consent of instructor. Seminar in econometric analysis of economic activity and residence in cities. (SP) Staff

256. Seminar In Urban Econometrics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Faculty-student research and dissertation workshop. (F,SP) Staff

260A-260B. Economic Systems. (3,3) Two hours of lecture and 3 hours of seminar per week. Prerequisites: Consent of instructor. Methods and problems of comparing economic systems; their institutions, ideologies, performance, and problems. (F,SP) Ward, Grossman

260C. Economic Systems. (3) Two hours of lecture per week. Case studies of the Soviet Union and other non-market economies.

*261. Seminar In Economic Systems. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor.

270A-270B. Analytics of Economic Development and Planning. (3,3) Two hours of lecture per week. Problems of underdevelopment and poverty, policy issues and development strategies. (F,SP) Staff, Adelman, Robinson

*270C. Analytics of Economic Development and Planning. (3) Two hours of lecture per week. See course announcement for current topics and prerequisites.

271. Seminar In Economic Development and Planning. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. (F,SP) Staff

275A. Economic Demography. (3) Two hours of lecture per week. Economic and policy analysis of demographic change in developing and developed countries including capital formation, labor markets, transfers and urbanization. Economic determinants of fertility, mortality and migration. (F,SP) Staff

275B. Selected Topics In Economic Demography. (3) Two hours of lecture per week. Prerequisites: 275A, 275B. Two-hour seminar per week. Prerequisites: Consent of Instructor. (SP) Staff

278A-278F. International Economics. (3,3) Two hours of lecture per week. Prerequisites: 278A or equivalent. The economy as a general equilibrium system. The theory of international economics, trade policy. (F,SP) Staff

280A. International Economics. (3,3) Two hours of lecture per week. Prerequisites: 278A or equivalent. The world economy as a general equilibrium system. (F,SP) Barthel, Letcher

280C. International Economics. (3,3) Two hours of lecture per week. Prerequisites: 278A. The first half of this course will cover the standard approaches to the macroeconomics of open economies, i.e., to the determination and policy analysis of exchange rates and balance of payments. The emphasis will be theoretical and, at times, economic. The second half of the course will be devoted to recent research in international finance. This primarily means the asset-market approach to exchange rates: perfect capital mobility, rational expectations, monetary and portfolio-balance models of exchange rate determination, tests of efficiency in international financial markets, and mean-variance optimization by investors. If time permits, other recent research topics in open economy macroeconomics may be included: the oil shock, real wage rigidity, unwanted real appreciation and the international debt problem. (SP) Frankel

281. Seminar in International Trade and Finance. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. (F,SP) Staff

289. Doctoral Thesis Workshop. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Prerequisites: Permission of instructor. Seminar for third-year doctoral students in the early stages of thesis research. (F,SP) Staff

295. Special Econ Topics. (3) Two hours of lecture per week. Prerequisites: Consent of instructor. Topics of different sections to be announced annually. (F,SP) Staff

298. Directed Group Study for Graduates. (1-4) Must be taken in a satisfactory/unsatisfactory basis. (F,SP) Staff

299. Supervised Independent Study and Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Consent of instructor. Seminars for the group of selected topics which will vary from year to year. (F,SP) Staff

Professional Courses

301. Graduate Student Instructor Practicum. (6) Must be taken in the fall of the student's third year. Two 2-hour seminar per week. Prerequisites: Appointment as a graduate student instructor in the department and permission of the graduate adviser. Course credit for experience gained in academic teaching through employment as a graduate student instructor. (F,SP) Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 103. Introduction to Mathematical Economics. (2) Students who have taken Economics 104 will receive no credit for IDS 103. Three hours of lecture per week. Prerequisites: Math 50A-50B. Selected topics illustrating the application of mathematics to economic theory. This course is intended for upper division students in mathematics, statistics, the physical sciences, and engineering, and for economics majors with adequate mathematical preparation. No economic background is required. Sponsoring departments: Mathematics and Economics. (SP) Staff

IDS 170. Economics of Organization. (3) New course. Two 1½-hour lectures per week. Prerequisites: Econ 100 or 101; or BA 110 or equivalent; or consent of instructor. This course uses economic and institutional analysis to explain the structure and behavior of complex organizations, and especially the business firm. Recent developments in the literature of transaction costs and property rights in economic analysis are employed to explain why firms vertically integrate, why there may be limits to their growth, how work is organized, what bosses do and how bosses get their power. Public policy issues related to the regulation of economic activity, including antitrust, are an integral part of the course. Broader organizational issues, such as the structure of government and the organizational properties of social capital, are also considered. Sponsoring departments: Business Administration and Economics. (SP) Williamson

IDS 180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisites: Math 51A or equivalent. Feedback sequences, system responses to exogenous changes, estimation, simulation and prediction. Examples in game theory, economics, business and biology. Growth dynamics, phase-plane methods, state variables, statistical signals, sampled data, stability, robust, gradient methods, and computer simulation of large systems. Sponsoring departments: Economics, EECS.
gathering information about these issues are also explored. (SP)
Schoenfield, Fillmore, Rohwer

184. Philosophical Foundations of Education. (3) Three hours of lecture per week. Systematic survey of educational thought with emphasis on the epistemological, logical, and foundational surveys of the major philosophies of education. (SP) Borowman

185. Social Foundations of Education for Teachers. (2) Two hours of lecture and discussion per week. Pre-requisites: Admission to a teacher education program. Relations of the American educational system to the society and culture and considerations of schools as social systems, with particular reference to the needs of teachers in training. Introduction to education law and government. (SP) Staff

280A-280B. Instruction in Elementary Schools: Social Sciences, Art, Music, Educational Psychology. (2,2) Formerly part of EMST 280A-280B. Former EDUC 280A is dropped. Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture and seminar plus two hours of workshop per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (F,S) Hurt

281. Social Foundations of Education for Teachers. (3) Three hours of lecture per week. Historical perspectives on various current issues in education. Emphasis on issues of the integration of ethnic groups, the political-economic of schooling, educational psychology, science and society and conflict among socio-economic groups. (SP) Staff

283A. History of Educational Thought. (3) Three hours of lecture per week. Evolution of educational theories about educational objectives, modes of human learning, and interactions between schools and other institutions. Some attention to traditional education in Europe and the Orient. Current problems will be emphasized in American thinkers. (SP) Borowman

283B. Issues in Education: Historical Perspectives. (3) Three hours of lecture per week. Historical perspectives on various current issues in education. Examples of issues include the integration of ethnic groups, the political-economic of schooling, educational psychology, science and society and conflict among socio-economic groups. (SP) Staff

284A. Philosophy of Education. (3) Three hours of lecture per week. Philosophical analysis applied to current educational problems and key concepts. (F) Borowman

284B. Value Education. (3) Three hours of lecture per week. Theories of the nature and types of value will be examined with a view to the development of a scheme of education centering upon the experience and judgment of moral and aesthetic value. (F) Borowman

284C. Signs, Symbols, and Language. (3) Three hours of lecture per week. A study of the processes of education considered as the development of the ability to employ and interpret symbols and signs in non-linguistic, metaphorical and literal— to serve expressive and communicative needs. (SP) Borowman

285A. The School as a Workplace. (3) Former course. Three hours of lecture/discussion per week. Introduction to theory and research on the school as a professional workplace and its effects on one week. An in-depth discussion of teaching teachers’ orientations to teaching and career commitment. Topics include school-level effects on pupil progress, teachers as colleagues, structures of school-level leadership, and the workplace effects of district, state and union policies. (SP) Little

285A. The Logic and Politics of Curriculum. (3) New course. Three hours of lecture and discussion per week. Examination of critical and recurring debates on school curriculum. Analyzes curriculum theories of knowledge and societal pressures. Topics include the roles of scholarship and science in curriculum development, oral and written language, the sciences vs. humanities, vocational and liberal studies, the religious and the secular, and differentiation by gender, age, and ability.

286. Teaching of History and Social Studies. (3) New course. One 3-hour lecture/seminar per week. Examination of the history of the social studies and teaching methods from the perspectives of student needs, public expectations, and requirements of the disciplines. Also explores historical and current issues in social studies education. (SP)

287A. Theories of the Self: Freud and Jung. (3) One 3-hour lecture/discussion per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (SP)

288A. Research on Teachers and Teaching. (2) New course. Two hours of lecture and discussion per week. Introduction to the research on teachers and teaching, from the history of social science. Examples of important research and the varieties of methods and perspectives are covered including issues such as teacher characteristions and school effectiveness, teacher gender and classroom organization, the economic status of teaching, continuity and change in teaching, and student perspectives on influential teachers. (F) Hollingsworth

288B. Methodology and Field Work I. (3) Formerly EDUC 280B, Course may be repeated for credit. Three hours of lectures, one 3-hour discussion section per week. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288A.

288C. Methodology and Field Work II. (3) Formerly EDUC 280B. Course may be repeated for credit. Three hours of lectures and discussion per week. Pre-requisites: 288B. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288B.

288D. School Ethnography. (3) New course. One 3-hour lecture/discussion per week. This course acquaints students with the ethnographic traditions in school research. It prepares students for the use of ethnographic methods. Students will design and conduct a small ethnographic study. The course is designed for prospective researchers or school professionals with an interest in applying qualitative, and ethnographic methods to study of schools and classrooms. The course includes a practicum component. (F,S) Little

289A. Teacher as Researcher. (3) Formerly EDUC 289A. One 3-hour lecture/discussion per week. Intended to prepare teachers and administrators for conceptualization and implementation of school research. Topics include methodology, and implementing research. Little

289B. Teaching of Ethnography. (3) New course. Three hours of lecture per week. Examination of critical and recurring debates on school curriculum. Analyzes curriculum theories of knowledge and societal pressures. Topics include the roles of scholarship and science in curriculum development, oral and written language, the sciences vs. humanities, vocational and liberal studies, the religious and the secular, and differentiation by gender, age, and ability.

289B. Teaching of History and Social Studies. (3) New course. One 3-hour lecture/seminar per week. Examination of the history of the social studies and teaching methods from the perspectives of student needs, public expectations, and requirements of the disciplines. Also explores historical and current issues in social studies education. (SP)

287A. Theories of the Self: Freud and Jung. (3) One 3-hour lecture/discussion per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (SP)

287B. Theories of the Self: Existentialism and Phenomenology. (3) One 3-hour lecture/discussion per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (SP) Jarrett

288A. Research on Teachers and Teaching. (2) New course. Two hours of lecture and discussion per week. Introduction to the research on teachers and teaching, from the history of social science. Examples of important research and the varieties of methods and perspectives are covered including issues such as teacher characteristions and school effectiveness, teacher gender and classroom organization, the economic status of teaching, continuity and change in teaching, and student perspectives on influential teachers. (F) Hollingsworth

288B. Methodology and Field Work I. (3) Formerly EDUC 280B, Course may be repeated for credit. Three hours of lectures, one 3-hour discussion section per week. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288A.

288C. Methodology and Field Work II. (3) Formerly EDUC 280B. Course may be repeated for credit. Three hours of lectures and discussion per week. Pre-requisites: 288B. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288B.

288D. School Ethnography. (3) New course. One 3-hour lecture/discussion per week. This course acquaints students with the ethnographic traditions in school research. It prepares students for the use of ethnographic methods. Students will design and conduct a small ethnographic study. The course is designed for prospective researchers or school professionals with an interest in applying qualitative, and ethnographic methods to study of schools and classrooms. The course includes a practicum component. (F,S) Little

289A. Teacher as Researcher. (3) Formerly EDUC 289A. One 3-hour lecture/discussion per week. Intended to prepare teachers and administrators for conceptualization and implementation of school research. Topics include methodology, and implementing research. Little

289B. Teaching of Ethnography. (3) New course. Three hours of lecture per week. Examination of critical and recurring debates on school curriculum. Analyzes curriculum theories of knowledge and societal pressures. Topics include the roles of scholarship and science in curriculum development, oral and written language, the sciences vs. humanities, vocational and liberal studies, the religious and the secular, and differentiation by gender, age, and ability.

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287A. Theories of the Self: Freud and Jung. (3) One 3-hour lecture/discussion per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (SP)

287B. Theories of the Self: Existentialism and Phenomenology. (3) One 3-hour lecture/discussion per week. Pre-requisites: Consent of instructor. An analysis of the logical and ethical foundations of the major philosophies of education. Credit approval required to be awarded upon completion of the sequence. (SP) Jarrett

288A. Research on Teachers and Teaching. (2) New course. Two hours of lecture and discussion per week. Introduction to the research on teachers and teaching, from the history of social science. Examples of important research and the varieties of methods and perspectives are covered including issues such as teacher characteristions and school effectiveness, teacher gender and classroom organization, the economic status of teaching, continuity and change in teaching, and student perspectives on influential teachers. (F) Hollingsworth

288B. Methodology and Field Work I. (3) Formerly EDUC 280B, Course may be repeated for credit. Three hours of lectures, one 3-hour discussion section per week. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288A.

288C. Methodology and Field Work II. (3) Formerly EDUC 280B. Course may be repeated for credit. Three hours of lectures and discussion per week. Pre-requisites: 288B. Development of field research skills, data reduction analysis, and model building in qualitative research. Continuation of 288B.

288D. School Ethnography. (3) New course. One 3-hour lecture/discussion per week. This course acquaints students with the ethnographic traditions in school research. It prepares students for the use of ethnographic methods. Students will design and conduct a small ethnographic study. The course is designed for prospective researchers or school professionals with an interest in applying qualitative, and ethnographic methods to study of schools and classrooms. The course includes a practicum component. (F,S) Little

289A. Teacher as Researcher. (3) Formerly EDUC 289A. One 3-hour lecture/discussion per week. Intended to prepare teachers and administrators for conceptualization and implementation of school research. Topics include methodology, and implementing research. Little

289B. Teaching of Ethnography. (3) New course. Three hours of lecture per week. Examination of critical and recurring debates on school curriculum. Analyzes curriculum theories of knowledge and societal pressures. Topics include the roles of scholarship and science in curriculum development, oral and written language, the sciences vs. humanities, vocational and liberal studies, the religious and the secular, and differentiation by gender, age, and ability.
262A. Issues in Educational Administration and Policy. (3) Three hours of lecture per week. (Required of all students in the Division of Educational Administration.) Concepts, theories, and issues related to administration and evaluation. Application is made to governmental policy for school systems. (F,SP) Hollingsworth

262B. Educational Policy. (3) Three hours of lecture per week. Emphasis on the role of teachers, the legislative process, and the interaction of the courts, government, and political reform networks with the education system. (SP) Haywood

263A. Economics of Education and Other Social Services. (3) Three hours of lecture per week. Fiscal policy and financing of social services. Systems of revenue generation. Tax systems and models in various social sectors. The political economy of social sector finance. (F,SP) Benveniste

263B. Concepts in Education Law. (1-3) One 1-hour lecture per week. Legal issues addressed will be timely and representative of the following: alternative methods of assessing the concept of educational achievement; education as a civil right; special education; and the implementation of the Individuals with Disabilities Education Act. (F,SP) Littie

264A. Intergovernmental Relations in Social Sector Organizations. (3) Three hours of lecture per week. Emphasis on the evolution and constitutional basis of local, state, and federal policies and programs for social agencies. Attention is given to policy development, planning, and coordination. (SP) Guthrie

264B. Special Topics in the Politics of Social Sector Services. (3) Course may be repeated for credit. Three hours of lecture per week. Directed research on special topics related to politics and governance of educational, welfare, healthcare, and political science organizations. (F,SP) Guthrie

265A. Economics of Education and Other Social Services. (3) Three hours of lecture per week. Topics to be considered include the following: alternative methods of assessing the concept of education to economic growth; demand for education services; education production functions; and the relationship of educational policy and planning. (SP) Benson

265B. Economic Development and Education in the Third World. (3) Formerly 170. Course may be repeated for credit. Three hours of lecture per week. Prerequisite: Economics 1004-1005 or Econ 101A-101B or equivalent. An analysis of the economic development process, particularly in developing countries. (F)

266A. Management in the Community College. (3) Three hours of lecture per week. A course exploring leadership and management in the community college (campus, district, state). The role of the community college in the economic development process, the role of government in the funding of educational programs, and the role of community colleges in the state and federal levels of government and the local community. (SP) Guthrie

268C. Seminar in Contemporary Higher Education: Planning, Budgeting, and Policy. (1-3) One 3-hour lecture per week. A seminar approach to review and analysis of higher education, its role in developing nations, and its role in developing countries. (SP) Haywood

268D. Higher Education Organization, (3) New Course. Three hours of seminar per week. An examination of the administrative organization of higher education, the role of the university, and the role of the college in the development of higher education. (SP) Guthrie

361. Practicum in Teacher Education. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture per week. This course consists of supervised experience in working with individuals and groups of students, either in the field of educational administration, but the methods used have wide application in business and the collection and organization of information. Students will use EXCEL (on the Macintosh) and Lotus 123 (on the IBM computer). (F) Woodson

261A. Organization Theory in Education and Other Social Services. (3) Three hours of lecture per week. Organizational analysis of the roles of experts in social services. (SP) Gandolfini

204. Organization Theory In Education and Other Social Organizations. (3) Three hours of lecture per week. An analysis of the role of experts in social services, including the following: alternative methods of assessing the concept of education to economic growth; demand for education services; education production functions; and the relationship of educational policy and planning. (SP) Benson

267A. Curriculum and Instructional Foundations. (3) Three hours of lecture per week. Focus on the development and evaluation of curriculum and instructional materials. Examples used will focus upon specific topics such as supervision, program design, and teacher education reform. (SP) Hollingsworth

207A. Organization Theory In Education and Other Social Organizations. (3) Three hours of lecture per week. An analysis of the role of experts in social services, including the following: alternative methods of assessing the concept of education to economic growth; demand for education services; education production functions; and the relationship of educational policy and planning. (SP) Benson

260A. Electronic Spreadsheets and Databases in Educational Administration. (2) New course. One 2-hour lecture per week. This course is an introduction to the use of electronic spreadsheets and databases on microcomputers. Examples will focus upon applications in the field of educational administration.
268E. Seminar in the History of the American College and University. (3) Formerly 261A under quarter system. One 3-hour lecture per week. A reading and seminar approach to the social and intellectual history of American higher education. Emphasis on European antecedents, institutional changes and development, growth of disciplines, the roles of faculty and student cultures, and the shifting functions of higher education throughout U.S. history.

268F. The Student in Post-secondary Education. (3) Formerly 261B under quarter system. One 3-hour lecture per week. Consideration of the college student as a developing human being, social creature, and active participant in the learning process. Analytical review of research results on personal characteristics, campus environments, and student subcultures, as related to the influences and effects of their academic experiences.

268G. The Curriculum of Higher Education. (3) Formerly ED 268B under the quarter system. One 3-hour lecture per week. Course focuses on participant observation and other anthropological techniques applied in educational research. Prerequisites: One year of English composition, psychological, and social bases of general, liberal, undergraduate education. Review of the substantive content of varying collegiate curricula and programmatic innovations, and their success or failure.

268A. Inter-ethnic and Interpersonal Relations in Education. (2) Three hours of lecture per week. Emphasis on educational implications of the subcultures of non-Anglo minorities. Study of research regarding the etiology of prejudice and educational strategies for its elimination. Exercises in inter-ethnic and intergroup relations and field work are involved.

270A. Principles of Program Evaluation. (3) Three hours of lecture and one hour of discussion per week. An overview of the models, methods and issues in educational evaluation. Includes basic concepts and procedures for designing, conducting, evaluating programs, projects and curricula. Course format combines lecture/discussion and practical applications of evaluation principles to "real" educational programs or projects. (F) Stone

271A. Quantitative Analysis of Educational Systems I. (3) Three hours of lecture per week. Prerequisites: basic course in educational data analysis, statistics, or econometrics. Methods for estimating predictive models in education systems. Includes models in which outcome variables are either numerical or categorical. (F) Stern

271B. Quantitative Analysis of Educational Systems II. (3) Three hours of lecture per week. Prerequisites: 271A or equivalent. Methods for estimating causal models in education, with non-experimental data. Path analysis, structural equations, LISREL.

272A. Evaluation in the Schools. (3) Course may be repeated for credit. Three hours of seminar per week. Seminar provides an opportunity for students to conduct evaluative research investigations on innovative projects, programs, curriculum, and courses.

273A. Qualitative Evaluation. (3) Course may be repeated for credit. Six hours of field work per week. Theory and applications of the case study method as the research instrument and the nature of valuing. Detailed treatment of ethnographic, naturalistic, illuminative, historical, and consensualist modes of inquiry. (SP)

273B. Field Research Methods. (3) Three hours of lecture and three hours of field work per week. Theory and practice of various qualitative field research techniques drawn from the disciplines of anthropology and sociology.

273C. Applied Field Research Methods. (3) Three hours of lecture and three hours of field work per week. Examination of qualitative research methods with emphasis on practice in their use in educational settings. Focus on social research, ethnography, and other anthropological techniques applied in educational research.

277. Evaluation Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of conference per week plus four hours of field work per unit credit. Prerequisites: Completion of first year in educational evaluation program. (SP) Freedman

294. Thesis Seminar. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar and four hours of independent research per week. Recommended for M.A. students working on senior papers or theses, and doctoral students preparing dissertation proposals. Topic varies with instructor.

Professional Courses

460A. Practicum in School Site Management I. (3) Three hours of field work per week. Prerequisites: Admission to Administrative Services Credential Program. Supervised field experience, conferences, and colloquium. (F) Staff

460B. Practicum in School Site Management II. (3) Three hours of seminar and three hours of field work per week. Prerequisites: Admission to Administrative Services Credential Program. Supervised field experience, conferences, and colloquium. (SP) Staff

460C-460D. Research Practicum in Administration. (2-4) Course may be repeated for credit. Two hours of lecture/field work per week. Prerequisites: EP 2004, 2005, or equivalent and consent of instructor. This course engages Ed.D. students in collecting and analyzing data on efforts to improve educational practices or solve important problems in school systems. (F,SP) Staff

460F. Field Based Practicum: Level II-1 Internship in Educational Administration. (2) New course. Six hours of field work per week. Prerequisites: Possession of Preliminary Administrative Services Credential. Supervised field-based practicum and seminar for students working toward the Professional Administrative Services Credential. Administrative skills addressed in the course include evaluation of educational programs, administrative leadership skills, and written and verbal communication skills. In addition to field work, one 3-hour seminar will be scheduled during each semester.

460G. Field Based Practicum: Level II-2 Internship in Educational Administration. (2) New course. Six hours of field work per week. Prerequisites: Possession of Preliminary Administrative Services Credential. Supervised field-based practicum and seminar for students working toward the Professional Administrative Services Credential. Administrative skills addressed in the course include implementation of personnel policies, planning procedures, staff/plant facility, and written and verbal communication skills. In addition to field work, one 3-hour seminar will be scheduled during each semester.

460H. Field Based Practicum: Level II-3 Internship in Educational Administration. (2) New course. Six hours of field work per week. Prerequisites: Possession of Preliminary Administrative Services Credential. Supervised field-based practicum and seminar for students working toward the Professional Administrative Services Credential. Administrative skills addressed in the course include development of community support, contract management, and written and verbal communication skills. In addition to field work, one 3-hour seminar will be scheduled during the semester.

465. Practicum in Evaluation. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of conference per week plus four hours of field work per unit credit. Prerequisites: Completion of first year in educational evaluation program. Practicum in the conduct of educational evaluations in the field. Students will individually or in small groups participate in evaluations in educational settings under faculty supervision.

Education in Language and Literacy

Lower Division Courses

90. Learning From Text. (1) Course may be repeated for credit. Must be taken on a pass/fail basis. One hour lecture plus discussion per week. This course assists undergraduates with reading and study skills. Students learn to evaluate and derive learning from their texts in such courses as anthropology, sciences, sociology, mathematics, and humanities. (F,SP) Staff

Upper Division Courses

140. Literacy: Individual and Societal Development. (3) Three hours of lecture and discussion per week. A consideration of literacy development in individuals and in societies: definitions of literacy, its effects on cognitive functioning in individuals, and its relation to cultural, economic, and political development in societies. These relationships and effects will be analyzed historically, psychologically, and sociologically. (F) Valdés

141. Language use in the Chicano Community. (3) Formerly 211B. Two 3-hour lecture per week. Introduction to the sociolinguistic study of bilingualism and Chicano, and of Chicano bilingualism in particular. Examination of the function and uses of language within minority communities in the U.S. which contrasts the Chicano experience as a primary example. Considerable attention will be given to the educational implications of bilingualism in immigrant communities. (SP) Valdés

Graduate Courses

240. Language and Literacy Studies. (2-3) Two hours of lectures per week; for an additional unit students must attend one hour discussion classes. An interdisciplinary study of language and literacy development which provides a broad introduction to the field, including sociolinguistic approaches and approaches in this area of research and teaching. A consideration of the social, psychological, cultural, linguistic, and pedagogical factors that influence language and literacy development in students of all ages. The one hour discussion requires at least three hours per week of outside preparation. (SP) Filmlore

241. Issues in Reading Instruction. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Course content will focus on the implications of reading theory and research for curricular decisions in teaching reading at elementary and secondary school levels. Critical analysis of instructional programs will be followed by curriculum planning for the school site and district levels. (F) Jeffreys

242. Issues in Composition Instruction. (3) Three hours of seminar per week. Students will review trends in the history of writing instruction, and then will examine current research about and theories of written language acquisition and the writing process. Connections will be made between research, theory, and practice. (F) Freedman

243A. Perspectives on the Education of Linguistic Minorities. (3) Formerly ELL 243. Three hours of lecture and discussion per week. The social, political, linguistic, and pedagogical issues associated with educating students who do not speak the societal language will be considered as they relate to the American experience, in relation to the experiences in other societies. Bilingual education, as an institutional approach to solving such problems in the United States will be examined. (F) Valdés

243B. Approaches in Teaching English as a Second Language. (3) New course. Three hours of lecture per week, plus a field work assignment. Prerequisites: Application linguistics course, or a course in second language acquisition. This course is primarily concerned with methods of teaching English as a second language (ESL) to K-12 students and adults. Traditional methods emphasizing the development of structural knowledge, and new methods focusing on the development of communication skills will be examined. Topics include...
teaching English through content instruction, structured English immersion, syllabus and curriculum design, second language reading, and language testing for placement and evaluation. (F) Fillmore

244A. Staff Development In Reading and Language Instruction. (3) Formerly ELL 242. Three hour lecture per week. Aims and procedures of the instructor. Emphasis is placed on design, articulation, and implementation of reading-language curricula for primary grades through community colleges. Dynamics of personal leadership critical to successful curricula implementation is stressed. (SP) Ruddell

244B. Issues in Languages Arts Instruction. (3) Formerly ELL 256. One 3-hour seminar per week. Working within a developmental and sociolinguistic framework, students will examine issues related to the assessment and fostering of oral and written language with emphasis on the elementary and middle school years. Among the topics to be covered are the role of talk in learning, the uses of the oral language arts, emergent literacy, and writing development. (F) Dyson

245A. The Social Contexts of Language and Learning. (3) Formerly 245. One 3-hour seminar per week. Influences of social structure and change on language use and learning in contemporary society. Seminar discussions will focus on theories of language use and language learning to cultural heritage, social status and situus, and mass communications systems, as well as family, schooling, and peer group process. (SP) Ayers

245B. Language Study for Educators. (3) New course. One 3-hour lecture/discussion per week. This course will introduce students to the broad areas of language study and explore the implications of such study on teaching and learning. Among the course topics are: the nature of language, the meanings of grammar, the varieties of English, the development of language in the preschool and school years. This course will be required for all Ed.D. students and recommended as an elective for all students who have had no formal course work in linguistics. (F) O'Connor

247. Research on Computers and the Teaching of Writing. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 242 or equivalent or consent of instructor. This course focuses on the uses of the computer in instruction and research in the teaching of writing. To learn about the role of the computer in the literature arts and the current programs in developing software and text editors and design research projects. (SP) Hull

248. Foundations In Reading Grades K-12. (2) Two hours of lecture per week. Prerequisites: Admission to Teaching Preparation Program or consent of instructor. Orientation to reading instruction in the school setting from a developmental perspective, basic reading skills, instructional materials and approaches, assessment, reading theories. (SP) Ruth

249. Foundations for Teaching in Elementary Schools. (3) Three hours of lecture per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Curriculum, Instructional theory, and methods for teaching language arts and social science in elementary schools. (SP) Hull

250A-250B. Seminar on Reading Disability. (3-5;3-5) One 3-hour seminar per week. In addition an eight hours of field work per week, an additional two units of credit will be awarded. Prerequisites: Consent of instructor or a course in the diagnosis and treatment of reading problems. Examination and in-depth analysis of reading disability. Remediation programs, diagnostic tests, and the basic literature in the field are reviewed. Perceptual tests will receive special attention. Optional field work includes eight hours a week of supervised work with a reading specialist, where students diagnose and treat children with reading problems. (F,SP)

251. Research in Reading. (3) Course may be repeated for credit. One 3-hour seminar per week. An examination of selected topics on reading research including historical aspects of reading research, word recognition, reading comprehension, the relationship between decoding and comprehension, attitudes toward reading, and models of the reading process. (F) Ruggell

252. Research in Composition. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisite: Consent of the instructor. Critical examination of major theories and approaches to research in writing. Preparation for designing and conducting research projects on the written language. (SP) Hull

253. Psycholinguistics and Discourse Analysis. (3) Three hours of seminar per week. Examination of the major psycholinguistic concepts and theories of text analysis and their application to literacy instruction. Topics include conversational paratexts, speech-act theory, given-new theory, and background knowledge, readability and comprehensibility, narrative structure and cohesion and text structure analysis. (SP) O'Connor

254A. Research in Second Language Acquisition. (F) Formerly 254. Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Psychology 143, background in linguistics or psychology helpful. Theory and research on second acquisition of second languages by children and adolescents. Focus on cognitive factors in the learning process and on the sources of individual differences. Examination of educational programs encountered by second language learners. (F) Filmore

254B. Communication in School-Age Children. (3) New course. One 3-hour seminar per week. Looks at development of language skills from preschool through adolescence in peer group, family, and school. How peer interaction provides a cultural-cognitive force for the child in situations where social class and minority group status make school success problematic. (F) Cook-Gumperz

255. Literacy Problems and Language Differences. (3) Three hours of lecture and discussion per week. An examination of the role of language differences on the problems of literacy. Emphasis will be on the effects of cultural and dialect differences on participation in classroom learning. These issues will be examined within a socio-linguistic and ethnic framework. (F) O'Connor

256. Research in Classroom Language. (3) Formerly ELL 291A. One 3-hour lecture per week. Focus is on students' and teachers' use of language from interrelated perspectives: language as a tool for learning; communication patterns in the classroom including teacher/child and peer talk: comparison of home/school language use; written communication in the classroom. Research is from sociolinguistic and ethnographic perspectives. (F) Dyson

258A-258B. Foundations for Reading Grades K-12. (2) One credit and grade to be awarded on completion of the sequence. Fall: Two hours of lecture per week. Spring: One hour of lecture and one hour of field work per week. Prerequisites: Admission to a teaching credential program or consent of instructor. Orientation to reading and writing instruction in school settings, basic literacy skills, instructional methods and approaches, assessment procedures, and reading and writing theories. (F,SP) Hollingsworth

259A-259B. Foundations in Reading for Secondary Schools. (2;1) Credit and grade to be awarded upon completion of the sequence. Fall: Two hours of lecture per week. Spring: One hour of lecture and one hour of field work per week. Prerequisites: Admission to a teaching credential program or consent of instructor. Orientation to reading and writing instruction in secondary school settings, basic literacy skills, instructional materials and approaches, assessment procedures, and reading and writing theories. (F,SP) Ruth

294. Thesis Seminar. (1-6) Course may be repeated for credit. One to 4 hours of seminar per week. Additional units earned by completing four hours of independent research per week or semester. Prerequisites: Consent of instructor. Recommended for students working on a major research or teaching project, theses, and dissertation proposals in language studies. Sections 1: Recommended for Ed.D. students and M.A. students working on curriculum projects. Section 2: Recommended for Ph.D. students and M.A. students working in research studies. (F,SP)

298. Group Study for Graduate Students. (3) Course may be repeated for credit. Section 1 must be taken for a letter grade; sections 2-10 must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Research on special problems and topics not covered by courses or seminars. (F,SP)

Professional Courses

340A-340B. Foundations for Secondary School English. (2,2) Credit and grade to be awarded upon completion of the sequence. One 2-hour lecture per week. Prerequisites: Admission to the Advanced Reading-Language Leadership Program of Bay Area Writing Project. Lectures and workshops on teaching the secondary school English curriculum, with emphasis on the teaching of composition. (F,SP)

390A-390B. Supervised Teaching. (7-8) One hour of lecture and 24-28 hours of supervised teaching in public school classrooms per week. Prerequisites: Admission to a teaching credential program. Credit and grade to be awarded upon completion of the sequence. (F,SP)

390C. Supervised Teaching. (1-2) Course may be repeated for a maximum of 15 units. Two to 20 hours of supervised teaching in public school classrooms and one to three hours of lecture per week. Prerequisites: Admission to a teaching credential program. Units and hours vary with individual credential programs and semesters.

440. Field Work for Advanced Reading-Language Leadership Program. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar and two hours of field work per week. Prerequisites: Admission to Advanced Reading-Language Leadership Program. Application of theoretical knowledge through implementation and evaluation of reading-language programs in individual classroom and school districts. (F,SP) Gillette

Education in Mathematics, Science and Technology

Upper Division Courses

121A. Teaching Science in the Non-School Setting. (3) Three hours of lecture per week. A series of workshops conducted in demonstration classrooms at the Lawrence Hall of Science focusing on special techniques for teaching in a non-school setting. The course is designed to develop skills for persons working in museums and youth organizations as well as preparing students considering it as a professional career. Selected topics in science, mathematics, and computing provide the central but not exclusive context for instruction. (F,SP)

123. Word Processing for Scientific Writing. (1) Formerly EDUCMST 191A. Must be taken on a pass/no pass basis. Self-paced with tutor including periodic group meetings. Prerequisites: Consent of Instructor. Conceptual overview of scientific paper writing using the word processor with emphasis on educational implications of the technology. Students will use the UNIX system to facilitate feedback, share annotated bibliographies, write, edit, and format papers in accordance with professional journal guidelines. Use of the Apple Macintosh and IBM/PC will also be introduced. (F,SP) Woolson

Graduate Courses

220A. Exploring Mathematics with Computers: Turtle Geometry. (3) New Course. One 2-hour lecture and one 2-hour laboratory per week. Provides in-depth mathematical subject matter through an exploratory approach made possible by computers. Students learn mathematics, engage in mathematical invention and discovery and reflect on the role of computation in all that happens effectively. Mathematical topics include elementary number theory, topology of planar paths, geometry on curved surfaces and Einstein's General...
Theory of Relativity. Some elementary programming recommended.

221B. Curriculum Development and Instruction in Science. (3) Three hours of lecture and one hour of discussion per week. This course provides an historical overview of science curriculum development and the components of instructional programs in the United States, including analysis of effect upon them by social trends, cultural influences, national and international events, and social defenses. Examination of the more successful programs will be made from various learning theories, perspectives, and research studies.

222A. Programming and Problem Solving. (3) New course. One 3-hour lecture per week. This course will analyze programming languages and applications solve programming problems, examine recent investigations of programming and relate these investigations to recent research on learning and instruction. Using these insights current programming instruction will be examined. Other topics include: programming environments such as MacPascal, instruction, programming texts, and student behavior when solving programming problems.

222B. Design of Computer-Based Instruction. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. The study of educational and psychological literature related to the design of effective computer-based instruction; development of students' abilities to critically review educational use and application of design principles for writing computer-based instructional materials.

222D. Computer System Design Project Laboratory. (1) New course. One 3-hour laboratory per week. Prerequisites: Consent of instructor. The systems design project laboratory is an advisory offering intended to put the ideas from EDUCMST 225C-Computational Approaches to Computer Systems Design into practice. The principal requirement will be a substantial software implementation and written paper. With instructor's consent, the project laboratory may be taken sequentially with EDUCMST 225C. In cases of extraordinary preparation, this laboratory course may be taken independently. (F) d'Sessa

225A. Advanced Topics in Math, Science, and Technology Education. (3) Formerly EDUCMST 222A. This course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor or 222A or consent of instructor. Problem solving, mathematics, and subject matter changes from offering to offering. (F)SP

223A. Special Problems in Math, Science, and Technology Education. (1-2) Formerly EDUCMST 222A. This course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture per week; an additional unit may be earned for an extra hour of discussion. Prerequisites: 222A or consent of instructor. This course will focus on special problems and issues in these educational areas. Examples include issues of science and society, the problem of math anxiety, learning in science centers and museums, environmental education, and health education.

224A. Mathematical Thinking and Problem Solving. (3) New course. One 3-hour lecture per week. This course explores contemporary research on mathematical cognition, with a particular emphasis on "higher-order thinking skills" and mathematical problem solving. We discuss various frameworks for characterizing mathematical behavior and various methodologies for examining it. As an "action-oriented" course in the EMST curricular sequence, this course includes a major research project. In their project, students engage in research incorporating the main ideas studied in the course.

224B. How People Learn Computer Science. (4) New course. Two 2-hour lectures per week. In this course, an attempt will be made to develop, test and refine theories of learning computer science topics using a variety of experimental methods. Theories and experiments will be individually presented by the instructor; by mid-semester, the class will collectively generate general concepts and hypotheses of interest and design one or more experiments to address these theories; by the end of the semester, students will be expected to have conducted their own small study.

225A. Introduction to Intelligent Computer-Assisted Instruction. (2) New course. One 2-hour lecture per week. An introduction to research on the computer-based learning environments augmented with an intelligent program that acts as a tutor, coach, or consultant.

225B. Programming Intelligent Computer-Assisted Instruction. (4) Prerequisites: Concurrent enrollment in EMST 222A or consent of instructor. One 2-hour lecture and one 2-hour workshop per week. The aim of the course is to confer upon students the facility to create intelligent computer-assisted instruction (ICAI) systems. A programming-intensive course that will require significant Lisp experience.

225C. Cognitive Approaches to Computer System Design. (2) New course. One 2-hour lecture per week. This course, based largely on reading and critical analysis, will survey and analyze some of the mental processes involved in understanding and operating computer systems. The course will include the design of calculators and user interface to computer systems, activity structures involving multiple operation tools and programming as well as cognitive constructs being developed to understand performance. Requirements include three analytical papers. (F) d'Sessa

225D. Computer System Design Project Laboratory. (1) New course. One 3-hour laboratory per week. Prerequisites: Consent of instructor. The systems design project laboratory is an advisory offering intended to put the ideas from EDUCMST 225C-Computational Approaches to Computer Systems Design into practice. The principal requirement will be a substantial software implementation and written paper. With instructor's consent, the project laboratory may be taken sequentially with EDUCMST 225C. In cases of extraordinary preparation, this laboratory course may be taken independently. (F) d'Sessa

228. Constructive Epistemology. (3) New course. One 3-hour lecture per week. Major approaches to metacognition (metamemory, executive control, self-regulation in problem solving; belief alteration and role-play) will be surveyed from the following points of view: metacognition's meaning and importance, evidence that humans have such knowledge, where such knowledge is attained, the extent to which it is learnable and suggestions about how it might be developed.

228. Modelling of Knowledge and Cognitive Processes. (4) New course. Two 2-hour lectures per week. Prerequisites: Planned in or in-progress research project. This course teaches the basic concepts and techniques of the major methods for constructing and testing cognitive models. Students will learn methodology in the context of use. A prerequisite of enrollment is that the student is either already conducting or has planned and will be conducting a research project in which they are developing a model of knowledge structures of cognitive processes. Construction of a cognitive model related to the research project will be a major activity of the course.

229. Cognitive Science Approaches to Learning. (2) Formerly EDUCMST 229. One 2-hour lecture/discussion per week. Discussion-oriented class that focuses on recent theories and models of learning in cognitive psychology and artificial intelligence. Through extended readings, students will become familiar with recent artificial intelligence approaches to machines learning, formal theories of learning and learnability and psychological work on learning and thinking. Topics covered will include concept learning, learning in connectionist networks, skill acquisition, analogy, language acquisition, and discovery learning.

229C. Cognition and Instruction of Children in Science. (3) New course. One 3-hour lecture per week. In this course selected models of children's scientific knowledge and reasoning processes (including Piaget's view of children's scientific reasoning, the information processing perspective, and models that have sought to integrate aspects of the two. The cognitive literature is then used as a base to conduct case studies of instruction children engaged in science and analyze science instruction.

230A-230B. Instruction in Elementary Schools: Mathematics and Science. (3;2) Credit and grade to be awarded upon completion of the sequence. Must be taken on a satisfactory/unsatisfactory basis. Three hours and seminar plus three hours of workshop per week in the fall; two hours of lecture and seminar plus two hours of workshop per week in the spring. Prerequisites: Admission to a credential program. Seminars, lectures, and workshops to meet requirements in the subject areas of mathematics and science for the multiple subject credential. (F,SP) Lowery

231A-231B. Instruction in Secondary Schools. (5,4) Credit and grade to be awarded upon completion of the sequence resulting in a satisfactory/unsatisfactory grade. Four hours of lecture/seminar plus three hours of workshop in the fall; three hours of lecture/seminar plus three hours of workshop per week in the spring. Prerequisites: Admission to a credential program. Seminars, lectures, and workshops to meet requirements for the single subject credential. Subject areas include educational psychology, instructional strategies, learning processes, and secondary school mathematics, science and social studies. (F,SP)

233. Research and Advanced Instruction—Elementary and Secondary Schools. (3) Three hours of lecture and one hour of laboratory per week. Exploration and research in advanced methods and strategies of teaching. (F) Hollingsworth, Lowery

235. Elementary Teaching in Mathematics and Science. (3) One 3-hour lecture per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Curriculum, instructional theory, and methods for teaching mathematics and science in the elementary school. (F,SP)

260A. Seminar for Mathematics Specialists: Foundations, Issues, and Research. (3) Formerly EDUCMST 226. Three hours of seminar per week. Prerequisites: Acceptance into Mathematics Specialist Credential Program. This seminar will give an orientation to fundamental ideas, issues, and research in mathematics education relevant to classroom teachers. Emphasis will be given to research on alternative teaching strategies, language in mathematics teaching and learning, and mathematical thinking processes and conceptualization. Barnett

291B. Cognitive Consequences of Computers in Classrooms. (3) One 2-hour seminar plus three hours of computer lab per week. Prerequisites: Graduate status. This course will focus on the cognitive consequences of computers in instruction and learning, the premise of computers in education will be examined and exemplary instructional software will be explored. A model of knowledge acquisition and knowledge change incorporating computer delivery of instruction will be developed. (F) Linn

294. Seminar on Formulation of Educational Research. (1-4) Course may be repeated once for credit. Must be taken on a satisfactory/unsatisfactory basis. One to four hours of seminar per week. Discussion on the formulation of useful educational research in both school and university settings; applying these criteria while developing plans for research on topics of interest to the participants. (F,SP) Staff

296. Internship in Mathematics, Science and Technology Education. (1-4) Course may be repeated once for credit. One 2-hour seminar every other week plus three to ten hours of laboratory per week on an educational research or development project on the UC campus or at a nearby cooperating institution such as the Exploratorium, Oakland Museum, etc. Two hours of seminar bi-weekly to discuss the students' experiences. (F,SP)

299. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to four hours of seminar per week in advanced group study in education. Topics vary from semester to semester. May consist of organized lectures or seminar discussions, related chiefly
to the research area in which the group is working.

Professional Courses

390A-390B. Supervised Teaching. (7,8) Credit and grade to be awarded upon completion of the sequence. One 2-hour seminar plus 11/2-hour sessions for planning, observation, and conference. Prerequisites: Admission to a credential program. Field work for teaching credential. The staff in supervised teaching will begin with the opening of the public schools in the fall and end through the spring semester. (F,SP)

Staff

Educational Psychology

Upper Division Courses

105. Educational Psychology for Teachers. (2) One 2-hour lecture and one hour of discussion per week. Prerequisites: Admission to a teaching credential program. Lectures on topics of special interest to teachers, including child and adolescent development, the teaching-learning process, and classroom evaluation. Application of these concepts to the school setting and consultation on actual classroom problems. Written assignments and final examination required. (F)

107. History of Psychology. (3) Two 2-hour sessions per week. Prerequisites: Consent of instructor. Study of the development of psychology, concentrating on the contributions of famous psychologists. (SP)

108. Research Methods. (3) Two 2-hour sessions per week. Prerequisites: Consent of instructor. Study of research methods, emphasizing the significance of research in the development of educational psychology. (F)

110. Development and Education of Exceptional Children. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Theories of exceptionalities, educational problems of exceptional persons, including children with mental retardation, emotional disturbance, and physical disabilities. (SP)

111. Child Development. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Introduction to child development. Emphasis on longitudinal study of individual differences and changes that occur in children from conception to adulthood. Prerequisites: Consent of instructor. Theories of child development, focusing on individual differences and changes that occur in children from conception to adulthood. (SP)

112. The Exceptional Child. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Examination of psychological explanations of the development of moral judgment and action in children and adolescents. Discussion of applications of developmental theories to programs of moral education. (SP)

114. Early Childhood Education: Policies, Practices, Theories. (4) One 2-hour seminar plus eight hours of field training per week. Prerequisites: Consent of instructor. Course integrates child development theories with educational practices and field observations. Topics include models of child development, discipline and problem solving, cultural and historical comparison, issues in current child care policy. Two hours of class per week and eight hours of scheduled field work in a child care or preschool setting. The course is divided into two parts: a final paper that integrates the field work requirements in the light of the theories being reviewed in class. (F,SP)

115A. Beginning Counseling Skills. (3) One 2-hour lecture and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Introduction to counseling theory, research, and practice. Emphasis on counseling skills associated with positive client behavior change. (SP)

115B. Advanced Counseling Skills. (3) One 2-hour lecture and one 3-hour laboratory per week. Advanced practice in those skills associated with positive client behavior change. Introduction to counseling theories. (SP)

Graduate Courses

200A. Cognitive Development. (3) One 3-hour session per week. A graduate level introduction to the development of thinking from early childhood through adolescence. (SP)

200B. Social Development. (3) One 3-hour session per week. Prerequisites: Consent of instructor. An examination of theory and research on social development from childhood to early adulthood. Review of different theoretical orientations to social cognition, morality, psychosexual development, and the role of social-environmental factors. (SP)

200C. Learning and Memory Development. (3) Two 1-hour lectures/discussions per week. Prerequisites: Consent of instructor. A consideration of major theories and research on the development of human learning and memory from early childhood through young adulthood. (SP)

200D. Theories of Intelligence. (3) Two 1-hour lectures per week. Prerequisites: One course in statistics. A consideration of psychometric approaches to the study of individual differences in human mental abilities, with emphasis on intelligence, including theories and empirical research on the measurement, nature, and structure of abilities, from Galton to the present. (SP)

200E. Neuropsychology of Reading. (3) One 3-hour lecture per week. Topics include neural basis for reading acquisition, word recognition and decoding skills, models of reading, normal development, the literacy problems of minority students, and reading disability. (SP)

201A. Psychology of Learning. (3) One 3-hour lecture per week. Topics include the acquisition of motor skills, word recognition and decoding skills, models of reading, normal development, the literacy problems of minority students, and reading disability. (SP)

201B. Seminars in Intellectual Development. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Relevant courses from the 200 sequence and consent of instructor. Intensive examination of advanced topics, which will vary from year to year in the areas denoted by the titles of the following sections:

(1) Cognitive Development
(2) Learning and Memory Development
(3) Language. (SP)

202A. Motivation and Self Perceptions in Human Learning. (3) Two 1-hour lectures/discussions per week. Achievement motivation and perceived causal attributions for performance. Related variables will be considered. Relevance for educational practice will be explored. (SP)

202B. Play and Games in Human Development. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisites: Consent of instructor. Examination of play and games in animal, psychological, and educational research. Concept of constructualism applied to analysis of new and classic games. Participants create new games for field testing. (SP)

202C. Mental Health. (3) One 2-hour session and 3 hours of field work per week. Concepts, practices and research related to the prevention and treatment of emotional problems. Ways of integrating cognitive and emotional processes—roles of family, peer play, and school experiences in promotion of mental health. (SP)

202D. Seminars in Social and Personality Development. (2) Course may be repeated for credit. One 2-hour session per week. Prerequisites: Relevant courses from the 200 sequence and consent of instructor. Intensive examination of advanced topics, which will vary from year to year. (SP)

203A. Individual Differences: Behavioral Genetic Analysis of Human Abilities. (3) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Introduction to behavioral genetics, emphasizing the interaction of genetic and environmental factors. (SP)

204A. Logic of Theoretical Inquiry. (2) One 2-hour seminar per week. Prerequisites: Consent of instructor. A review and discussion of theoretical positions in logic. Emphasis on the need for scientifi rigorous scientific research. (SP)

204B. Critical Analysis of Empirical Inquiry. (2) Two 1-hour sessions per week. Prerequisites: Consent of instructor. Critical review and detailed discussion of current research. Emphasis on the need for scientific rigor in empirical research. (SP)

204C. Research Seminars: Inquiry in Educational Psychology. (3) Course may be repeated for credit. Three 1-hour sessions per week. Prerequisites: Consent of instructor. The doctoral program in educational psychology requires that students complete extensive projects of documentary and empirical research. As they engage in these projects, students will enroll (ordinarily during alternate years in appropriate sections of the seminar. At each meeting, participants will present their own projects, and analyze those presented by others. (SP)

205. Instruction and Development. (3) One 3-hour lecture per week. Prerequisites: Consent of instructor. An examination of cognitive development approaches to instruction. Review of different theoretical orientations to learning and memory, metacognition, emergent literacy, reading, writing, mathematics, science, computer literacy, motivation, self-regulated learning, classroom management. (SP)

207A. Standard Tests in Education. (2) One 2-hour lecture per week, plus two hours of field work bi-weekly. Introduction to measurement concepts and procedures applicable to the development, selection and utilization of educational and psychological tests in schools. During the 2nd year, the course will be integrated with Education 207B in hands on experience with the administration, scoring, and interpretation of selected tests. (SP)

207B. Individual Appraisal of Intelligence. (4) One 3-hour lecture and six hours of field work per week. Prerequisites: Consent of instructor. An examination of intelligence as applied to the assessment of intelligence, measurement concepts applied to intelligence tests, development, administration, and interpretation of the Wechsler Intelligence Scale for Children. (SP)

207C. Diagnosis of Human Handicaps. (4) One 3-hour lecture and six hours of field work per week. Prerequisites: Consent of instructor. An examination of conceptualization of human handicaps, cognitive, motor, emotional and behavioral disorders. (SP)

207D. Assessment and Education of Exceptional Pupils in Regular Classes. (2) One 1-hour lecture and one hour of discussion per week. Methods for assessment of handicapped children in regular classroom settings. Topics to be covered include techniques for in-classification, teacher observation, parent communication, interperusal ability training. (SP)

On leave, spring
On leave, fall
Recipient of Distinguished Teaching Award
280. Educational Measurement I. (4) Two 2-hour lectures per week. An introduction to classical test theory and item response theory from a conceptual and practical viewpoint. Both quantitative and qualitative aspects of assessment will be addressed. Emphasis will be placed on the appreciation of what makes for good measurement through practical exercises in the interpretation of development of tests. (F) Wilson

280B. Educational Measurement II. (4) Two 2-hour lectures per week. Prerequisites: 280A or satisfactory background to follow the mathematical development. An introduction to classical test theory and item response theory from a formal model development point. Application of techniques to a practical measurement situation will be studied. Topics such as test bias, computerized and polytomous response modes will be discussed. (SP)

206. Psychological Scaling. (4) Three 1½-hour lectures per week. An introduction to the measurement of psychological value. Emphasis will be placed on psychophysical methods. Topics will include Weber's Law, Fechner's Law, Thurstone scaling, signal detection theory, debates on the use of category ratings vs. magnitude estimation, the ratio-difference controversy, cross modality, matching, theories of contextual effects, etc. 206C and Psychology 206C will be offered in alternate years. (F,SP)

206D. Factor Analysis in Educational Psychology. (4) Three 1½-hour lectures per week. Introduction to factor and component analysis. Rotation and transformation problems will be dealt with. Fitting the factor analytic model via statistical procedures will be addressed. Factorial indeterminacy issues will also be introduced. 206D and Psychology 206D will be offered in alternate years.

208E. Test Construction. (4) Three 1½-hour lectures per week. Prerequisites: 208B or Psychology 208B; 208D or Psychology 208D recommended. Issues in the development, construction, and evaluation of procedures for assessing traits and measuring attainment in educational or psychological contexts. Questionnaire development as well as more traditional forms of item development, and Likert Scales will be discussed along with the usual form of item construction. 208E and Psychology 208E will be offered in alternate years.

208F. Proseminar in Educational Measurement. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisite: Consent of instructor. Current research and applications on educational measurement by faculty, students, and others is examined and criticized. (F) Wilson

209A. Data Analysis in Educational Research and Program Evaluation I. (4) Two 2-hour lectures per week. Prerequisites: 209A. Analysis of variance, contingency tables; planned and post hoc comparisons. (F) Marascuilo

210F. Proseminar in Educational Data Analysis. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Consent of instructor. Current research and publications on educational data analysis by faculty, students, and others are examined and critiqued. (F,SP) Wilson

210L. Advanced Data Analysis Laboratory. (1) Course may be repeated for credit. Two hours of laboratory per week. Prerequisites: Must be taken concurrently with 210A and 210B. Advanced techniques and computer problems will be presented and discussed. Outside assignments of 10-15 hours per week. (F) Marascuilo

211A-211B. Human Development and Education. (3;3) One ¾-hour lecture/discussion per week. Prerequisites: Consent of instructor. Advanced principles of human development and their application to elementary and preschool education. Topics include cognitive development, moral and social development, language acquisition, psycho-social perspectives on social-emotional development and a developmental analysis of classroom organization. (F) Ammon, Turkel

211C-211D. Advanced Human Development and Education. (3;3) Three 1-hour lecture/discussion per week. Prerequisites: Consent of instructor. Development to a new level. (F) Marascuilo

211L. Laboratory for Human Development and Education. (1) Three days of laboratory per week. This laboratory is designed for students pursuing an advanced study of human development and the design of Individual and group programs in the education of exceptional children. (F) Wilson

212B. Seminar on the Re-Education of Severely Emotionally Disturbed Children. (3) Course may be repeated for credit. One ¾-hour seminar and 1 hour of field work per week. Prerequisites: Consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and the social psychological perspectives of the education of exceptional children. (F) Black

212C. Advanced Seminar on the Re-Education of Emotionally Disturbed Children. (3) Course may be repeated for credit. One ¾-hour seminar and 1 hour of field work per week. Prerequisites: Consent of instructor. Behavior management; remedial techniques in school subjects; working with parents and teaching in schools; utilization of community resources and agencies. Use of group procedures with disturbed children; social and educational competence in the classroom. (F) Staff

212D. Advanced Seminar on the Re-Education of Emotionally Disturbed Children. (3) Course may be repeated for credit. One ¾-hour seminar and 1 hour of field work per week. Prerequisites: Consent of instructor. Diagnostic assessment of academic abilities in language, reading, mathematics, health, and study practices. Curriculum and interpersonal processes. Analysis of successful and unsuccessful students including home, school, and vocational factors. (F,SP) Morissette

213A. Conceptual Bases for School Psychology. (3) Three 1-hour lecture and six hours of field work per week. Historical and contemporary overview of the professional specialty of school psychology. (F) Staff

213B. Theoretical and Scientific Bases for School Psychology Practice. (3) One ¾-hour lecture per week. Examines the empirical evidence for developmental and learning models in relation to the school curriculum and student organization from elementary through high school. (SP) Goodman

213C. School-Based Consultation. (3) One 1-hour lecture per week. Topics of consultation, consultation methods, and research on consultation applicable to primary and secondary prevention of school failure and mental health problems. (F) Lamber

213D. Educational Interventions for the School Psychologist. (3) One 1-hour lecture per week. Theories and procedures for individual and group assessment of children's learning and behavior problems as applied to the design of individual and group programs in the classroom. (SP) Duncan

213L. Laboratory for School Psychology. (1) One hour of discussion and six hours of field work per week. Laboratory section to evaluate field work records and for supervision of student assignment. Must be taken concurrently with 213A-213B-213C-213D. (F,SP) Staff

214. Thesis Seminar. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of discussion per unit plus independent research. Prerequisites: Consent of instructor. Recommended for degree students working on seminar papers, theses or dissertation proposals. Topics include the adoption of a thesis topic, research design, statistical analysis. (F,SP)

215. Group Study and Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/ unsatisfactory basis. One to six hours of seminar per week. Group study and research on special problems and topics. (F,SP) Wilson

Professional Courses

390C. Supervised Teaching. (1-8) Course may be repeated for a maximum of 15 units. 2-20 hours of supervised teaching in public school classrooms and one to three hours of lecture per week. Prerequisites: completion of a teaching credential or graduate degree. Must be taken on a satisfactory/unsatisfactory basis. Two hours of laboratory/discussion and one day field work per week. Supervised assignment to a school district in capacity of school psychologist. (F,SP) Staff

411L. Inservice Practicum and Consultation in Development and Teaching. (1) This course is offered for credit up to a maximum of four units. Two 1-hour lectures plus 23 hours of field work and consultation per semester. Prerequisites: Admission to DTE Inservice Program; Biweekly, one hour lecture/discussion sections combined with regular on-site consultations by campus-based supervisors focused on adapting the material presented in the core program seminars (EP 211A-C-D) to teaching practice.

413A-413B. Community-Based Internship in School Psychology. (3;3) Must be taken on a satisfactory/ unsatisfactory basis. Two hours of lecture/discussion and one day field work per week. Supervised assignment to a community mental health agency in capacity of school psychologist. (F,SP) Staff

413C-413D. School-Based Internship in School Psychology. (3;3) Must be taken on a satisfactory/ unsatisfactory basis. Two hours lecture and three days of field work per week. Supervised assignment to a school district in capacity of school psychologist. (F,SP) Staff

413L. Consultation for School Psychology Students. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour consultation on campus and six hours of field work per week. Prerequisites: Consent of instructor. Must be taken concurrently with 213A-213B and 413C-413D. (F,SP) Sampels

Interdepartmental Studies Courses

Upper Division Courses

IDS 110. Introduction to Computers. (3) Students who have taken CS 7, 8, or 50 may not receive credit for IDS 110. Three hours of lecture per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110L (with the same grading option as in IDS 110) or an equivalent departmental course. Primarily for students in the social sciences and humanities and in the professional schools other than Education. The conceptual foundations of computing and information technology. Structure and function of computing systems. Elements of programming. Applications programs. Examples are drawn mainly from word processing, database management, electronic spreadsheet, graphics and simulation, and telecommunications. Sponsoring disciplines: Computer Engineering, Education, and Computer Science. (F,SP) Staff

IDS 110L. Introductory Computer Laboratory. (1) Two 2-hour laboratories per week. Prerequisites: Upper
Program in Public and Nonprofit Management

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)

IDS 207. Managers and Management. (3)

IDS 208. Techniques of Management Control. (3)

IDS 209. Applied Microeconomics. (3)

IDS 210. Organizational Understanding for Managers. (3)

IDS 211. Public Sector Accounting. (3)

IDS 212. Financial Management. (3)

IDS 214. Organizational Skill for Managers. (3)

IDS 217. Technology, Tasks, and Politics. (3)

IDS 218. Information Resource Management. (3)

IDS 219. Financing Tools for Public Managers. (3)

For information about these and other courses related to this program, see the Public and Nonprofit Management section of this catalog.

Electrical Engineering and Computer Sciences

(College of Engineering)

Department Office: 231 Cory Hall, 642-3214
Chair: Eugene Wong, Ph.D.

University Professors:
- John H. Weinberg, Ph.D. (Emeritus) University of California, Berkeley. Communications applications of lasers
- Robert T. Howe, Ph.D. University of California, Berkeley. Robotics
- Edward A. Lee, Ph.D. University of California, Berkeley. Computer architecture

Related Courses in Other Departments

- Mass Communications for complete course description.
- Electrical Engineering and Computer Sciences / 171

Graduate Courses

IDS 271. Seminar in Neuropsychology. (3) Course may be repeated for credit. One 3-hour lecture and one 2-hour laboratory per week. Lectures and case presentations introduce the architecture of cognitive and information processing manifested in cases of aphasia, dementia stroke, traumatic injury, and other forms of neurological damage. Case presentations of patient material alternate with discussions of research strategies for evaluation of cognitive functioning. Presentation of neuropsychological populations as opportunities for the study of cognitive functioning. Sponsoring departments: Education and Psychology. (SP) Hardycn

Related Courses in Other Departments


Division Office, 571 Evans Hall, 643-1034
Professors:
- Michael Blum, Ph.D. (Vice Chair) Massachusetts Institute of Technology. Recursive function theory
- Alvin M. Diep, Ph.D. University of Utah. Computer design, architecture
- Robert J. Feller, Ph.D. (Associate Chair) Harvard University. Symbolic and algebraic manipulation
- Jerome A. Slein, Ph.D. Carnegie-Mellon University. Symbolic and algebraic manipulation
- Domenico Ferrari, Dr.Ing. Polytechnic Institute of Milan. Computer system performance evaluation
- Robert Gill, Ph.D. University of California, Berkeley. Computer architecture
- Susan L. Graham, Ph.D. Stanford University. Programming languages
- Michael A. Harrison, Ph.D. University of Michigan. Fast parsing techniques
- Wilbert K. Kohn, Ph.D. University of Toronto. Automated symbolic mathematical analysis
- Robert W. Karp, Ph.D. Harvard University. Analysis of algorithms
- Eugene G. Lawler, Ph.D. Harvard University. Computation theory, optimization theory
- Berends F. Parlett, Ph.D. Stanford University. Numerical linear algebra
- David A. Patterson, Ph.D. University of California, Los Angeles. VLSI design
- Chitofo V. Ramamoorthy, Ph.D. Harvard University. Computer architecture
- Carlo Sequin, Ph.D. University of U Basle, VLSI design tools
- Alan J. Smith, Ph.D. Stanford University. Computer operating systems, computer performance analysis
- Michael R. Stanne, Ph.D. University of Michigan. Data base management
- Lofti A. Zadeh, Ph.D. Columbia University. Artificial intelligence
- Sergey L. Lehtinen, Ph.D. (Emeritus) Stanford University. Artificial intelligence
- Edward A. Lee, Ph.D. University of California, Berkeley. Computer architecture

Associate Professors:
- Brian Balaji, Ph.D. University of Utah. Computer design, modeling
- Robert H. Katz, Ph.D. University of California, Berkeley
- John A. G. Overhous, Ph.D. Carnegie-Mellon University. VLSI design tools
- Lawrence A. Rowe, Ph.D. University of California, Irvine. Computer architecture
- Robert J. Wilensky, Ph.D. Yale University. Artificial intelligence

Assistant Professors:
- David P. Anderson, Ph.D. University of Wisconsin, Madison. Distributed systems, computer graphics
- On leave, spring
- Recalled to active service
- Recipient of Distinguished Teaching Award
4. Computer Science. For students interested in machine organization and logical design, programming systems and languages, digital devices and circuits, heuristic programming and artificial intelligence, design and analysis of algorithms, complexity theory, algebraic theory of machines, mathematical language of theories, coding theory, data structures, pattern classification, and learning systems. This program is available within the department through its Computer Science Division.

Curriculum for the Bachelor's Degree
A minimum of 120 semester units is required for the bachelor's degree in EECS, including:

1. (a) 45 units in the College of Engineering, including 30 upper division units. These units must include 30 units officially designated as engineering science courses in the following categories: (b) EECS 40, EECS 40C, or EECS 411, EUSI, and CS 60A. (c) 20 upper division units in EECS, not including EECS 100; (d) Three upper division laboratory courses in one of the four main programs in the Department of Electrical Engineering and Computer Sciences: electronics, systems, computer sciences, and bioelectronics. These courses are chosen from the following list: EECS 104; EECS 117A; EECS 120; EECS 130; CS 60C, CS 150 or CS 170. For students in the Bioelectronics Program, the requirement is satisfied by at least three units chosen from EECS 40, EECS 411, and CS 60A. These courses must be taken from the current list of acceptable physical and life sciences courses. 

2. 16 units of physical or life sciences, including Physics 7A-7B-7C. Courses must be taken from the current list of acceptable physical and life sciences courses.

3. 16 units of mathematics or statistics from the current list of acceptable courses, including Mathematics 1A-1B, or 8 units of Mathematics 15, 16 units of Mathematics 10A-1B-1C. These units must be taken concurrently. (F, SP) Schwarz

4. 43 units of electives, with no more than 40 taken on a passed/not passed basis. No more than 3 units of English as a Second Language, 4 units of physical education, or 7 units of Course 199 (independent study and research) may be counted toward the degree. These units must be approved by the advisors. Students must pass at least one in upper division, (b) at least 6 approved upper division units in humanities and social sciences, and (c) 3 units in English composition. The required units in English composition must be taken on a passed/not passed basis. It is expected that the English composition will be taken at Berkeley, not at other schools.

Note: None of the 77 units in requirements 1, 2, and 3 may be taken on a passed/not passed basis. In cases of Biology 1A-1B and CS 60C for EECS 45. In the cases of Biology 1A-1B and Physics 7A-7B, these courses cannot be used to satisfy requirement 1(a) of 45 units in the College of Engineering.

Graduate Program
To prepare the graduate student for work in the rapidly developing fields of electrical engineering and computer sciences, the department offers a wide selection of courses, seminars, and flexibility in meeting degree requirements. Since no single sequence of courses is required, students are free to design programs to suit their particular needs and interests, in consultation with a faculty advisor in their field.

Graduate degree programs are available in preparation for research and for careers in design, development, and management (Master of Engineering and Doctor of Engineering). The Master of Science program requires about one-year's study. About three additional years are usually required for the Doctor of Philosophy. The Master of Engineering program requires four semesters of study and includes a minor and a major. The Doctor of Engineering program, of about two years duration, builds on the course work for the Master of Engineering and requires a one-year internship in a design and development organization. Students should consult with either a B.S. or an M.S. who intend to study for the D.Eng. should apply first for the M.Eng. program.

Details of the available fields of graduate study in electrical engineering and computer sciences are described in the Announcement of the College of Engineering. For further information on graduate courses and procedures, see the Electrical Engineering and Computer Sciences Graduate Information booklet, available in 259 Cory Hall.

Electrical Engineering
Lower Division Courses
40. Introduction to Electrical Engineering. (4) Students who have taken EECS 401, 411, or 100 may not receive credit for 40. Three hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 1A-1B and Physics 7B. Passive circuit analysis, analog building blocks and analog systems, digital building blocks and digital systems, semiconductor devices, electronic circuits. (F, SP)

41. Introduction to Electrical Engineering (Self-Study). (4) Four hours of discussion per week. Prerequisites: Mathematics 1A and Physics 7B. Passive circuit analysis, analog building blocks and analog systems, digital building blocks and digital systems; semiconductor devices, electronic circuits. (F, SP)

42. Introduction to Electronics for Computer Science. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 1A and 1B, Fundamental principles of electrical engineering with emphasis on analog and digital circuits. Upper division credit for transfer students arriving with backgrounds containing one year of EECS 40 or EECS 401. Instructional format as in EECS 40. Analog building blocks and analog systems, digital building blocks and digital systems, semiconductor devices, electronic circuits. (F, SP)

43. Introduction to Electronics for Computer Science. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 1A and 1B. Fundamental principles of electrical engineering with emphasis on analog and digital circuits. Upper division credit for transfer students arriving with backgrounds containing one year of EECS 40 or EECS 401. Instructional format as in EECS 40. Analog building blocks and analog systems, digital building blocks and digital systems, semiconductor devices, electronic circuits. (F, SP)

44. Introductory Electronics Lab. (1) Must be taken on a passed/not passed basis. Two hours of laboratory per week. Prerequisites: 4 or 40 (may be taken concurrently). Introductory electronics laboratory. Emphasis on understanding the equipment and on laboratory techniques using an oscilloscope, power supplies, multimeters, an analog-to-digital converter, and a computer interface. No final examination. (F, SP)

45. Topics in Electrical Engineering and Computer Sciences (1) Course may be repeated twice for credit.
120. Signals and Systems. (4) Four hours of lecture and one hour recitation per week. Prerequisites: 104; Mathematics 50B. Continuous and discrete-time transform analysis techniques with illustrative applications. Linear and time-invariant systems, transfer functions, Fourier series, Fourier transform, Laplace and Z-transforms. Sampling theorem. Solution of differential and difference equations using transforms. Vector differential and difference equation, state-space method of analysis. Frequency response, Bode and Nyquist plots, stability analysis. (F,SP) Neureuther

121. Noise Analysis of Communications Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: 120. Elementary probability and random process theory; description of modulation systems, AM, FM, digital transmission methods such as PSK, QAM. Comparative noise analysis of modulation systems. Signal space concepts, error rate analysis of digital modulation systems, including non-coherent systems. (SP) Messerschmitt

122. Introduction to Communication Networks. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 40 and Mathematics 50A. Network architectural structures. Protocols and routing in store-and-forward networks (e.g., ARPANET and IBM's SNA). Satellite and packet radio networks. (e.g., ALOHA and cellular phones). Local area networks (e.g., ETHERNET and RINGS). Introduction to processing and signaling. Some hardware issues (e.g., VLSI switches, filter optics). (F) Walrand

123. Digital Signal Processing. (4) Three hours of lecture, one hour of discussion, and one hour of lab per week. Prerequisite: 120. Discrete time signals and systems: Fourier and Z transforms, DFT, DCT. Digital signal processing topics: flow graphs, realizations, FFT, chirp-Z algorithms, Hilbert transform relations, quantization effects, linear prediction. Digital filter design methods: windowing, frequency sampling, S-to-Z methods, frequency-transformation methods, optimization methods, two-dimensional filter design. (F,SP) Lee

124. Spectrum Analysis Lab. (1) One four hour lab per week. Prerequisite: 130. Laboratory exercises exploring measurement, data analysis, and signal processing techniques for optimizing compensators for feedback systems. (F,SP) Polak

130. Integrated-Circuit Devices. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: 40 and Physics 7C. Overview of basic semiconductor physics and electronics of metal-semiconductor contacts, pn junctions, bipolar transistors, and of junction and MOS field-effect transistors. Properties that are significant to device operation for integrated circuits. Silicon device and circuit technology. (F,SP) Muller

131. Semiconductor Electronics. (3) Three hours of lecture per week plus several one hour mini labs. Prerequisites: 130 (which may be taken concurrently). Physics of solid-state electronics. Review of quantum mechanics, lattice properties, band theory, electrons and holes, diffusion and drift, recombination, high-field phenomena, optical effects, device applications. Several one-hour mini-labs done in pairs with the aid of a graduate teaching assistant. (F,SP) Van Duzer

135. Microwave, Optics and Plasma Laboratory. (2) One hour of lecture and four hours laboratory per week. Prerequisites: 117A and Physics 7C. Six fundamental experiments (characteristics of antennas, microwave components, network analyzer measurements, laser optics, electrical discharges, and electromagnetic wave phenomena) will be chosen from twelve available in optical, microwave, and plasma devices and measurements. (SP) Gustafson, Lieberman

136. Introduction to Quantum and Optical Elec- tronics. (3) Three hours of lecture per week. Prerequisites: 117A and Physics 7C. The laser principle and survey of basic laser types; optical resonators; fiber optics and integrated optics; interactions between coher- ent light and anisotropic materials; modulation, detection; and other applications. (F,SP) Whinnery

140. Analog Integrated Circuits. (4) Three hours of lecture, one hour of discussion, and three hours laboratory per week. Prerequisites: 104. Introduction to analog integrated circuits. Bipolar and MOS transistor models. Single and two stage transistor amplifiers. Emitter coupled pairs, source coupled pairs, temperature and supply independent biasing. Operational amplifiers. Frequency response, feedback concepts, feedback amplifiers and design, root locus in integrated circuits. MOS analog circuits. (F,SP) Gray

141. Digital Integrated Circuits. (4) Three hours of lecture and three hours laboratory per week. Prerequisites: 40 and 104; 130 recommended. Introduction to digital integrated circuits, MOS fabrication technology. Design of MOS inverters and gates. Propagation delay and noise margins. Dynamic logic concepts. Bipolar transistor inverters and gates. Regenerative logic circuits. Memories. (F,SP) Hedges

142. Integrated Circuits for Communications. (4) Three hours of lecture and two hours laboratory per week. Prerequisites: 40, 104, and 140. Analysis and design of electronic circuits for communication systems. Analysis of distortion in amplifiers. Design of power amplifiers and voiceband nonlinear circuits. Oscillators, mixers, voltage-controlled oscillators, phase-locked loops. (F,SP) Meyer

145A. Sensors, Actuators and Electrodes. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 40 plus elementary chemistry and physics. Introduction to the physical principles of the detection of signals in the presence of noise, applications of lumped- and distributed-parameter network theory to design and sensor and actuator systems in acoustics, optics, mechanics, dynamics, thermodynamics, chemical dynamics, and electrodynamics. Electrochemical bases of electrodes. Biological sensors and actuators. (F) Lewis

145B. Computer Applications in Biology and Medicine. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 40 plus elementary chemistry and physics. Introduction to the use of digital computers in biology and medical science. Course will include special computer programs using digital computers, of biological and medical source data to useful compact representations. Applications to medical diagnosis and medical systems management. (SP) Bear

145L. Introductory Electronic Transducer Laboratory. (2) Three hours laboratory and one hour of lecture per week. Prerequisites: 140. Laboratory exercises exploring a variety of electronic transducers for measuring temperature, force, displacement, sound, light, ionic potentials. Concepts and principles of operation, equipment, signal to noise. Use of circuits for analog signal processing and microcomputers for digital sampling and storage. (F) Derezno

145M. Introductory Microcomputer Interfacing Lab- oratory. (2) Three hours laboratory and one hour of lecture per week. Prerequisites: 140. Laboratory exercises constructing basic circuits and interfacing them to a microcomputer for the filtering and
periodic sampling of analog signals. Programming ex-
ercises (FORTRAN or C) to sample analog signals,
and perform digital filtering, numerical analysis, real-
time control, and data visualization. (F,SP)

146. Dynamic Networks in Biology. (3) Three hours
of lecture per week. Prerequisites: 40 or Mathematics
508. Introduction to the application of engineering mod-
eling and analysis methods to continuous and discrete
dynamical systems and stochastic biological processes. Net-
work formats used to deal with cellular, organismal,
and population phenomena. (F) Kellner, Lewis

147. Electrical and Radiation Safety. (2) Two hours
of lecture per week. Prerequisites: 104, Occupational
and environmental hazards associated with electrical
devices; dielectric breakdown, insulation, high voltage,
and radiofrequency and technical measures for minimizing dangers. (SP) Suskind

198. Directed Group Study for Advanced Under-
graduates. (1-4) Course may be repeated for credit.
Must be taken on a pass/no pass basis. To vary with the
interest, theme, size and cohort. 60 units completed.
Group study of selected topics in reliability,
engineering, usually relating to new developments. (F,SP)

Staff

199. Supervised Independent Study. (1-4) Course
may be repeated for a maximum of four units per se-
man. May be taken on a pass/no pass basis. Individual
special studies: Consists of instructor and major adviser.
Supervised independent study. Please see pages 81 and 82 of this catalog for
description and prerequisites. (F,SP)

Staff

Graduate Courses

205. Electron and Gaseous Devices. (2) Two 1-hour
lectures per week. Prerequisites: 117A. Theory and
applications of vacuum and gaseous devices, with
emphasis on devices of the electron-microscope type used
for microbeam analysis. (SP)

Whitney, Mel

210A-210B. Applied Electromagnetic Theory. (3,3)
Three 1-hour lectures per week. Prerequisites: 117A-
117B or Physics 110A-110B. Advanced treatment of
classical electromagnetic theory and its application to
electronics, antennas, and magnetic fields. Maxwell's equations and special theory of
relativity. Methods of analyzing field problems arising from wave
guides, antennas, and wave scatterers. (F,SP)

Jaffe, Charles; Whitney, Mel

215. Power Systems. (3) Three hours of lecture per
week. Prerequisites: 210A or equivalent. Computer-
aided analysis methods for power systems including
planning and operation. Demand forecasting, Reliability evaluation.
Probabilistic production costs calculation. System plan-
nig optimization. Real-time security analysis and control.
Power flows, State estimation, External network mod-
elling, Optimal power flows. Transient stability. (SP)

Wu

216. Microwave Antennas. (3) Three 1-hour lectures
per week. Prerequisites: 210A or consent of instructor.
Application of Maxwell's equations to single antennas and
antenna arrays in the transmission and reception
of radio waves. Classical and numerical methods are
emphasized. (SP)

Mel, Neavuth

217. Microwave and Optical Distributed Networks.
(3) Three 1-hour lectures per week. Prerequisites: 117A-
117B. Relations between field theory and network theory;
analysis of network parameters and concepts of the
analysis and design of microwave and optical wave
guides, resonators, oscillators, amplifiers, couplers, filters,
signal processing, and finite devices. Overview of high
frequency solid-state devices. (SP)

Whitney

(3) Three 1-hour lectures per week. Prerequisites: 104,
Device modeling, formulation of network equations.
Causality, reciprocity, losslessness, passivity, stability,
gain-bandwidth. Algorithms for computing linear, pie-
zosensitive; and nonlinear resistive and dynamic cir-
cuits. Sparse, implicit, and implicit stiffness
formulations and circuit interpretations. Sensitivity
analysis. Nonlinear distortion. (F)

Chua, Kuh

220. Nonlinear Circuits. (3) Three 1-hour lectures
per week. Prerequisites: 104. Algebraic and dynamic n-
ports. Potential and state functions. Volterra series. Fre-
quency-power formulas. Qualitative properties: equilib-
rium states, stability, oscillations, subharmonic, almost-
periodic, and chaotic phenomenon. Frequency entrain-
ment. Harmonic balance, describing function and bif-
urcation. Applications of popov, lyapunov, and
converter mixers, and harmonic generators. (F,SP)

Chua, Kuh

221A. Linear System Theory. (4) Three 1-hour
lectures and two 1-hour recitation per week. Prerequisites:
120; Mathematics 112 recommended. Basic system con-
cepts; state-space and I/O representation. Properties of linear
systems. Controllability, observability, minimality, state
Nyquist test. (F,SP)

Descens, Sastry

221B. Multivariable Feedback Systems. (3) Three
hours of lecture per week. Prerequisites: 221A or equiv-
alent and one undergraduate control course. MIMO
feedback systems. Matrix fraction description. Stabiliza-
tion, tracking, disturbance rejection. Two degrees of
freedom design. Robustness. Large scale interconnected
systems. Linear Quadratic Optimal Control. (SP)

Desoer, Sastry

222. Nonlinear Systems Analysis, Stability and
Control. (3) Three hours of lecture per week.
Prereq-
户ues: 221A (may be taken concurrently). Basic graduate course in non-
linear systems. Numerical solution methods, the describing function
method, linearization. Stability—direct and indirect
methods of Lyapunov. Applications to the Lure problem—
Poppov criterion. Input-Output stability. Additional topics include:
bifurcations of dynamical systems, intro-
duction to the geometric theory of control for nonlinear
systems, passivity concepts and dissipative dynamical systems. (SP)

Sastry

(3) Three 1-hour lectures per week. Prerequisites: 226A.
which studies stochastic methods to take concurrently. Parameter and
(WP)

Messerschmitt, Sastry

224. Digital Control. (3) Three 1-hour lectures
per week. Prerequisites: 128 and 221A. Analysis, synthesis,
and critical study of digital control systems. General
application of both the z-transform and the space-
state approach for discrete systems. Study of various non-
linearities in digital control systems, including quantization
effects. Application of Popov and Lyapunov stability
methods to PPM and PFM feedback systems. Appli-
cation of discrete theory of biocomplex systems. (SP)

Messerschmitt

225. Digital Signal Processing. (3) Three 1-
hour lectures per week. Prerequisites: 119; Statistics 134A
or equivalent, ECE 137, and IR digital filters, decimation
and interpolation. Detailed treatment of one application
area, such as speech, sonar, or image processing. (SP)

Messerschmitt

228A. Random Processes In Systems. (3) Three
Hours of lecture per week. Prerequisites: Statistics 200A or equivalent. Probability, random variables and their con-
straints. Random processes. Wide sense stationary processes, spectal density, Wiener and Kal-

Wu

228B. Applications of Stochastic Process Theory.
(2) Course may be repeated for credit. Two 1-hour
lectures per week. Prerequisites: 228A. Advanced topics in
such as: Martingale theory, stochastic calculus, random
processes, Markov processes and Markov chains: passage times, restrictions, approximations,
control. Queuing models for global networks: quasi-
reversibility, routing, capacity assignment, flow control,
numerical methods. Models of local area networks, opti-
networks, analysis of multiple access strategies. (SP)

Waindorff

229A. Statistical Communication Theory. (3) Three
hours of lecture per week. Prerequisites: 226A. Statistical
formulation of digital and analog communication, de-
tection, and estimation. Decision rules. Gaussian chan-
nel. Radar ranging. Parameter modulation. Rate distortion
theory. (SP)

Waindorff

229B. Information Theory. (3) Three hours of lecture
per week. Prerequisites: Statistics 200A or equivalent.
Fundamental concepts and results in Shannon theory.
Source and channel coding theorems, Error correction
codes. (SP)

Messerschmitt

230. Solid State Electronics. (3) Three 1-hour lectures
per week. Prerequisites: 131; Physics 137B. Crystals
state population. Recombination theory. Carrier transport
theory. Interface properties. Optical processes and
photocells. (F)

Wang

231. Solid-State Devices. (3) Three 1-hour lectures
per week. Prerequisites: 130 or equivalent. Physical
principles and operational characteristics of semicon-
ductor devices. Devices of carrier transport in solids and
at interfaces, high-field and hot carrier effects. Ad-
vanced discussion of bipolar and field-effect transistors
transistor, a hybrid model developed by present and
possible future technologies. (SP)

Muller

233A-233B. Quantum and Optical Electronics.
(3,3) Three 1-hour lectures per week. Prerequisites: 117A,
Physics 137A, or equivalents. The laser principle; analy-
sis of specific laser systems such as gas lasers, semi-
conductor lasers, and other solid-state lasers; laser dy-
namics; noise phenomena, nonlinear optics; guided-
wave optics; selected applications of coherent optics. (F)

Schwarz, Wang, Whitney

237. Quantum Electronics of Solids. (3) Three 1-
hour lectures per week. Prerequisites: 117A and Physics
137A or equivalents. Optical properties of solids; electro-
optic and magneto-optic effects; nonlinear optical effects;
guided-wave optics; semiconductor lasers; recent de-
velopments in integrated optics and fiber optics. (SP)

Wu

238. Superconductive Devices and Circuits. (3)
Three 1-hour lectures per week. Prerequisites: EECS 117A,
131; Physics 137A. Introduction to superconductivity.
Electron pairing. BCS and Ginzburg-Landau theories.
Josephson junctions and Josephson effects. Dyna-
metics of superconductors and Josephson junctions.
Proximity effect. Mixed state in type II superconductors.
Thin films. Applications in analog and digital circuits.
(2-4)

Wen

239A. Partially Ionized Plasmas. (3) Three 1-
hour lectures per week. Prerequisites: 117A or Physics
110A; EECS 117B or Physics 110B recommended. Introduction
to cold and cool plasmas, including collisional processes,
thin dense plasmas, sheathes, plasmas and their
applications. Plasma and ion detectors. Detectors and
beams. Application to plasma-assisted materials proc-
cessing and to fusion first walls. (F)

Birdsal, Lieberman, Lichtenberg

239B. Fully Ionized Plasmas. (3) Three 1-hour
lectures per week. Prerequisites: 117A or Physics 110A;
EECS 117A or Physics 110B. Recommended. Introduction
to hot and warm magnetized plasmas. Single particle motion in electric and magnetic fields. Collective
particle oscillations, waves and instabilities. Magnetohydrodynamic equilibria, stability and transport. Mag-


241. Advanced Digital Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 141 and 142 or 143 and 144 or 145. The key processes for the fabrication of integrated circuits. Optical, X-ray, and e-beam lithography, ion implantation, oxidation and diffusion. Thin film deposition techniques, backetching and ion etching. Effects of phase and defect equilibria on process control. (SP) Neufeld

244. Computer Aided Design of Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 140 or 141. This course will cover a wide variety of topics relating to the development of computer aids for integrated circuit design. The course will emphasize state-of-the-art techniques and both the theoretical basis for the methods as well as the application of results to practical problems, including details of implementation of the methods and computers necessary for implementation of these techniques. The human as an element within instrumentation feedback systems. (F) Budinger

246. Biological Systems. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Nuclear Magnetic Resonance Imaging and blood flow measurement principles. State-of-the-art techniques in medical instrumentation to measure parameters of direct clinical significance, nuclear magnetic resonance, electron spin resonance, vibrational spectroscopy. Application to practical problems and computers necessary for implementation of these techniques. The human as an element within instrumentation feedback systems. (F) Budinger

250A. System Theory. (2) Two 1-hour lectures per week. Recent developments in system theory and related areas. Lectures oriented toward advanced students. (F) Sastri


250C. Advanced Circuit Theory. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture per week. Current research topics in electrical circuits, networks, and systems. Typical subjects include device modeling, computer-aided design circuit, electronics, non-linear networks and systems, stability, sensitivity, non-linear oscillation and non-linear dynamics. (F) Chua, Kuh


290E. Regular and Stochastic Motion in Dynamical Systems. (3) Three 1-hour lectures per week. Prerequisites: An upper division course in classical mechanics or consent of instructor. Integrable and near integrable systems, canonical perturbation theory, Lie transforms, mappings, KAM theory, fixed points and linear stability, transition to global stochasticity, KS entropy, Liouvil conform and diffusion, Arnold diffusion, dissipative systems and strange attractors. (SP) Lichtenberg

290F. Mathematical Methods in Electromagnetic Theory. (3) Three 1-hour lectures per week. Prerequisites: 210A-210B or consent of instructor. Current techniques for solving boundary value problems which arise in electromagnetic theory. (SP) Mei

290G. Solar Cells and Semiconductor Power Devices. (3) Course may be repeated once for credit. Three 1-hour lectures per week. Prerequisites: 130. Topics in solar cells and power semiconductor devices. Device physics; key concepts, production technology. Applications, systems and circuits, economics. (F) Hu

290H. Computer-Aids for IC Design. (3) Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: Recent developments in computer-aided design of integrated circuits. (SP) Sangiovanni-Vincentelli

290I. Advanced Topics in Digital Transmission and Switching. (2) Two 1-hour lectures per week. Prerequisites: 120 or 121 or 145B. Transmission theory as well as 228A or 229A would be helpful but not required. Sampling and reconstruction of waveforms. Time division multiplexing. Asynchronous vs. synchronous digital switching. Basics of computer-aided design and simulation of digital switching systems. Extensive techniques; electrical properties of defects and modification of thin-film properties. (SP) Cheung

290J. Image Processing. (3) Two and one-half hours of lecture per week. Prerequisites: Basic programming skills and 120 or 121 or 145B. Theory and practical application of two and three-dimensional photon emission, transmission, and NMR imaging. Course topics include image manipulation and restoration, noise filtering, Fourier and wavelet transforms, and multiparametric imaging including display methods. Applications include biological, medical and physical sciences. (F) Messerschmitt

290K. Solar Thermal Electric Systems. (3) Three hours lecture and one hour laboratory per week. Prerequisites: Engineering 290J; one of Math 120 or 121 or 145B, or consent of instructor. Synthesis of thermal and electrical systems for solar energy extraction and storage, thermodynamic systems, and heat rejection systems. Cost minimization programs. Hybrid bottoming cycles. Environmental impact. (F) Smith


290M. Advanced Topics in Integrated Circuits for Communications. (2) Two hours of lecture per week. Prerequisites: 142. Analysis and design of monolithic amplifiers, oscillators, and phase-locked loops, with application to communication systems. (F) Meyer

290N. Integrated Circuit Technology Design. (3) One 2-hour lecture and one 3-hour lab per week. Prerequisites: 141C; consent. Current topics of integrated circuit process design and fabrication with emphasis on: (sub micron) lithography and planarization for multi-level metallization. Lectures will cover design rule theory; basic lithography issues; methods of dielectric and metal deposition and planarization; design of visual and electrical test patterns; and in-process monitoring and control. (F) Neureuther

290O. Microsensors and Microactuators. (2) New course. Two 1-hour lectures per week. Prerequisites: EECS 130 and 143, or consent of instructor. Fundamentals, fabrication techniques and constraints, and case studies of microsensors. Systems for surveying, calibrating, and control made by integrated-circuit manufacturing processes and/or including integrated electronic circuits for control, signal conditioning, and output. (SP) Howe, Miller, White

290P. Thin Film Technology for IC Fabrication. (3) Three hours of lecture per week. Prerequisites: 143 or equivalent. Course will focus on preparation and properties of thin-film electronic materials. Topics will include: condensation, nucleation, and growth of thin films; deposition techniques; electrical properties of defects and impurities; semiconductor interfaces; reliability issues and modification of thin-film properties. (SP) Cheung

290Q. Plasma Simulation. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: EECS 142 and 145B, or consent of instructor. Computer simulation using many-particle and fluid models on computers. Introductory topics on oscillations, waves and instabilities; advanced projects on heating and transport processes. Comparison with theory. Comparison with theory. (SP) O. Smith

290R. Control of Computer Communication. (2) Two hours of lecture per week. Prerequisites: EECS 227A and knowledge of Pascal and probability theory or consent of instructor. Analysis and control of computer communication protocols in a telephone switch and for coordinating multi-access communication like ethernet. (SP) Vareja

290S. Topics in Quantum Electronics. (3) Three hours of lecture per week. Prerequisites: 117A, Physics 115 or equivalent. Topics include: interferometry, magnetic spin resonance phenomena. Nuclear and electron spin resonance description, resonance instrumentation, spin echo, optical spin-echo (with lasers), detection of resonance phenomena in noise. Coherent detection, signal averaging, computer processing of periodic signals.

290T. Advanced Topics in Distributed Commmunications. (2) One 2-hour lecture per week. Prerequisites: Approval of instructor. The course will cover issues in communication networks. Distributed computation and resource-sharing systems. Emphasis will be placed on analytical models for performance evaluation of networks, recognition of network congestion, and optimal sharing of competing users. Simulation studies will be introduced where appropriate. The course is directed toward advanced students in communication and control with a strong background in stochastic processes. (F) SPS

290U. Digital Computers in Experimental Systems. (2) Formerly CS 292U in the quarter system. Three hours of lecture per week. Prerequisites: Consent of instructor. A detailed study will be made of one or more experimental systems which intimately involve the use of digital computers. The specific systems will be chosen according to the interests of the class from fields such as biology, physics and psychology. (SP) M. Graham

290V. Adaptive and Identification Systems. (3) Three hours of lecture per week. Prerequisites: Statistics 200A. Adaptive, control, and measurement systems responsive to changes in commands, disturbances, components, and models. Time-varying systems. Identification of unknown systems by use of observation equations, suboptimal control, and instrumental variables. Nonlinear identification by adjustable decision functions. Convergence with noisy and noiseless state variables. (SP) O. Smith

290W. Radio Telescopes. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. A detailed study of the brightness distribution from measurements on the ground. Parabolic, spherical, cruciform and interferometric antennas. Occultation and scintillation measurements.

*Not offered 1988-89
1On leave, spring, fall
2On leave, fall
3Recipient of Distinguished Teaching Award

On leave, spring, fall
1On leave, spring, fall
2On leave, fall
3Recipient of Distinguished Teaching Award
ments. Atmospheric effects and intensity interferometers. (F)

290Z. Advanced Topics in Robotics. (3) New course. Three hours of lecture per week. Prerequisites: Course work in introductory robotics, 221A and Math 112 or equivalent. Special topics related to research and development in the field of robotics. Measures of manipulator workspace conditioning. Kinematic and dynamic issues in the analysis and design of manipulators. Adaptive control of mechanical manipulators. Design and control of articulated mechanical hands. Trajectory planning, generation and control for mobile robots. Off-line programming and graphic simulation of industrial robots. Advanced topics related to research and development.

90A. Introduction to Fortran for Scientific Computation. (1) Students who have taken 7 or 7S may not receive credit for 9A. One hour of programming lab per week. Prerequisites: 8S or equivalent. Self-paced Fortran course for students who already know basic Pascal. Solution of problems drawn mainly from UNIX system program libraries. Solution of problems from an introductory course in computer science. Includes both compiled and interpreted languages; emphasis on problem-solving techniques. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. and other doctoral degrees. (F,SP) Staff

Interdepartmental Studies Courses

Lower Division Courses

IDS 1. Technology and Society. (3) Three 1-hour lectures per week. Role of technology in the solution of social problems. Historical development of modern technology. Examples of current technological systems: communications, data processing, materials, energy generation. Sponsoring departments: Political Science and EECS. (F)

Upper Division Courses

IDS 100. History of American Technology. (4) Four hours of lecture per week. Survey of American technology from colonial times to the present. Analysis of technical innovation with its cultural, economic, and political ramifications. Topics include the Industrial Revolution, technology of war, inflation of science in technology, industrialization and the use of corporations. Sponsoring departments: History and EECS. (SP)

IDS 112. Mammalian Neurophysiology. (3) Two 1-hour lectures, each followed by a 1-hour discussion section per week. Prerequisites: Biology 1A-1B or consent of instructor. Properties of neurons and neural systems in terms of their function in relation to reflex and voluntary behavior. Sponsoring departments: Physics and EECS and Physiology. (SP)

IDS 115. Microcomputer Data Acquisition and Control in the Biology Laboratory. (2) One hour of lecture and one 3-hour lab per week. Prerequisites: Consent of instructor. Introduction to the use of microcomputers for data acquisition, analysis, and control of data in biological systems. Background in engineering and computer systems not required. Programming will be minimal. Sponsoring departments: EECS and Physiology. (SP)

IDS 180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisites: Math 51 or equivalent. Feedback sequences, system responses to exogenous changes, estimation, simulation and prediction. Examples in government, economics, business and biology. Growth dynamics, phase-plane methods, statistical, signals and noise, data, stability, root locus, gradient methods, and computer simulation of large systems. (F)

Graduate Courses

IDS 200A. Cellular Neurobiology. (3) Two 1/2-hour lectures per week. Prerequisites: Chemistry 1B, Mathematics 1B, Physics 6B, and an introductory neurobiology course. Physico-chemical basis of membrane potentials, excitatory and inhibitory neurotransmitters, and propagation, synaptic transmission, sensory receptor function, and volume conductor potentials. Sponsoring departments: Physiology, Biophysics, and EECS. (F,SP)

IDS 200B. Integrative Neurobiology. (3) Two 1/2-hour lectures and one hour of recitation per week. Prerequisites: IDS 111 or Zoology 121. In-depth consideration of current research questions central to the understanding of the organization of nervous systems, and of the behavior mediated by these systems. When appropriate these questions are illustrated with examples drawn from both the vertebrate and invertebrate literature. Circuit, networks, or system analogs and analysis will be emphasized where these approaches lend clarity. Sensory motor integrations of the nervous system of simple organisms to more complex ensembles, including mammalian cortex and cerebellum. Sponsoring departments: Physiology, Zoology, and EECS. (SP)

IDS 201. Research Topics in Neurobiology. (2) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent study in consultation with faculty member. Graduate standing or consent of instructor. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. and other doctoral degrees. (F,SP) Staff

IDS 202. Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour lecture per week. Prerequisites: Consent of instructor. Neurobiology faculty will present recent research topics in seminar form. Emphasis on design and rationale and directions of the work as well as the experimental results. Sponsoring departments: EECS and Zoology. (SP)

IDS 202. Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour lecture per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring departments: Zoology and EECS. (F,SP)

IDS 493. Physiological Instrumentation. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour lecture per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring departments: Zoology and EECS. (F,SP)

IDS 494. Physiological Instrumentation. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three 1/2-hour lectures per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring departments: Zoology and EECS. (F,SP)

IDS 495. Physiological Instrumentation. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three 1/2-hour lectures per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring departments: Zoology and EECS. (F,SP)

Computer Science

Lower Division Courses

A total of at most 5 units of credit toward graduation may be earned for courses numbered 6, 7, 8, or 9. Students may enroll for additional units of courses numbered 9, but these units will be recognized only for the purpose of computing work load units on the study list.

6. Workshop in Introductory Computer Science. (1) Must be taken on a passed/not passed basis. Two hours of lecture and one hour of discussion per week during the first 6 weeks. Prerequisites: Concurrent enrollment in CS60A. Fundamentals of programming, accompanied by numerous short exercises. Intended for students with limited programming experience who need additional preparation for course CS60A. (F,SP)

7S. Self-Paced Introduction to Programming for Scientists and Engineers. (1-3) Prerequisites: Mathemat ics 1A (which may be taken concurrently); 8, 8S, 50. A self-paced version of CS7. Unit 1: Variables and computation; subprograms and parameters; control structures. Unit 2: Vectors and matrices. Unit 3: Project (program over 300 lines in length). (F,SP) Clancy

8. Introduction to Programming. (4) Students who have taken CS7, CS7S, or CS60A/60G will receive no credit for CS8. At most, 5 units may be earned in total for courses numbered less than 10. Two hours of lecture, one hour of discussion per week, and self-paced laboratory. Prerequisites: High school algebra. Introduction to computer programming, using the Pascal language. Variables and computation; subprograms and parameters; control structures; arrays and records. Programming techniques and style issues. Assumed are knowledge and examples are drawn from nonnumerical applications. (SP) Clancy

85. Self-Paced Introduction to Programming. (1-4) Course may be repeated for up to 4 units. Students who have taken CS7, CS7S, or CS60A/60G will receive no credit for CS8S. At most, 5 units may be earned in total for courses numbered less than 10. Prerequisites: High school algebra. The same material as CS8 but in a self-paced format. Units assigned depend on amount of work completed. Computer solution, using the Pascal language, of problems drawn from various fields, with emphasis on nonnumerical applications. (SP) Clancy

9A. Introduction to Fortran for Scientific Computation. (1) Students who have taken 7 or 7S may not receive credit for 9A. One hour of programming lab per week. Prerequisites: 8S or equivalent. Self-paced Fortran course for students who already know basic Pascal. Solution of problems drawn mainly from nonnumerical applications. (SP) Clancy

9B. Pascal for Programmers. (1) Formerly CS 8P. Must be taken on a passed/not passed basis. Students who have taken CS8 or CS8S may not enroll for CS9B. Three hours of discussion and one hour of programming lab per week. Prerequisites: 7 or equivalent. Self-paced Pascal course for students who already know basic Pascal. Solution of problems drawn mainly from nonnumerical applications. (SP) Clancy

9C. C for Programmers. (1) Must be taken on a passed/not passed basis. At most 5 units may be earned in total for courses numbered less than 10. Self-paced, with one to three discussion hours per week. Prerequisites: 8S or equivalent. Self-paced course in the C programming language, or with pointers in a high-level language. Self-paced course in the C programming language. Solution of problems drawn mainly from UNIX system programing applications. (F,SP) Clancy

9D. Lisp and Functional Programming. (1) Students who have taken 60A may not receive credit for 9D; otherwise same credit restrictions as apply to other courses in CS 9 sequence. Self-paced. Prerequisites: CS 8B or equivalent. Introduction to the LISP programming language and the techniques of functional programming. Functions and list structure; recursion; functions as parameters and returned values; higher-order functions; functions as stored values. (F,SP) Clancy

60A. Introduction to Computer Science. (3) Two hours of lecture, one hour of discussion, and four hours of programming lab per week. Prerequisites: Math 1A (may be taken concurrently) and knowledge of basic Pascal programming or CS6 (may be taken concurrently). Fundamentals of computer science. Concepts of computer organization, machine and assembly language, the roles of Linkers, loaders, assemblers, compilers, interpreters. Exercises in problem solving with the Pascal programming language, including style issues. Assumed are simple dynamic data structures. Introduction to recursion, data abstraction. (F,SP) Clancy

60B. Introduction to Computer Science. (3) Students who have taken 55 may not receive credit for 60B. Two hours of lectures, one hour of discussion, and four hours of programming lab per week. Prerequisites: 60A and consent of Instructor. The internal organization and operation of digital computers. Machine architecture support for data types (numbers characters, strings), data structures (arrays, stacks, lists), program structures
182. Operating Systems and System Programming. (4) Three hours of lecture, one hour of discussion and six hours of programming laboratory per week. Prerequisites: 60C. Basic concepts of operating systems and system programming. Understanding of hardware and software interaction. Multi-user environments, multiple-program systems. Processes, interprocess communication and synchronization. Memory allocation, segmentation, paging. Loading and linking, libraries. Resource allocation and file management. File systems, storage devices, I/O systems. Protection, security and privacy. (F,SP) Ousterhout, Katz

183. Computer Architecture and Engineering. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 60C, 150, 170, and 175. Course for computer scientists interested in the design of computer systems. Topics include microprocessors, computer arithmetic, computer organization, memory hierarchies, input/output. (F,SP) Patterson

184. Foundations of Computer Graphics. (4) Three hours of lecture and three hours of programming laboratory per week. Prerequisites: 60C; knowledge of linear algebra and geometry. The principles of computer graphics. A comparison of various display devices. Two-dimensional and three-dimensional transformations such as rotation, scaling, and translation, and their matrix representation. Convex and nonconvex objects, clipping, clipping and path finding. Algorithms for hidden surface removal, antialiasing, lighting algorithms, reflections, and transparency. (F,SP) Barsky, Katz

185. Introduction to Artificial Intelligence. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 60C or 60A and consent of instructor. Basic ideas and techniques underlying the design of intelligent computer systems. Heuristic search, problem solving, game playing, knowledge representation, logical inference, planning, reasoning under uncertainty, expert systems, learning, perception, language understanding. (F,SP) Werringer

186. Language Processing, Prolog and Query Languages. (3) Three hours of lecture per week. Prerequisites: 60C or 188 or consent of instructor. Symbolic semantics of artificial and formal programming languages; Prolog and logic programming; query languages and relational models of data. Question answering, inference, and information analysis. (F,SP) Brody

190. Microcomputer-Based System Design. (4) Two hours of lecture per week. Prerequisites: CS 252. The implementation of machine architectures, considering alternative technologies and performance requirements. Characteristic of microprocessors and their relationship to microprogramming. Case studies include different implementations of the same machine

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*Not offered 1988-89
*On leave, spring
*On leave, fall
*Recipient of Distinguished Teaching Award
287. Computer System Analysis. (3) Three hours of lecture per week. Prerequisites: CS 252 Topics in computer system analysis of specific high-level programming languages for computer systems. The study of inherent complexity of specific computational problems. Algorithmic complexity theory, circuit complexity, and communication complexity. (SP) Ferrai

257. Advanced Computer Architecture. (3) Three hours of lecture per week. Prerequisite: CS 252. The study of computer systems will be covered, including computer system design and implementation. (F) Pait


262. Advanced Topics in Operating Systems. (4) Three hours of lecture per week. Prerequisite: CS 162 and reasonable familiarity with computer architecture. Graduate study of systems operating covering early systems, virtual memory, protection, and memory management. Deadlock, process management, scheduling, input/output, file systems, virtual machines, performance analysis, software engineering, user interfaces, distributed systems, networks, current operating systems and database systems. Term paper or project required. (F,SP) Staff

263. Design of Programming Languages. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: CS 164. Selected topics from: analysis, compilation, and design of programming languages, formal languages and semantical analysis and transformation, programming techniques, structured programming, debugging, verification of programs and compilers, and proofs of correctness. (F) Staff

264. Implementation of Programming Languages. (3) Three hours of lecture and six hours of laboratory per week. Prerequisites: CS 162 and 263 recommended. Compiler construction. Lexical analysis, syntax analysis. Semantic analysis code generation and optimization. Storage management. Run-time organization. (F) Staff

265. Advanced Programming Language Implementation. (3) Three hours of lecture per week. Prerequisite: CS 264. Table-driven and reentrant code generators. Register Management. Flow analysis and global optimization methods. Code optimization for higher level languages and architectures. Local code improvement. Optimization by program transformation. (SP) S. Graham


267. Computer System Analysis. (2) Course may be repeated for credit with permission of instructor. Two hours of lecture per week. Prerequisites: CS 266. Analysis of computer system operation: processor scheduling, virtual memory management, secondary storage device modeling, models of program behavior. Use of analytic modeling techniques. Queuing theory. Statistical data analysis as applied to computer systems. Discrete event simulation techniques. A term project or paper will be required. (SP) Staff

277. Concrete Complexity. (2) Two hours of lecture per week. Prerequisites: CS 170 and Math 1134. The study of inherent complexity of specific computational problems. Algorithmic complexity theory, circuit complexity, and communication complexity. (SP) Staff

278. Machine-Based Complexity Theory. (3) Three hours of lecture per week. Prerequisite: Math 105. Properties of multitape Turing machines, nondeterministic time and space complexity classes, and their relation to the PSPACE class. (SP) Staff

279. System Support for Scientific Computation. (3) Formerly 281. Three hours of lecture per week. Prerequisites: CS 162 and 608. Trace the consequences of design decisions made by "architects" of hardware, languages, and operating systems upon those who use the computer for large-scale numerical computations in business, engineering, and science. (F)

280. Computer Vision. (3) Formerly 292X. Three hours of lecture per week. Prerequisites: CS 180 and consent of instructor. Learning from the point of view of artificial intelligence with contributions from philosophy and psychology. Readings and discussion will cover concept learning, compounding and intelligent caching, database-based generalization, reasoning by analogy, inductive learning, architectures for general learning systems, knowledge-level analysis of learning systems. A substantial project will be undertaken. (F) Russell

281. Machine Learning. (3) Formerly 292M. Three hours of lecture per week. Prerequisites: CS 180 or consent of instructor. Learning from the point of view of artificial intelligence with contributions from philosophy and psychology. Readings and discussion will cover concept learning, compounding and intelligent caching, database-based generalization, reasoning by analogy, inductive learning, architectures for general learning systems, knowledge-level analysis of learning systems. A substantial project will be undertaken. (F) Russell

282. Algebraic Algorithms. (2) Two hours of lecture per week. Prerequisite: CS 170. Advanced algorithms and construction of algebraic algorithms. Polynomial arithmetic, GCD, factorization, integration of elementary functions, analysis approximation, simplification, design of computer systems, and languages for symbolic manipulation. (F) Felenath

283. Programming Technology for Artificial Intelligence and Symbol Manipulation. (3) Three hours lecture per week. Prerequisites: CS 164. Advanced programming techniques for artificial intelligence, expert systems, knowledge representation, deduction, symbol based representation, search algorithms, general problem solving, and parallel processing. (F) Staff

284. Computer-Aided Geometric Design and Modeling. (3) Three hours of lectures per week. Prerequisites: Mathematical skill in calculus and linear algebra. Mathematical techniques for curve and surface representation, approximation, and fitting. Hermite interpolation, tensor product splines, Bezier curves and surfaces, B-splines, Beta-splines, Coons patches, tensor product forms, as well as subdivision and bounding conditions, and computer-aided geometric design. (SP) Barey

285. Procedural Generation of Geometric Objects. (3) Formerly CS 292A. Three hours of lecture per week. Prerequisite: CS 184 or equivalent. Object descriptions for geometric modeling, computer graphics, and robotics. Generation of geometric shapes, mathematical parts, and shapes by programs. Generalized cutting and translational sweep surfaces. Planar solids and lattices in 3 and 4 dimensions. Other advanced topics and recent developments in the field. (SP) Sequin

286. Implementation of Database Systems. (3) Three hours of lecture per week. Prerequisites: CS 162 and 168. Implementation of database systems on modern hardware systems. Considerations concerning operating
**Endocrinology / 179**

**Endocrinology**

(College of Letters and Science)

Group Office: 5094 Life Sciences Building, 642-2840
Chair: Howard A. Bern, Ph.D.

Professors:

- James M. Allison, Ph.D.
- Howard A. Bern, Ph.D.
- Roy L. Caldwell, Ph.D.
- Marian O. Diamond, Ph.D.
- Joseph A. LaMont, Ph.D.
- Stephen E. Gliokman, Ph.D.
- James W. Fristrom, Ph.D.
- Joseph E. Glomset, Ph.D.
- Russell L. Jones, Ph.D.
- Janet C. King, Ph.D.
- Werner Loher, Ph.D.
- Yifat Avivi, Ph.D.
- Satyabarta Nandi, Ph.D.
- Charles S. Nicol, Ph.D.
- Kenneth Pellem, Ph.D.
- Rudolph L. Pipa, Ph.D.
- Donald L. Rider, Ph.D.
- Herbert H. Srebnik, Ph.D.
- Paola S. Timiras, M.D., Ph.D.
- David L. Wood, Ph.D.
- Irving L. Zucker, Ph.D.
- Frank A. Beach, Ph.D. (Emeritus)
- E. L. Steiner, Ph.D. (Emeritus)

Associate Professor:

Gertrude O. Buehring, Ph.D.

**Graduate Program**

The program leading to the M.A. and Ph.D. in Endocrinology is administered by an interdisciplinary group of faculty from the four northern campuses of the University of California (Berkeley, Davis, San Francisco, and Santa Cruz), currently comprising 122 members. The group's interests are diverse and represent endocrinology in the broadest sense: Chemical- and integrative approaches to the living world (autocrine, paracrine, endocrine, and ectohormonal factors), and its members

- On leave, spring
- Recalled to active service
- *Recipient of Distinguished Teaching Award*
represent the full extent of the field from molecular and cellular endocrinology through organismal and comparative endocrinology to chemical ecology.

Students who plan to work for higher degrees in endocrinology at Berkeley will be guided by a graduate adviser and by the professor who directs their research. The graduate adviser and this major professor will ascertain whether students have met the minimum requirements, will recommend to prospective candidates what additional courses to take, will collaborate with them the fields to be covered in the qualifying examinations, and will act generally in an advisory capacity. The candidates are expected to have completed an undergraduate major in some area of animal biology leading to the B.A. or B.S. degree.

To advance to candidacy for the Ph.D., students must complete all requirements (information can be obtained from the graduate advisers or at the office given above), including satisfaction of the foreign language requirement and passage of an oral qualifying examination.

Group members on other campuses may serve on qualifying examination and/or thesis committees, should the needs and interests of the candidate so indicate.

Energy and Resources Group (Special Studies)

(Interdisciplinary Advisory Program and Graduate Group)

Department Office: Stigl T-4 Room 100, 642-1640
Chair: Robert F. Sawyer, Ph.D.

Professors:

John P. Holdren, Ph.D. (Chair) Stanford University
Mark N. Christensen, Ph.D. University of California, Berkeley
John Letcher, Ph.D. (Government)
Todd LaPorte, Ph.D. (Poltical Science)
Alexander J. Home, Ph.D. (Civil Engineering)
Ernest Koenigsberg, Ph.D. (Business Administration)
Allan Lichtenberg, Ph.D. (Chemical Engineering and Computer Science)
Richard Speer, Ph.D. (Biomedical and Environmental Health Sciences)
K.S. Spiegler, Ph.D. (Emeritus) (Mechanical Engineering)
Hillig O'Connell, Ph.D. (Geography)
Richard C. Strichman, Ph.D. (Zoology)
David Teixe, Ph.D. (Business Administration)
Chang-Lin Tien, Ph.D. (Chemical Engineering)
Robert H. Twiss, Ph.D. (Landscape Architecture)
Sim Van der Ryn, B.Arch. (Architecture)
Clyde Wahrmann, Ph.D. (Emeritus) (Geology and Geophysics)
Melvin M. Webber, M.C.P. (City and Regional Planning)

Associate Professors:

Edward Arens, Ph.D. (Architecture)
Clyde Carr, Ph.D. (Conservation and Resource Studies)
John Daily, Ph.D. (Mechanical Engineering)
Mary K. Freidson, Ph.D. (Plant and Soil Biology)
Omer Granger, Ph.D. (Geography)
Michael Hanesmann, Ph.D. (Agricultural and Resource Economics)
Robert G. Heins, Ph.D. (Business Administration)
Marshall Merritt, Ph.D. (Environmental Science and Mineing)
Jeffrey Romm, Ph.D. (Forestry)
Artifl Ronell, Ph.D. (Comparative Literature)
Kenneth Train, Ph.D. (Voting) (Economics)
Michael Witts, Ph.D. (Geography)
John Zimyam, Ph.D. (Political Science)

Assistant Professors:

Catherine Koseba, Ph.D. (Biomedical and Environmental Health Sciences)
Gail Schilling, Ph.D. (Architecture)

Lecturers:

William Ahern, Ph.D. (Graduate School of Public Policy)
J. Daniel Kuzmoczo, Ph.D. (Economics)
E. Phillips Levitan, Ph.D. (Conservation and Resource Studies)
Daniel Luten, Ph.D. (Emeritus, Geography)
Doris Sloan, Ph.D. (Environmental Sciences)

Research Assistants:

Sammel Berman, Ph.D. (Lawrence Berkeley Laboratory)
Carl Blumenstain, Ph.D. (Energy and Resources Group)
F. Harris Brown, Ph.D. (Lawrence Livermore National Laboratory)
Graff Borin, Ph.D. (Department of Nutrition, School of Public Health)
Ted K. Bredan, Ph.D. (Institute of Governmental Studies)
Nancy Brown, Ph.D. (Lawrence Berkeley Laboratory)
Robert J. Budlitz, Ph.D. (Future Resources Associates)
T. Kenneth Foose, Ph.D. (Lawrence Livermore Laboratory)
Wayne M. Gehl, Ph.D. (Agricultural Experiment Station)
Charles Hartman, Ph.D. (Lawrence Livermore National Laboratory)
Mary Hunt, Ph.D. (Marine Sciences Group, Paleontology)
Michael Lederer, Ph.D. (University of Washington, Resource Group)
Gregory Morris, Ph.D. (Future Resources Associates)
Anthony V. Nemer, Ph.D. (Lawrence Berkeley Laboratory)
Margaret S. Race, Ph.D. (Office of the President)
Michael Rotherman, Ph.D. (Lawrence Livermore Laboratory)
Lee Schipper, Ph.D. (Lawrence Berkeley Laboratory)
Douglas A. Segar, Ph.D. (San Francisco-Delta Aquatic Habitat Institute)
Jerome Weinberg, Ph.D. (Poyline, Inc., and Lawrence Berkeley Laboratory)

The Energy and Resources Group (ERG) is an interdisciplinary academic unit conducting graduate teaching and research that treat a wide range of energy and resource issues as the intersection of technological, environmental, and socio-political components. Established in mid-1973, ERG offers two-year M.A. and M.S. degrees in Energy and Resources, as well as the Ph.D.

Faculty. The faculty of ERG consists of five professors of Energy and Resources plus some 70 other affiliated faculty members who make appointments span all five colleges and four of the six schools of the Berkeley campus, as well as the University's Lawrence Berkeley and Lawrence Livermore laboratories, and is drawn from a rotating basis from the affiliated faculty.

Students. There are approximately 40 graduate students enrolled in ERG degree programs, about a third of them doctoral candidates. The students come from a wide variety of backgrounds—engineering, natural sciences, social sciences, and humanities. The characteristics they have in common are an interest in interdisciplinary approaches to energy and resource issues and the intellectual credentials to survive a highly competitive admissions process (there are typically 10 applicants for each opening). All receive training at ERG in interdisciplinary perspectives: economics, resources, political economy, and environmental science. Established in mid-1973, ERG offers two-year M.A. and M.S. degrees in Energy and Resource Issues, as well as the Ph.D. program with a master's degree in a related field from another institution are required to pass ERG's preliminary examination before proceeding with the Ph.D. program. Continuing students may be recommended for admission to the Ph.D. program upon completion of their master's work.

Further Information. Contact the Energy and Resources Group, Bldg. T-4 Room 100, University of California at Berkeley, Berkeley, CA 94720; (415) 642-1640.

Upper Division Courses

100. Energy and Society. (4) Three 1/2-hour lectures and one 1-hour discussion per week. Energy sources, uses, and impacts; an introduction to the technology, politics, economics, and environmental components of contemporary society. Energy and well-being; energy in international perspective, origins, and character of energy crisis. (F) Holdren, Christensen

102. Quantitative Aspects of Global Environmental Problems. (4) Three hours lecture and one hour discussion per week. Pre-requisites: Physics 7B or 7C and Math 1B or 2B and Chemistry 1A, or their equivalents. Transport and fate of persistent pollutants, impact of human activities on climate, acid precipitation and other interventions in biogeochemical cycles, environmental consequences of nuclear war. (SP) Holdren, Harting

140. Efficient End Use of Energy. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Physics 7A/7B/7C; upper division standing. First course to introduce second laws of thermodynamics; efficiencies of a variety of tasks. Cascading of energy flows, matching of loads and sources, and thermal storage. Concepts will be applied to space heating and cooling, transportation, industrial processes. (F) Christensen

141. Residential Energy Conservation. (3) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisites: Upper division standing. Engineering, economic, and policy aspects of residential energy conservation. Meeting head-on the challenge of efficient design, life cycle costing and economic analysis of conservation potentials in appliances, house-doctoring, and national and local energy conservation policies. (F) Meller

151. Politics of Energy and Environmental Policy. (4) Two 1/2-hour lectures and one 1-hour discussion per week. Prerequisites: Upper division or graduate standing;
some course work in social science and technical areas. How existing agencies and policy makers incorporate new concerns into their deliberations, and how agencies given the mandate to address the newer concerns seek to fold their priorities into the existing institutional and policy structures. (F,SP) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Prerequisites: Enrollment limited to 15 students; regulations listed on pages 61 and 62 of this catalog. Individual conferences. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Prerequisites: Enrollment limited to 15 students; regulations listed on pages 61 and 62 of this catalog. Individual conferences. (F,SP) Staff

Graduate Courses

200. Interdisciplinary Energy Analysis. (4) Two 2-hour lectures per week. Prerequisites: 100, or equivalent and consent of instructor, and graduate standing. Graduate-level treatment of the interacting technological, economic, environmental, and sociopolitical aspects of energy from the perspectives of regional, national, and international issues. Emphasizes systematic assessment of alternative strategies and options from an interdisciplinary viewpoint. (F) Staff

202. Modeling Ecological and Meteorological Phenomena. (3) May be taken on a satisfied/satisfactory basis. Two 1-hour lectures per week. Prerequisites: Environmental Studies 102 or consent of instructor. Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic stress on natural systems. (F) Staff

241. Current Energy Problems in Historical Perspective. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. The political and social implications of energy policies. (F) Staff

245. The Political Economy of Energy. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Some familiarity with current issues in energy policy and at least a broad general understanding of recent political, economic, and technological developments in the energy sector; emphasis on the actual and potential role of governments, state and federal. Emphasis on possible energy policies and regulations that may affect the lives of citizens. (SP) Staff

260. Critical Issues in Energy Technology. (4) Two 2-hour lectures per week. Prerequisites: Engineering 100 or equivalent. Quantitative examination of selected issues in energy technology combining analytical approaches and inputs from several disciplines. Issues selected for relevance to current policy formation. (SP) Staff

280. Energy Economics. (3) Two 1-hour lectures per week. Prerequisites: Economics 100A or equivalent; basic calculus or linear algebra. Input-output analysis; cost-benefit analysis; methods to evaluate energy; economic growth and energy; energy and economic growth; economic growth and energy; economics of energy; factors of energy supply; energy use; trade-offs in energy conservation; the effect of energy policy on supply and demand; energy consumption and resource supply and use. (SP) Staff

281. Issues in Public Utility Planning and Regulation. (3) Two 1-hour lectures per week. Introduction to current planning and regulatory issues in the public sector. Traditional methods of economic evaluation and ratemaking procedures used by regulatory agencies will be covered. Interaction of planning methods and regulatory alternatives will be explored through selected case studies. Alternate years. (F) Staff

290. Group Seminar. (1-3) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: Consent of instructor. Energy supply at the community scale through development of locally available renewable energy resources (solar, wind, biomass). Architecture; site planning and urban development; review of conservation and supply technologies. For students in design, planning, energy, public policy, and related fields. Term project. Sponsoring departments: Architecture, Landscape Architecture, and Energy and Resources Group. (F,SP) Staff

292A. Analytical Methods in Energy and Resources. (2) Grading on a satisfactory/unsatisfactory basis. One 2-hour lecture per week. Prerequisites: Open to ERG graduate students only. Quantitative methods for energy and resource analysis. Topics include linear algebra, differential equations, statistical methods, chemical equilibrium theory, and thermodynamics. (F) Staff

292B. Interdisciplinary Problem Solving as a Profession. (3) Must be taken on a satisfied/satisfactory basis. One 2-hour lecture per week. Prerequisites: Open to ERG graduate students only. An introduction to a profession in interdisciplinary research, including such topics as organizing time and information, selecting and defining research topics, conducting research, writing skills, oral presentations, getting published, getting funded, finding employment. (SP) Staff

292C-292D. Master's Project Seminar. (2;2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Lectures, reports, and discussion on current research in energy and resource sections. Course content depends on the need of students to plan and conduct research in the core curriculum. Sequence beginning fall each year. Credit and grade to be awarded on completion of the full sequence. (F,SP) Staff

295. Special Topics in Energy and Resources. (1) Formerly 295B. Must be taken on a satisfied/satisfactory basis. One 1-hour lecture per week. Prerequisites: Consent of instructor. Lectures, reports, and discussion on current research in energy and resource sections. Courses are operated independently and under direction of faculty. (F,SP) Staff

296. Individual Research in Energy and Resources. (1-8) Course may be repeated for credit. Variable. Prerequisites: Graduate standing. Investigation of problems in energy and resources from an interdisciplinary perspective. (SP) Staff

301. Graduate Student Instructor Practicum. (3) Course may be repeated for credit. Must be taken on a satisfied/satisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Lectures, reports, and discussion on current research in energy and resource sections. Courses are operated independently and under direction of faculty. (F,SP) Staff

360. Energy Economics. (3) Two 1-hour lectures per week. Prerequisites: Economics 100A or equivalent; political science and quantitative methods. Application of techniques; style issues. Applications and examples are drawn from environmental and social issues. Rebonding, numerical integration, simulation, matrix manipulation. Students will write computer programs over 300 lines in length. (F,SP) Staff

28. Graphic Communication in Engineering. (3) Two hours of lecture and three hours of laboratory per week. The fundamentals of orthographic projection and descriptive geometry, with applications. Engineering sketching and computer-aided design. Emphasis on computer software. Graphical analysis, empirical equations, the documentation and presentation of engineering information. The engineering report. Sponsoring department: Mechanical Engineering. (F,SP) Staff

36. Engineering Mechanics I. (2) Two hours of lecture and one 1-hour laboratory per week. Prerequisites: Physics 7A, Mathematics 1A or equivalent. Physics 7A. A vectorial treatment of the principles of statics of particles and rigid bodies. Application to problems of equilibrium of two-dimensional and three-dimensional systems. Work and potential energy. The principle of virtual work, stability of equilibrium. Sponsoring department: Civil Engineering. (F,SP) Staff

44. Introduction to Mineral Engineering. (2) One 2-hour lecture per week. Prerequisites: Physics 7A, Chemistry 1A, Mathematics 1A or equivalent. Products and properties of minerals in the modern world and the role of mineral engineering. Availability and strategic importance of mineral resources. Existing and proposed methods of exploration for such resources; their mining and milling, and industrial processing for conversion into engineering materials and energy. Environmental and political concerns. Sponsoring department: Materials Science and Mineral Engineering. (F) Staff

45. Properties of Materials. (3) Two 1-hour lectures per week plus one 3-hour laboratory on alternate weeks. Prerequisites: Physics 7A. Application of basic principles of physics and chemistry to the engineering properties of materials. Special emphasis devoted to relation between microstructure and the mechanical properties of metals, concrete, polymers, and ceramics, and the electrical properties of semiconductor materials. Sponsoring department: Materials Science and Mineral Engineering. (F,SP) Staff

47. Supplementary Work in Lower Division Engineering Courses. (1-3) Course may be repeated for credit. Prerequisites: Limited to students who must make up a fraction of a required lower division course. Course content may be taken only with permission of the Dean of the College of Engineering. Students who are taking a lower division engineering course may complete the work under this heading. (F,SP) Staff

48. Nonrenewable Energy Resources. (2) Two hours of lecture per week. Prerequisites: Mathematics 1A; Physics 5A (7A). The technology of non-renewable energy resources is discussed from the environmental and management points of view. Topics include ecology of fossil fuels, energy reserves, gas and oil production methods, tar sands oil recovery, oil
102. Introduction to Operations Research. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 18. Not open to students receiving credit for or enrolled in Operations Research. Introduction to the methods and techniques of operations research as they pertain to engineering system problems. Linear and dynamic programming. Queues and inventory models. Examples will be drawn from various engineering disciplines to illustrate the techniques, models, and optimization of engineering systems. Sponsoring department: Industrial Engineering and Operations Research. (SP) 117. Methods of Engineering Analysis. (3) Three hours of lecture per week. Prerequisites: Mathematics 30B; Computer Science 7. Application of digital computer solutions to engineering problems. Solution, by compiler languages, of linear algebraic equations, nonlinear equations, and differential and integral equations. Analysis. Sponsoring department: Mechanical Engineering. (F) 118. Introduction to Scientific Computing. (3) Three hours of lecture per week. Prerequisites: Mathematics 30B; Computer Science 7. Application of digital computer solutions to engineering problems. Solution, by compiler languages, of linear algebraic equations, nonlinear equations, and differential and integral equations. Analysis. Sponsoring department: Mechanical Engineering. (SP) 120. Principles of Engineering Economics. (3) Students who have taken CE 167 may not receive credit for 120. Two hours of lecture and one hour of discussion per week. Prerequisites: Completion of 60 units of an approved engineering curriculum. Economic analysis for engineering decision making: Capital flows, effect of time and interest rate. Different methods of evaluation of alternatives. Minimum-cost life and replacement analysis. Depreciation and taxes. Use of a brief decision making under risk; decision analysis. Capital sources and their effects. Economic studies. Sponsoring department: Industrial Engineering and Operations Research. (F,SP) 135. Applied Geophysics. (2) Two hours of lecture per week, plus two afternoon and one weekend field trips. Prerequisites: Geology 50, Math 50A-528, Physics 7C. Geophysical methods applied to petroleum and mineral exploration, geological engineering, geological mapping, and groundwater hydrology. Seismic reflection and refraction, seismic, gravity, and magnetic surveying techniques. Approximately three weeks and one field exercise will be devoted to each method. (F) 147. Supplementary Work in Upper Division Engineering. (1-3) Course may be repeated for credit. Prerequisite: Must enroll the 1st activity every time you attend class; up to a fraction of a required upper division course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in an upper division course may complete the partial under this heading. (F,SP) 150. Environmental Engineering: Air Pollution. (3) Three hours of lecture per week. Prerequisites: Chemistry 18B; Mathematics 50B; Physics 5A (7A). An introduction to the technology of air pollution dealing with air pollutants, effects, control, combustion processes, control technology and abatement. Sponsoring department: Civil Engineering (SP) Koehlheim, Sawyer 151. Toxic and Hazardous Waste Management. (3) May be taken on a passed/not passed basis. Students who have completed CE217 will receive no credit for 151. Three 1-hour lectures per week. Prerequisites: Math 1A, 1B, Chem 1A. Quantitative analysis of waste generation, treatment and disposal alternatives, and environmental transport on the land as well as in the water and the atmosphere. Also included will be properties that make a waste hazardous, a brief history of toxicology, and some background on current federal and state legislation. Sponsoring departments: Civil Engineering and Mechanical Engineering. 153. Introduction to Bioengineering. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Chemistry 1B, Physics 5C; Mathematics 50A; junior standing. Introduction to applications of bioengineering. Biomechanics, physiological fluid mechanics, biomaterials, bio heat transfer, physiological mass transport, biological network modeling, physiological control systems. Sponsoring department: Mechanical Engineering (SP) Berger 159. Thermodynamics (3) Three hours of lecture per week. Prerequisites: Mathematics 50B; Physics 7C. Sources, conversion, transmission and requirements for energy in human society, concentrating on electric power and heat. Energy transfer, sources of energy, nuclear fission and fusion and hydroelectric power generation. Geothermal tidal and solar power. Direct energy conversion. Ecological and social problems. Sponsoring department: Mechanical Engineering and Computer Sciences and Nuclear Engineering. (F) Grossman, Lieberman 161. Solar Energy. (3) Three hours of lecture per week. Prerequisites: Physics 7B or 85. Survey of solar energy: solar engineering, collection, design, water heating pools, space conditioning, solar ponds, photo thermal and photovoltaic electricity generation. Photothermal approaches and biomass, institutional, and economic aspects. Sponsoring department: Materials Science and Mineral Engineering. (F) Merriman 162. Renewable Resources for Electric Power. (3) Three hours of lecture per week. Prerequisites: Physics 7B or 85 or Engineering 48. 160, or 161. Wind, waves, tides, hydro, geothermal, solar and conservation technologies for expanding electric power supply. Characteristics of the electric power industry. Economics technologies, environmental aspects. Existing, historical, and proposed projects. (F) Sponsoring department: Materials Science and Mineral Engineering. (SP) Merriman 163. Introduction to Bioengineering. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: English 1A or equivalent course; upper division standing. Principles of technical communication: analyzing one's audience, organizing material; developing a clear, economical style; using proper formats and rhetorical strategies for technical reports, feasibility studies, abstracts, descriptions and instructions, proposals, letters, and memos. Practice in oral presentations to technical and nontechnical audiences. (F,SP) Spretnak 191A. Social Implications of Technology. (1) Must be taken on a passed/not passed basis. One hour of lecture or discussion per week. Developments in technology have a profound, often unanticipated influence on society. As participants in these developments, engineers have a special interest in and responsibility for understanding, analyzing and foreseeing the social implications of each significant technological development. This class will discuss ethical issues faced by engineers in industry and academia, concern with public interest in specific technologies, and the transfer of technology to developing countries. (F,SP) Graeber 193. California Engineer Staff. (1) Course may be repeated once for credit. Must be taken on a passed/not passed basis. One 3-hour laboratory per week. Work on the California Engineer Magazine, in one or more of the following capacities: read candidate articles, select articles, proof read copy, produce copy, produce layout, produce facsimile of Magazine, type copy, write articles, enter articles into UNX computer system. Topics which form the basis of seminars will be announced at the beginning of each semester. (F,SP) 298A. Group Studies or Seminars. (1-6) Course may be repeated for credit. Varies. Advanced group studies or seminars in subjects which are interdisciplinary in the various fields of engineering or other sciences associated with engineering problems. Topics which form the basis of seminars will be announced at the beginning of each semester. (F,SP) 298B. Group Studies or Seminars. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Variable. Advanced group studies or seminars in subjects which are interdisciplinary in the various fields of engineering or other sciences associated with engineering problems. Topics which form the basis of seminars will be announced at the beginning of each semester. (F,SP) Interdepartmental Studies Course IDS191. Social Implications of Technology. (1) New course. Must be taken on a passed/not passed basis. One hour of lecture or discussion per week. Developments in technology have a profound, often unanticipated influence on society. As participants in these developments, engineers have a special interest in and responsibility for understanding, analyzing and foreseeing the social implications of technology. This course will discuss ethical issues faced by engineers in industry and academia, concerns with public interest in specific technologies and the transfer of technology to developing countries. (F,SP)
Engineering—Double Major Programs
(Showe of Engineering)

Double Major Programs of Study. The Double Major Program is designed for students who wish to obtain degrees in two areas of engineering in order to qualify for employment in either field or for positions in which competence in two fields is required. These curricula include the core courses in each of the major fields. While they may require slightly increased course loads, they can be completed in four years. Both majors are shown on the student's transcript of record. For complete information about programs of study under the double major, see the Announcement of the College of Engineering.

Students may prepare for a bachelor's degree combining study in the following areas:

Electrical Engineering and Computer Sciences
- Materials Science and Engineering
- Mechanical Engineering
- Materials Science and Engineering
- Nuclear Engineering
- Electrical Engineering
- Computer Sciences
- Nuclear Engineering
- Mechanical Engineering

In addition to the double major programs within the College of Engineering listed above, two double major curricula involving the College of Engineering and the College of Chemistry are offered. These are:

1. Materials Science and Engineering/Chemical Engineering
2. Nuclear Engineering/Chemical Engineering

Details on these curricula can be found in the Announcements of the College of Engineering and College of Chemistry.

Environmental Engineering. The College of Engineering offers a series of courses in environmental engineering aimed at senior engineering students and to qualified students in other fields. These courses are listed under "Engineering" and are sponsored by individual departments or groups of departments as indicated. The courses are intended to provide a sound introduction to the identification of energy and environmentally related problems. Energy-related topics include nuclear fusion and fission and hydropower power generation; geothermal energy and solar power; and direct energy conversion. Environmentally related topics include air pollution, water pollution, solid waste disposal, and toxic and radioactive waste management.

Engineering—Interdisciplinary Studies
(College of Engineering)

The Interdisciplinary Studies Center helps students develop skills that go beyond their departmental preparation in a field of engineering. At the undergraduate level the course offers the interdepartmental course, Engineering 190, Technical Communication, and Interdisciplinary Studies 140, Technical Communication for Non-native Speakers of English. The center supports such college-wide offerings as Engineering 151, Toxic and Hazardous Waste Management, Engineering 160, Energy and Power, and the Engineering Science Program. The center supports the technical communication component of departmental courses in the college and the social sciences and humanities electives through the Kennedy Award Program. The Kennedy Award is designed to encourage engineering students to select a theme for their studies outside the college and to take a coherent approach to their course selection in the liberal arts. The center also coordinates the course, Interdisciplinary Studies 110/110L, Introduction to Computers, which is offered to students outside the college.

At the graduate level the center supports the activities of several interdepartmental committees and an intercampus graduate group. The interdepartmental committees are:

Bioengineering, Ocean Engineering, Plasmas, Hazardous Waste Management, Robotics and Manufacturing, Integrated Sensors, Nonlinear Systems and Dynamics, and Rock Mechanics. These committees provide a wide range of interdepartmental activities, including special course offerings, group studies and seminars, and public lectures and conferences. The center publishes occasional reports of its activities.

The intercampus graduate group administers a joint program between the San Francisco and Berkeley campuses leading to the M.S. and Ph.D. in Bioengineering. For information about the Graduate Group in Bioengineering, see the Bioengineering section of this catalog.

Prospective graduate students wishing to participate in such programs should apply for admission to one of the departments of the College or to the Graduate Group in Bioengineering. Applicants may designate an interdepartmental committee with which they wish to be associated so that a departmental program of study that addresses their interests can be developed.

Additional information about the Center may be obtained by writing the Meakins Interdisciplinary Studies Center, 230 Bectal Engineering Center, College of Engineering, University of California at Berkeley, Berkeley, CA 94720.

Upper Division Courses

110. Introduction to Computers. (3) Students who have completed courses in Computer Science 7, 8, or 50 series will receive no credit for 110. Three hours of lecture per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110L (with the same grading option) as the equivalent departmental course. (Upper Division Standing) Primarily for students in the social sciences and humanities and in the professional schools rather than Engineering. The conceptual foundations of computing and information technology. Structure and function of computing systems, elements of programming. Applications programs. Examples are drawn mainly from word processing, database management, electronic spreadsheets, graphics, and telecommunications. Sponsoring departments: Engineering, Education, and Computer Science. (F,SP)

110L. Introductory Computer Laboratory. (1) Two 2-hour laboratories per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110L with the same grading option. Primarily for students in the social sciences and humanities and in the professional schools other than Engineering. Elements of programming. Applications programs. Laboratory exercises are drawn mainly from word processing, database management, electronic spreadsheets, graphics and simulation, and telecommunications. Sponsoring departments: Engineering, Education, and Computer Science. (F,SP)

140. Technical Communication for Non-native Speakers of English. (3) Two 1½-hour lectures per week. Prerequisites: English 1A, or equivalent course; upper division or graduate standing. Emphasis on improving language skills and use of the rhetorical conventions of technical writing (see course description for Enginering 190). Also, some work with oral presentations. This course is designed to prepare non-native speakers for the more advanced work in Engineering 190. Sponsoring departments: Subject A and the College of Engineering. (F,SP)

Staff

190. Technical Communication. (3) Three hours of lecture per week. Prerequisites: English 1A or equivalent course; upper division standing. Principles of technical communication: analyzing one's audience; organizing material; developing paragraphs; using proper formats and rhetorical strategies for formal technical reports, feasibility studies, abstracts, descriptions and instructions, proposals, letters, and memos. Practice in oral presentations to technical and nontechnical audiences. (F,SP)

295. Management of Innovation and Policy. (3) New course. Two 1½-hour lectures per week. Prerequisites: Graduate standing in Business and Engineering. This course is designed to introduce students to the innovation process and its management. It draws on a variety of disciplines and attempts to integrate them in a fashion which will generate key insights into how technology can be developed and managed. Sponsoring departments: Engineering and Business Administration. (SP)

Tice

Engineering Science
(College of Engineering)

The student in engineering science is in one of several areas where engineering closely interacts with the natural sciences, mathematics, physics, or medicine. Students in this program may choose to prepare for graduate study in engineering fields, the natural sciences, or medicine.

Programs for the Bachelor's Degree

The undergraduate Engineering Science curriculum is multidisciplinary and is administered by the Engineering Science Committee. Continued enrollment and admission to upper division standing in the engineering science program require a minimum grade-point average of 3.0. All engineering science programs must include a total of 18 units of humanities and social studies of which at least three units must be in English and 6 units must be in upper division, a minimum of two courses, at least one of which is in upper division, must be taken from a single department.

Lower Division. Required: (for all upper division programs in engineering science) Mathematics 1A-1B, 5A-5B, Chemistry 1A-1B; Computer Science 60A, or Engineering 7; Physics 1A-1B, 5A-5B, 7A-7B, 8A-8B; Electrical Engineering and Computer Science 40 and Engineering 45 for those in Bioengineering; English 1A or Rhetoric 1A or Comparative Literature 1A; Technical electives, eight units which must include Biological Chemistry 1B-1A for those in Bioengineering, Geology 100 for those in engineering geoscience. Transfer students admitted to Engineering Mathematics and Statistics, or Engineering Physics may substitute divisional electives approved by an adviser.

Upper Division. All Engineering Science programs must include at least 40 units of approved technical subjects, (mathematics, statistics, science, engineering), of which at least 16 units are upper division engineering courses (required upper division courses may be included).

Particular requirements of the various options in the engineering science program are described below. The Announcement of the College of Engineering should be consulted for full details.

Bioengineering. Required: Chemistry 112A or 8A; Biophysics 123; Engineering 153; and selected courses chosen from approved lists. Engineering Geoscience. Required: Physics 105 or Mechanical Engineering 104, Physics 110A-110B or Electrical Engineering and Computer Sciences 117A-117B, Mathematics 120A-120B, or 121A-121B; Geophysics 122A-122B; Civil Engineering 123A-123B; Nuclear Engineering 185; electives which must include: (a) 4 units of upper-division courses in geology or geophysics; (b) an upper-division course in statistics; (c) for those who did not take in the lower-division a course in materials such as Engineering 45, an upper-division course dealing with materials; (d) a course in thermodynamics; (e) a course in fluid mechanics.

*Not offered 1966-67
1On leave, spring
2Recalled to active service
3Recipient of Distinguished Teaching Award
The English major program comprises two parts: a structure of prerequisites and an array of further specifications of electives. At least seven courses fulfilling major requirements must be upper division courses.

Prerequisites: In order to declare the major, students must: (1) have completed the Reading and Composition requirement of the college (1A-1B, or the equivalent); English 1A and 1B, or their equivalents in other departments, are not counted in the number of courses required by the major. For those, however, who complete the second half of the requirement with a "writing-intensive" section of a literature course in the English Department (see below: 17W, 26W, 27W, 28W, 30W, 44AW, 44BW), the literature component of any of these courses counts as one course toward the major.

(2) have taken English 15 and any two of the four additional core requirements of the major listed below.

ALL FOUR of these core requirements must be fulfilled in order to complete the major, but only two need be taken by the time the student files the Declaration of Major. a) English 46A, or one of the following: English 19A, 19B, and 19C, as its equivalent. b) English 46B, or one of the two upper division courses that may be offered as its equivalent. (For these equivalents, see the major program description for a list of other courses that also fulfill this requirement.)

The Major: Besides English 15 and the four additional core requirements above, English majors must include the following items in their programs: (1) a course in Shakespeare (English 117E, 117T, or a 150 seminar on Shakespeare do not fulfill this requirement; (2) a course in a figure, genre, or period before 1900 (exclusive of Shakespeare; a course in a figure or period of British literature representing a variety of historical periods, genres, and types. The latter three courses (15, 46A, 46B), as well as a course in American literature, and a course in a figure or period of British literature, define the "core" of the major, from which further upper division study proceeds. While all five are required, three of them (English 15 and any two of the remaining four) must be taken as prerequisite to declaring the major.

Awareness of the historical varieties of writing in English, and familiarity with a diversity of critical enterprises in literary study, is fostered by the remaining specifications of the major: a course in Shakespeare; a course in a figure or period of British or American literature before 1900 (exclusive of Shakespeare and English 150); a course chosen from either the 170 series (literature and related disciplines) or the 180 series (literary genres); and the Upper Division Seminar, English 150, which brings the student's critical skills and learning to bear upon a single literature or figure problem, in the writing of a long essay. Beyond these categorical requirements, students are largely free to construct their own programs. They are encouraged to compose intellectually coherent courses of study and to pursue sustained projects of special interest, in consultation with their advisers. Collateral study in the arts, history, languages, literature in other languages, philosophy, and in relevant topics and methods in the social sciences is encouraged, though not specifically required.

Subject A. Students must have fulfilled the requirement in Subject A before taking any course in the major. Additional information for further information, see Subject A listing in Index.

Major Program

Note: The following requirements apply to students who declare the major in fall 1988 and thereafter. Students already in the major may complete it under the former regulations, copies of which may be obtained from the department office: 322 Wheeler. Further details of the new major will be available from the department office in late spring 1988.

The English major program comprises two parts: a structure of prerequisites and an array of further specifications of electives. At least seven courses fulfilling major requirements must be upper division courses.

Prerequisites: In order to declare the major, students must: (1) have completed the Reading and Composition requirement of the college (1A-1B, or the equivalent); English 1A and 1B, or their equivalents in other departments, are not counted in the number of courses required by the major. For those, however, who complete the second half of the requirement with a "writing-intensive" section of a literature course in the English Department (see below: 17W, 26W, 27W, 28W, 30W, 44AW, 44BW), the literature component of any of these courses counts as one course toward the major.

(2) have taken English 15 and any two of the four additional core requirements of the major listed below.

ALL FOUR of these core requirements must be fulfilled in order to complete the major, but only two need be taken by the time the student files the Declaration of Major. a) English 46A, or one of the following: English 19A, 19B, and 19C, as its equivalent. b) English 46B, or one of the two upper division courses that may be offered as its equivalent. (For these equivalents, see the major program description for a list of other courses that also fulfill this requirement.)

The Major: Besides English 15 and the four additional core requirements above, English majors must include the following items in their programs: (1) a course in Shakespeare (English 117E, 117T, or a 150 seminar on Shakespeare do not fulfill this requirement; (2) a course in a figure, genre, or period before 1900 (exclusive of Shakespeare; a course in a figure or period of British literature representing a variety of historical periods, genres, and types. The latter three courses (15, 46A, 46B), as well as a course in American literature, and a course in a figure or period of British literature, define the "core" of the major, from which further upper division study proceeds. While all five are required, three of them (English 15 and any two of the remaining four) must be taken as prerequisite to declaring the major.

Awareness of the historical varieties of writing in English, and familiarity with a diversity of critical enterprises in literary study, is fostered by the remaining specifications of the major: a course in Shakespeare; a course in a figure or period of British or American literature before 1900 (exclusive of Shakespeare and English 150); a course chosen from either the 170 series (literature and related disciplines) or the 180 series (literary genres); and the Upper Division Seminar, English 150, which brings the student's critical skills and learning to bear upon a single literature or figure problem, in the writing of a long essay. Beyond these categorical requirements, students are largely free to construct their own programs. They are encouraged to compose intellectually coherent courses of study and to pursue sustained projects of special interest, in consultation with their advisers. Collateral study in the arts, history, languages, literature in other languages, philosophy, and in relevant topics and methods in the social sciences is encouraged, though not specifically required.

Subject A. Students must have fulfilled the requirement in Subject A before taking any course in the major. Additional information for further information, see Subject A listing in Index.

Major Program

Note: The following requirements apply to students who declare the major in fall 1988 and thereafter. Students already in the major may complete it under the former regulations, copies of which may be obtained from the department office: 322 Wheeler. Further details of the new major will be available from the department office in late spring 1988.

The English major program comprises two parts: a structure of prerequisites and an array of further specifications of electives. At least seven courses fulfilling major requirements must be upper division courses.

Prerequisites: In order to declare the major, students must: (1) have completed the Reading and Composition requirement of the college (1A-1B, or the equivalent); English 1A and 1B, or their equivalents in other departments, are not counted in the number of courses required by the major. For those, however, who complete the second half of the requirement with a "writing-intensive" section of a literature course in the English Department (see below: 17W, 26W, 27W, 28W, 30W, 44AW, 44BW), the literature component of any of these courses counts as one course toward the major.

(2) have taken English 15 and any two of the four additional core requirements of the major listed below.

ALL FOUR of these core requirements must be fulfilled in order to complete the major, but only two need be taken by the time the student files the Declaration of Major. a) English 46A, or one of the following: English 19A, 19B, and 19C, as its equivalent. b) English 46B, or one of the two upper division courses that may be offered as its equivalent. (For these equivalents, see the major program description for a list of other courses that also fulfill this requirement.)

The Major: Besides English 15 and the four additional core requirements above, English majors must include the following items in their programs: (1) a course in Shakespeare (English 117E, 117T, or a 150 seminar on Shakespeare do not fulfill this requirement; (2) a course in a figure, genre, or period before 1900 (exclusive of Shakespeare; a course in a figure or period of British literature representing a variety of historical periods, genres, and types. The latter three courses (15, 46A, 46B), as well as a course in American literature, and a course in a figure or period of British literature, define the "core" of the major, from which further upper division study proceeds. While all five are required, three of them (English 15 and any two of the remaining four) must be taken as prerequisite to declaring the major.

Awareness of the historical varieties of writing in English, and familiarity with a diversity of critical enterprises in literary study, is fostered by the remaining specifications of the major: a course in Shakespeare; a course in a figure or period of British or American literature before 1900 (exclusive of Shakespeare and English 150); a course chosen from either the 170 series (literature and related disciplines) or the 180 series (literary genres); and the Upper Division Seminar, English 150, which brings the student's critical skills and learning to bear upon a single literature or figure problem, in the writing of a long essay. Beyond these categorical requirements, students are largely free to construct their own programs. They are encouraged to compose intellectually coherent courses of study and to pursue sustained projects of special interest, in consultation with their advisers. Collateral study in the arts, history, languages, literature in other languages, philosophy, and in relevant topics and methods in the social sciences is encouraged, though not specifically required.

Subject A. Students must have fulfilled the requirement in Subject A before taking any course in the major. Additional information for further information, see Subject A listing in Index.
Minor Program

The minor in English offers students the opportunity to complete a related group of courses in one of three areas: Creative Writing, American Literature, or British Poetry and Prose. (Note: Courses in the 143 series can be repeated for credit. Repeat courses in this series count toward the minor with the permission of the minor adviser. Courses and grade requirements: all minors in English require the completion of five upper division courses. Of these five courses, at least three must be taken at Berkeley. Four of the five courses required for the minor must be taken for a letter grade. An overall grade-point average of 2.0 is required.)

Creative Writing: Five upper division courses, including two literature courses and three selected courses in the 143 series. (Note: Courses in the 143 series can be repeated for credit. Repeat courses in this series count toward the minor with the permission of the minor adviser.)

American Literature: Five upper division courses, including three selected from 130A, 130B, 130C, and 130D, and two selected from 131, 132, 133, and 136. (Note: Courses not on this list but on special topics in American literature can count toward the minor with the permission of the minor adviser.)

British Poetry and Prose: Five upper division literature courses, including at least three courses before 1900, of which two must be selected from 105A, 105B, 106A, 111, 112, 114A, 114B, 115A, 115B, 117A, 117B, 117J, 117F, 117S, 117T, 118, 119, and 120, one must be selected from 106B, 121, 122A, 125A, and 125B. (Note: Courses not on this list can count toward the minor with the permission of the minor adviser.)

Courses and grade requirements: all minors in English require the completion of five upper division courses. Of these five courses, at least three must be taken at Berkeley. Four of the five courses required for the minor must be taken for a letter grade. An overall grade-point average of 2.0 is required.

Teacher Training. The Department of English offers an examination workshop for the Single Subject teaching credential in English. For further information contact the department teacher training adviser or the Current Services Office, School of Education, Tolman.

Note: The semester in which a particular course will be offered and the instructor who will teach it may change after this catalog is printed. Please consult the department’s "Announcement of Classes" (available well before the beginning of each semester in the ASUC Bookstore, Textbook Division). Specific topics in the following staff courses varies from year to year: English 37, 38, 136, 138, 150, 165, 166, 203, and 250; offerings and instructors for each semester of the current academic year are listed each semester in the department’s "Announcement of Classes."

Many of the courses listed below have limited enrollments.

Preparation for Graduate Studies

Those interested in graduate studies in English at Berkeley should become familiar with the regulations of the Graduate Division. The prospective graduate student is strongly advised to gain a solid background in foreign languages; the Department of English requires candidates for the Ph.D. to pass examinations in a minimum of two foreign languages.

Graduate Program

The Ph.D. Program. Students are admitted to graduate studies only in the fall semester. The program requires successful completion of 10 letter-graded courses, of which at least eight will be in English and at least one will be a 250 seminar. Of the eight courses in English, six will be distributed as follows: English 200, an introductory course in literary criticism usually taken in the first semester of graduate study, and one course at the graduate level in each of five historical fields: Medieval literature; Renaissance literature; the Restoration and Eighteenth Century; Nineteenth- and Twentieth-Century British literature; and American literature. Students are also expected to have undertaken substantial course work in Chaucer, Shakespeare, and Cervantes. The balance of the Ph.D. program includes fulfilling an oral qualifying examination of two to three hours, and writing a dissertation. Additional details on requirements for the doctorate in English are available from the English Graduate Office, 319 Wheeler Hall.

The M.A. Program. The M.A. program in English is separate from the Ph.D. program. It welcomes a broad range of applicants including students from a variety of academic and cultural backgrounds. It is designed to serve students who wish to undertake one year's intensive graduate study in the general field of English and/or American literature, or who wish to pursue a special interest that lies within or cuts across the traditional fields. A student's course of study will be determined individually at the beginning of the fall semester, and may or may not include a short thesis or approved special project. In special cases, study for the M.A. degree may be extended into a second year. The M.A. program requires the successful completion of at least 20 units (usually five courses) plus a thesis; or 24 units (usually six courses) and a general examination (written or oral) the scope of which will be determined in consultation with the adviser and the M.A. Program Committee. A third lower division undergraduate course may not be counted toward the degree. There is no general language requirement for M.A. students.

Courses in Writing

Note: Courses in writing require individual conferences as part of the expected student workload. Some instructors in courses in the 43 and 143 series may require students to complete the course (pass/no pass) only. Students will find information about the grading basis of a specific class in these series in the English Department's "Announcement of Classes," available at pre-enrollment.

Lower Division Courses

41A. First-Year Reading and Composition. (4) Three hours of lecture per week. Prerequisites: Passing grade in Subject A (exam or course). Training in writing expository prose.

41B. First-Year Reading and Composition. (4) Three hours of lecture per week. Prerequisites: Passing grade in Subject B (exam or course). Training in writing expository prose. (F,SP) Staff

B. Further instruction in expository writing in conjunction with reading literature. For other English courses that fulfill the second half of the Reading and Composition requirement, see also English 17W, 20W, 26W, 27W, 28W, 30W, 44AW, and 44BW. (F,SP) Staff

Note: Students seeking to fulfill the second half of the reading and composition requirement may take, in place of 1B, a writing-intensive form of any of several lower division literature courses. For specific course details, see, under Course Descriptions, "W" courses. The "W" courses also counts as one course toward the English major.

40. Intermediate Expository Writing. (4) Three hours of lecture per week. Prerequisites: 1A-1B and consent of instructor. Training in expository writing. (F,SP) Read

43A. Introduction to the Writing of Short Fiction. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. A workshop course intended for students who have recently begun to write fiction or who have not previously taken a course in creative writing.

43B. Introduction to the Writing of Verse. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. A workshop course intended for students who have recently begun to write verse or who have not previously taken a course in creative writing. (F,SP)

43D. Introduction to the Writing of Nonfiction. (4) Three hours of lecture per week. Prerequisites: 1A-1B or equivalent and consent of instructor. A workshop course for students who have recently written on nonfiction as an art. Writing and discussion of student work in such genres as the personal essay, biography, autobiography, history, and travel literature. Reading and discussion of work by established artists in the same modes. (SP) Muscatine

Upper Division Courses

141. Modes of Writing (Exposition, Fiction, Verse, Etc.). (4) Course may be repeated once for credit with a different instructor. Three hours of lecture per week. Prerequisites: 1A-1B or equivalent and consent of instructor. Writings in connection with reading in recent English literature and its continental background. (F,SP) Soto, Pinsky

142A. Advanced Composition for Potential Teachers of English in Secondary Schools. (4) Three hours of lecture per week. Prerequisites: None. Advanced composition and methods of teaching composition; emphasis on writing about literature with readings from literature of major American ethnic groups suitable for young people. Primarily for students who wish to pursue English as their single subject teaching field. (F,SP) Katling

142D. Advanced Composition for Potential College Teachers. (4) Three hours of lecture per week. Prerequisites: None. Special section in advanced prose for graduate student instructors, readers, and honors students in departments other than English.

143A. Short Fiction. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. A seminar in writing short stories. (F,SP) Loewinsohn, Michaels

143B. Verse. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. A seminar in writing poetry. (F,SP) Scott, Gunn, Soto

143C. Long Narrative. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. A seminar in writing the personal essay. Training in expository prose. (F,SP) Staff

143E. Playwriting. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. A seminar in writing the personal essay.

143T. Poetry Translation Workshop. (4) May be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor, willingness to translate, working knowledge of at least one foreign language. Open to those who wish to assimilate foreign influences for writing poetry or to seek a fuller understanding of any foreign poetry by rendering it into English.

144. Practical Writing. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. Training in expository prose without emphasis on literary subject matter. Attention to general standards of effective writing and to specific problems in the prose of class members. Designed for nonmajors.

Courses in Language

Note: Courses in language have irregularly scheduled tutorials, as the instructional material demands.

Lower Division Courses

25. Language. (4) Three hours of lecture per week. The origins and symbols of human speech; pattern, change, and growth in language, with emphasis on English; interrelations of language and thought; practical implications of these issues in America today. (SP) Boyd

202. Problems in English Linguistics. (4) Course may be repeated for credit with permission of the instructor. Three hours of lecture per week. Topics vary from year to year, but will consider diachronic and synchronic linguistics and their application to the study of literature. (SP) Banfield
Courses in Literature

Note: Students in literature courses are expected to devote an average of nine hours per week to class preparation.

Lower Division Courses

10. Methods and Materials of Literary Study. (4) Three hours of lecture per week. Study of literary and critical texts and of critical methods and theories. Enrollment limited to 25 students.

15. Introduction to Literary Study. (4) New course. Three hours of lecture and discussion per week. Designed for prospective English majors. Reading in a variety of literary texts and types as an introduction to critical thought and writing about literature. Taught in limited-enrollment sections; readings vary from section to section. (F,SP) Staff

17. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works. (F) Richmond

17W. Shakespeare. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Prerequisites: 1A or equivalent. Three hours of lecture plus two additional one-hour section meetings per week. Course syllabus and format identical to 17 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Aitman

20. Modern British and American Literature. (4) Three hours of lecture per week. Lectures on and discussion of major authors of modern British and American literature. (SP) Loewenschnur

20W. Modern British and American Literature. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 20 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Loewenschnur

26. Introduction to the Study of Poetry. (4) Three hours of lecture per week. Lectures and discussion intended to develop the students' ability to understand and evaluate poetry. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (F,SP) Goldsmith, Gunn

26W. Introduction to the Study of Poetry. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 26 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (F,SP) Goldsmith, Gunn

27. Introduction to the Study of Fiction. (4) Three hours of lecture per week. Lectures and discussion intended to develop the students' ability to understand and evaluate fiction. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (SP) Abel

27W. Introduction to the Study of Fiction. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 27 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Abel

28. Introduction to the Study of Drama. (4) Three hours of lecture per week. Lectures and discussion intended to develop the students' ability to read, understand, evaluate and produce plays. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (SP) Altmann

29W. Introduction to the Study of Drama. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 29 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Altmann

30. American Literature. (4) Three hours of lecture per week. An introductory survey of American literature. (SP) Franchot

30W. American Literature. (6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 30 above, with the two additional one-hour section meetings per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Altmann

37. Topics in American Literature. (4) Three hours of seminar per week. Prerequisites: Consent of instructor. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings before the beginning of the semester. (F) Breitwiser

39. Freshman Seminar. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of instructor. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings before the start of the semester. (Sections limited to 15 students each.) (F,SP) Bloom, Gallagher, Payley, Parkinson, Dinhaw, Goldsmith

44A-44B. Masterpieces of Literature. (4-4) Three hours of lecture per week. Lectures on great works of the world's literature.

A. Classical Literature. (F) Justice

B. Medieval and Renaissance Literature. (SP) Anson

44AW-44BW. Masterpieces of Literature. (6-6) New course. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture plus two additional one-hour section meetings per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 44 above, with the two additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (F,SP) Justice, Anson

46A-46B. Major British Writers. (4-4) Three hours of lecture per week. Prerequisites: 1A-1B. Discussion of typical works of major authors from Chaucer through the twentieth century with consideration of the more important aspects of English literary history.

A. Chaucer through Milton. (F,SP) Damon, Coolidge

B. The 18th through the 20th centuries. (F,SP) Starr, Knapp

60C. Children's Literature. (4) Three hours of lecture per week. The study of selected works written for children.

Upper Division Courses

105A-105B. Introduction to Early English Poetry. (4-4) Three hours of lecture per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 105A or 105B above, with the additional one-hour section meetings devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Abel

26B. Irish Literature. (4) Three hours of lecture per week. The Native Tradition in English, 1800 to present. (SP) O'Hear

106B. Irish Literature. (4) Three hours of lecture per week. The Native Tradition in English, 1800 to present. (SP) Tracy

107. The English Bible As Literature. (4) Three hours of lecture per week. Introduction to the English Bible treated as a literary work. (F,SP) Knapp, Coolidge

110A-110B. Medieval Literature. (4-4) Three hours of lecture per week.

A. Development of literary form and idiom through the Christian West from the first to the fifteenth century. (F,SP) Aitman

B. Close study of selected classics in translation, including Niebelungenlied and Dante's Divine Comedy. (SP) Scott

111. Chaucer. (4) Three hours of lecture per week. Lectures on and discussion of Chaucer's major works. (F,SP) Nelson, Muscatine

112. Middle English Literature. (4) Three hours of lecture per week. Middle English literature exclusive of Chaucer studied in the original language. (F) Oliver

114A-114B. English Drama. (4-4) Three hours of lecture per week.

A. English drama to 1603. (SP) Aitman

B. English drama from 1603 to 1700. (SP) Aitman

115A-115B. The English Renaissance. (4-4) Three hours of lecture per week. A chronological survey of Shakespeare's career.

117E. Shakespeare for Non-Majors. (4) Three hours of lecture per week. General introduction to Shakespeare's plays, intended for nonmajors. (SP) Richmond

117F. Shakespeare and Film. (4) Three hours of lecture per week. Close study of the texts and films based on 8 to 10 plays. Lectures will emphasize the critical implications of transposing plays to film. The goal of the course is the critical understanding of Shakespeare, and the students will satisfy the departmental requirement of a course on Shakespeare in the major.

117J. Shakespeare. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. Studies of selected plays, with practice in various critical approaches, e.g., establishing text, relation to source, changing concepts of comedy and tragedy, influence of theatrical conditions on technique. (F,SP) Fineman, Nestrick, Adelman, Altman, Feigold, Stout

117S. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works. (F,SP) Adelman, Fineman

117T. Shakespeare In the Theatre. (4) Three hours of lecture per week. Prerequisites: Offered in conjunction with or as a sequel to 117S or 117A-117B. The interrelation of Elizabethan plays and stage practices. Classroom exercises, written assignments, and a final examination.

118. Milton. (4) Three hours of lecture per week. Lectures on and discussion of Milton's major works.

119. The Augustan Age. (4) Three hours of lecture per week. Lectures on and discussion of the works of Dryden, Pope, and some of their contemporaries. (SP) Starr

120. The Age of Johnson. (4) Three hours of lecture per week. Lectures on and discussion of later eighteenth century British literature. (SP) Bridgman
121. Romantic Period. (4) Three hours of lecture per week. Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and contemporaries. (F) Rayley

122. Victorian Period. (4) Three hours of lecture per week. Literature of the Victorian period with an emphasis on poetry and nonfictional prose. (SP) Tracy

124. The English Lyric. (4) Three hours of lecture per week. The development of the English tradition of structure and style in lyric poetry. (SP) Boyd

125A-125B. The English Novel. (4) Three hours of lecture per week. A. Defoe through Scott. B. Dickens through Conrad. (F) Tracy

125C. The European Novel. (4) Three hours of lecture per week. Lectures on and discussion of major European novels. (SP) Bishop

125D. The 20th Century Novel. (4) Three hours of lecture per week. Lectures on and discussion of major novels of the twentieth century. (F) Bernstein

126. British Literature: 1900-1945. (4) Three hours of lecture per week. Lectures on and discussion of British literature written between 1900 and 1945. (F) Bishop

127. Modern Poetry. (4) Three hours of lecture per week. British and American poetry: 1900 to the present. (SP) Pelletier

128. Modern Drama. (4) Three hours of lecture per week. British and American drama: 1860 to the present. (SP) Padilla

130A. American Literature: Before 1800. (4) Three hours of lecture per week. Lectures on and discussion of the major writers of the early American period. (F) Breiby

130B. American Renaissance. (4) Three hours of lecture per week. Lectures on and discussion of the major texts of the American Renaissance. (SP) Breiby

130C. American Literature: 1865-1900. (4) Three hours of lecture per week. Lectures on and discussion of American literature from the Civil War through 1900. (SP) Sunquist

130D. American Literature: 1900-1945. (4) Three hours of lecture per week. A survey of modern American literature. (SP) Padilla

131. American Poetry. (4) Three hours of lecture per week. A survey of American poetry and its background from Puritan times until the present. The special emphasis of the course will be historical, with particular attention to such poets as Bradstreet, Taylor, Fureves, Bryant, Emerson, Longfellow, Poe, Whitman, Dickinson, Frost, Pound, Eliot, and Stevens. (F) Breslin


133. Black Writers in America. (4) Three hours of lecture per week. Black writers in the American cultural context. (F) JanMohamed

134. Contemporary Literature. (4) Three hours of lecture per week. Lectures on and discussion of selected works of literature written since the Second World War. (SP) Breiby

135. American Studies. (4) Course may be repeated for credit with a different topic and permission of the instructor. Three hours of lecture per week. A course on the intellectual, cultural, historical, and social background of American literature. Topics will vary from semester to semester. Students should consult the department's "Announcement of Classes" for current offerings before the start of the semester. (F) JanMohamed

150. Upper Division Seminar. (4) New course. Course may be repeated for credit with consent of instructor. Three hours of seminar per week. Prerequisites: A course in the period or type of literature to be considered in the seminar, or comparable background in a related discipline relevant to its topic, is strongly recommended. Designed primarily for English majors. Intensive study of a special topic or critical problem in literary study. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings before the beginning of the semester. (F,SP) Staff

160. Methods and Materials of Literary Criticism. (4) Three hours of lecture per week. An introduction to issues in literary criticism with emphasis on application of principles and methods to selected literary texts. (F) Hudson

161. Introduction to Literary Theory. (4) Three hours of lecture per week. This class will focus on literary theory. (F,SP) Staff

165. Special Topics. (4) Course may be repeated for credit on a different topic. Three hours of lecture per week. Prerequisites: Consent of instructor. Designed primarily for English majors. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings before the beginning of the semester.

166. Special Topics. (4) Course may be repeated for credit on a different topic. Three hours of lecture per week. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings before the beginning of the semester. (F,SP) Staff

170. Literature and the Arts. (4) Course may be repeated for credit with permission of the instructor. Three hours of lecture per week. A survey of literature in relation to the arts. In-depth study of topics in literature in relation to thematics, literary convention, cultural and historical contexts, the nature of their composition, and the development of the form. (SP) Scott

180H. Short Story. (4) Three hours of lecture per week. Lectures on and discussion of the form of the short story. (SP) Scott

180R. The Romance. (4) Three hours of lecture per week. A survey of Romance fiction which includes both novels and novellas. (SP) Scott

180S. Satire. (4) Three hours of lecture per week. Study of representative satire forms, techniques, and points of view. (SP) Bernstein

180T. Tragedy. (4) Three hours of lecture per week. Study of representative tragic forms, techniques, and points of view. (F) Coolidge

180U. Science Fiction. (4) Three hours of lecture per week. A survey of science fiction which includes both novels and novellas. (SP) Scott

190. Field Studies in Tutoring Writing. (1-4) Course may be repeated for a maximum of 6 units. Must be taken On a pass/fail basis. (SP) Krasin

210. Professional Courses

310. Field Studies in Tutoring Writing. (1-4) Course may be repeated for a maximum of 6 units. Must be taken On a pass/fail basis. (SP) Krasin

*Not offered 1988-89

190. Field Studies in Tutoring Writing. (1-4) Course may be repeated for credit. Must be taken On a pass/fail basis. (SP) Krasin

*On leave, spring 1989

#Recipient of Distinguished Teaching Award

Honors and Tutorial Courses

Lower Division Courses

99. Independent Study. (1-4) Course may be repeated for credit. Must be taken On a pass/fail basis. (SP) Krasin

*On leave, spring 1989

*Recipient of Distinguished Teaching Award
that of any regular course and shall be specific enough to enable students to write essays based on their studies. (F,SP) Staff

Upper Division Courses

H195A-H195B. Honors Course. (4-4) Credit and grade to be awarded upon completion of the sequence. Three hours of lecture per week. Prerequisites: Open only to senior honors candidates (i.e., students with an overall GPA of 3.5 or better). Consent of instructor is also required. This is a two-semester course, graded IP at the end of the first semester. During the second semester each student will write an honors thesis. Completion of the thesis is required for a passing grade in the course. (F,SP) Alpers, Dinshaw

196A. Junior Seminar: Great Books of English and American Literature. (4) Three hours of lecture per week. Prerequisites: Normally open only to junior students with a GPA of 3.5 or better. Consent of instructor. Intensive study of major works, for example: Canterbury Tales, King Lear, Hamlet, Paradise Lost, Grimm’s Travels, Pride and Prejudice, Bleak House, 1984. Leave of Grass, Scarlet Letter, Moby Dick. Not limited to English majors.

196B. Senior Seminar: Special Topics. (4) Three hours of seminar per week. Prerequisites: Normally open only to senior students with a GPA of 3.5 or better. Consent of instructor. Special topics, usually with one of the following general areas: 1) Critical and Methodological Problems in the Study of Literature. Sample topics: comedy; stylistic genres; modes of literary analysis; psychoanalytic criticism; dramatic literature and problems in staging; literature and sociology; literature and politics. 2) Literary Modes and Eras. Sample topics: politics and literature in 18th century England; the social context of the British novel of the 1840s; women in literature.

198. Directed Group Study. (1-4) New course. Course may be repeated for credit. Credit must be taken on a passed/not passed basis. Meetings to be arranged. Prerequisites: Open to students who have completed 12 units of upper division English with an average of not less than B. Enrollment is restricted by University regulations. Group study in a field that shall not coincide with that of any regular course and shall be specific enough to enable students to write essays based upon their studies. (F,SP) Staff

199. Supervised Independent Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Open to students who have completed 12 units of upper division English with an average grade of not less than B. Meetings to be arranged. Enrollment is restricted by University regulations. Reading and conference with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable students to write essays based upon their studies. (F,SP) Staff

Teachers’ Courses

Professional Courses

301. Problems in the Teaching of Literature. (3) Seminar. Students will serve as readers and discussion section leaders in an undergraduate lecture course, and must have completed satisfactorily a seminar, pro-seminar, or equivalent course in the area of the undergraduate course. Weekly meetings, preparation, grading of course assignments, and evaluation of student exercises, and a term project report required.

302. The Teaching of Composition. (3) Course may be repeated for credit with consent of instructor. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture per week. Discussion of courses in composition, instructional methods, grading standards, and special problems, with practice in handling sample essays. When given for graduate student instructors in the English 198 course program, the course will include class visitation.

303. Teaching of English in Open Admission Programs. (3) Three hours of lecture per week. Discussion of course aims, instructional methods, grading standards. Practice with actual student papers. The focus is on subjects whose level of skills may disqualify them from regular freshman programs.

304. The Teaching of Composition. (3) Three hours of lecture per week. Prerequisites: Open only to student license candidates (i.e., students with an overall GPA of 3.5 or better). Consent of instructor in the major). Consent of instructor is also required. This is a two-semester course, graded IP at the end of the first semester. During the second semester each student will write an honors thesis. Completion of the thesis is required for a passing grade in the course. (F,SP) Alpers, Dinshaw

Prerequisites: Enrollment in Ph.D. program in English; consent of instructor; normally based on prior writings submitted. A writing workshop in fiction for graduate students. (SP) Lowinson

243B. Poetry Writing Workshop. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Enrollment in Ph.D. program in English; consent of instructor, normally based on prior writings submitted. A writing workshop in poetry for graduate students. (SP) Pinsky

246. Graduate Proseminars. (4) Three hours of lecture per week. Proseminars in the major chronological fields of English and American literature providing graduate instruction in scholarly and critical approaches appropriate to each field. (F,SP) Staff


250. Research Seminars. (4) Course may be repeated for credit. Open only to seniors in the 2-3 hour range. Required of all Ph.D. students. Advanced study in various fields, leading to a substantial piece of writing. Offerings vary from semester to semester. Students should consult the department’s “Announcement of Classes” for offerings before the beginning of the semester. (F) Staff

251. Colloquia for Students in the English M.A. Program. (4) One 3-hour meeting per week. Prerequisites: Open only to students in the M.A. program. Qualified students should consult their advisors and the department’s “Announcement of Classes” for offerings before the beginning of the semester. (F) Adelman, Booth

258. Special Studies. (4-12) Course may be repeated for credit. Independent. Normally reserved for students directly engaged upon the doctoral dissertation. (F,SP) Staff

259. Special Study. (1-8) Course may be repeated for credit. Independent. Primarily for students engaged in preliminary exploration of a restricted field, involving research and the writing of a report. May not be substituted for available seminars. (F,SP) Staff

399. Supervised Practice in Guiding and Evaluating Student Work. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Students will serve as readers in an undergraduate lecture course. Evaluation of student papers, examination and exercises, weekly individual consultation with the instructor of the lecture course, and a final written assessment by the student of the training received. (F,SP) Staff

601. Individual Study. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: Graduate standing. Individual study in consultation with the major field advisor. Intended to provide an opportunity for qualified students to do necessary work to prepare themselves for language examinations and the comprehensive examination. May not be used for unit or residence requirements for the master’s degree. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: Graduate standing. Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the oral examination, and directing of the doctoral dissertation. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff
Entomological Sciences
(College of Natural Resources)

Department Office: 216 Wellman Hall, 642-6660
Chair: David L. Wood, Ph.D.

Professors
John R. Anderson, Ph.D. University of Wisconsin, Madison. Medical entomology, parasitology, environmental health, library and museum practices.
Elizabeth Bell, Ph.D. University of London. Arthropod feeding relationships with plants.
Leonard C. Brown, Ph.D. University of California at Berkeley. Biological control of weeds.
John E. Casida, Ph.D. University of Wisconsin, Madison. Insecticide chemistry and toxicology. Aquatic environments.
Donald L. DeBolt, Ph.D. University of California at Berkeley. Biological control of insects.
Richard H. Davis, Ph.D. Imperial College, University of London. Insect physiology, nutrition.
Abraham E. Michelsbach, Ph.D. University of California at Berkeley. Agricultural entomology (Emeritus).
Alan K. Nyrop, Ph.D. Cornell University. Animal taxonomy and systematics.

Lower Division Courses
10. Natural History of the Insects. (2) Must be taken on a passed/not passed basis. Two 1-hour lectures per week and optional field trips. An outline of the main facts and principles of biology illustrated by insects, with special emphasis on their relations to plants and animals, including humans. (F) Frankie

30. Biological Control. (2) Two 1-hour lectures per week. Regulation of populations of organisms, especially insects, through interactions with parasites, predators, pathogens, competitors. Discussion of examples from agricultural, forest, urban, and recreational environments. (SP) Doyen

Upper Division Courses
100. General Entomology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: General introduction to courses in biological science. Biology of insects, including classification of orders and common families, morphology, physiology, behavior, and ecology. (SP) Dely

101. Insect Classification and Identification. (4) Students taking this course with 104 under quarter system or enroll in 104 under semester system will receive only partial credit for 104. Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: 100. Comparative biology of insect orders; identification and classification of families. (SP) Doyen

102. Functional Insect Anatomy. (4) Two 1-hour lectures and one 2-hour discussion per week. Prerequisites: 100 or consent of instructor. A survey of anatomical and physiological characteristics of insect organ systems. (SP) Pipe

103. Insect Physiology. (3) Two 1-hour lectures and one 2-hour discussion per week. Prerequisites: 105 or consent of instructor. An introduction to and laboratory exercises and demonstrations using modern methods to study insect physiology. Includes experiments with the nervous system, muscle, heart, digestive and excretory systems, endocrine system, and behavior. Experience with a range of physiological instrumentation and laboratory techniques. (SP) Weeks

103L. Insect Physiology Laboratory. (2) Two 3-hour laboratories per week. Prerequisites: 105 (may be taken concurrently) or consent of instructor. Laboratory exercises and demonstrations using modern methods to study insect physiology. Includes experiments with the nervous system, muscle, heart, digestive and excretory systems, endocrine system, and behavior. Experience with a range of physiological instrumentation and laboratory techniques. (SP) Weeks

104. Principles of Systematic Zoology. (2) Students who have taken 104 or 101 under the semester system will not receive credit for 104. Three 1-hour lectures and two 1-hour discussions per week. Prerequisites: 100 or consent of instructor. Principles and methods of animal taxonomy, including biological history, concepts of species and other taxa, methods of classification, bibliographic procedures, nomenclature and museum practices, with emphasis on examples in insects. (F) Powell

105. Insect Ecology. (3) One hour of lecture, one 3-hour lab per week, and a research project. Prerequisites: A course in general entomology or consent of instructor.

For lower division and upper division requirements, see the Announcement of the College of Natural Resources.

Graduate Program. The M.S. and Ph.D. degree programs are offered. A basic education in the physical and biological sciences is a prerequisite. The preparatory undergraduate program should include: General biology, insect classification, insect ecology, entomological systematics, insect fitness, evolution, phylogeny, classification, nomenclature, and identification.

The minimum requirements are usually fulfilled by a bachelor's degree in entomology from an accredited institution. The preparatory undergraduate program should include: General biology, insect classification, insect ecology, entomological systematics, insect fitness, evolution, phylogeny, classification, nomenclature, and identification.
Ecology of insects: interactions with the physical environment; population and community dynamics; description of different insect community types; applied insect ecology. (SP) Walter I

108. Biology of Aquatic Insects. (3) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Introductory course in biological science. Identification and ecology of aquatic insects, including their role as indicators of environmental quality. Offered even-numbered years. (SP) Wash

109. Applied Entomology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: An introductory course in a biological science. Introduction to the identification, biology, and management of beneficial and harmful arthropods. Offered odd-numbered years. (SP) Kasda, Kubo I

110. Applied Entomology 177. Laboratory in Pesticide Chemistry and Toxicology. (1) One 3-hour laboratory per week. Prerequisites: 117 (may be taken concurrently) and consent of instructor. An introduction to the study of insect behavior and its physiological and ecological correlates. Offered odd-numbered years. (F) Loher I

111. Insect Behavior. (2) Two 1-hour lectures per week. Prerequisites: 100 or consent of instructor. An introduction to the study of insect behavior and its physiological and ecological correlates. Offered odd-numbered years. (SP) Kasda, Kubo I

112. Laboratory in Insect Behavior. (1) One 3-hour laboratory per week. Prerequisites: 117 (may be taken concurrently) and consent of instructor. Laboratories in locomotion, orientation, feeding behavior, communication, reproductive behavior, circadian rhythms. Offered odd-numbered years. (F) Loher I

113. Biological Control of Pests. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 100 and 104, or consent of instructor. Study of various host-parasite, prey-predator systems, especially those of significance to agriculture, forestry, urban, and recreational environments. Implementation of biological control methods involving importation, augmentation, and conservation of natural enemies. Offered odd-numbered years. (F) Hagen, Castagno I

114. Medical-Veterinary Parasitology. (3) Two 1-hour lectures per week. Prerequisites: Upper division standing or consent of instructor. Identification and control of the diseases of man and domestic animals. Host-parasite interactions, epidemiology, pathogenesis, treatment, and control. (SP) Weismann, Silverman I

115. Medical and Veterinary Entomology. (4) Two 1-hour lectures, one 3-hour laboratory, and one 3-hour insect management session per week. Role of insects and other arthropods in transmission and causation of diseases of humans and domestic animals; general and specific chemicals, including significance to public health and the welfare of humans and livestock; collection and identification of important species. (SP) Anderson, Lane II

116. An Introduction to Acrology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 117 or consent of instructor. An introduction to the ecology, biology, morphology, physiology, and classification of mites and ticks and their economic importance. The taxonomy, morphology, and life cycles of representative mites and ticks will be surveyed in laboratories and demonstrations. (SP) Moyer I

165. Vector-Pathogen Relationships. (2-4) This course may be taken as a lecture for 2 units, or lecture and lab for 4 units. Two 1-hour lectures and two optional 3-hour laboratories per week. Prerequisites: Introductory courses in entomology and plant pathology or consent of instructor. Biological relationships of plant pathogens and arthropods acting as vectors in the spread of plant diseases. Laboratory emphasis on rearing, manipulation, and use of territorial insects in transmission of plant viruses and protozoans. (SP) Purcell, Sylvester I

170. Chemical Ecology. (2) Two 1-hour lectures per week. Prerequisites: Introductory courses in organic chemistry and biology or consent of instructor. Plant-arthropod interactions and the effects on their animals, hormonal interaction between plants and animals, feeding preferences, animal pheromones and defense substances, biochemical interactions between higher plants, and phytoalexins and phyto-pheromones. (F) Kubo I

179. Field Studies in Entomology. (1-3) Course may be repeated for credit. Must be taken on a pass/credit basis. One unit for three hours of work per week. Prerequisites: Consent of instructor. Supervised experiences for students relevant to specific aspects of entomology. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

189. Directed Group Studies for Advanced Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a pass/credit basis. One unit for three hours of work per week. Prerequisites: Consent of instructor. Study or research on topics that may vary from semester to semester. (F,SP) Staff

190. Seminar in Entomology. (2) Two 1-hour lectures and discussion per week. Prerequisites: Consent of instructor. An introduction to the study of insect behavior and its physiological and ecological correlates. Offered odd-numbered years. (SP) Castagno, Kubo I

200. Entomology Staff Seminar. (2) No credit. One 1-hour seminar per week. Weekly meetings for the presentation of research findings by the faculty, visiting lecturers, and graduate students. Enrollment by permission of all graduate students. Recommended for beginning graduate students. (F,SP) Sylvester, Staff I

254. Field Courses in Medical Entomology-Parasitology. (1) Prerequisites: 150 and/or 153, or consent of instructor. One weekend and two Saturday field trips; two to three formal 1-2 hour meetings will precede and follow each field trip. Techniques used for collecting blood-feeding arthropods and methods of distinguishing vertebrate hosts; methods of preparing specimens for study; examining bloods, etc., for parasites and identification of specimens. Offered even-numbered years. (SP) Anderson, Lane, Weismann I

272. Principles and Methods of Entomological Research. (3) Three 1-hour lectures and two 2-day field trips per week. Course will deal with topics such as organization of research presentations (seminars, papers at meetings), selection and preparation of slides and other visual aids, the scientific publication process, academic and other career options, and considerations about extramural funding. Individual research presentations and other assignments will be required. Offered odd-numbered years, (F) Rash

282. Research Reviews in Comparative Virology. (1) Course may be repeated for credit. Must be taken on a pass/credit basis. One 1-hour seminar per week. Prerequisites: Consent of instructor. Reports and discussion of original research by staff and students. (F,SP) Vollman I

287. Seminar in Insect Physiology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in insect physiology through individually prepared papers by students. (SP) Bernays, Loher, Mittler, Pipa

288. Seminar in Parasitology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in parasitology through individually prepared papers by students. (SP) Anderson, Lane, Weismann I

299. Special Seminar Topics. (1-3) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in a special field through individually prepared papers/talks by students. (F,SP) Staff

300. Seminar in Urban and Agricultural Entomology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in urban and agricultural entomology through individually prepared papers by students. (F) Allen, Frankle, Welther I

302. Seminar in Insect Bio-organic Chemistry. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in insect bio-organic chemistry through individually prepared papers by students. (SP) Kubo I

303. Seminar in Insect Pathology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in insect pathology through individually prepared papers by students. (SP) Kubo I

289. Seminar in Systematic Entomology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in systematic entomology through individually prepared papers by students. (SP) Kubo I

295. Seminar in Insect Ecology and Biological Control. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss the advances in insect ecology and biological control through individually prepared papers by students. (F) DeHaan in charge
Environmental Design
(College of Environmental Design)

Department Office: 234 Wurster Hall, 642-0832
Chair: Raymond Litches
Professors: Laris G. Lerup (Architecture)
Raymond Litches (Architecture)
Sim H. Van der Ryn (Architecture)
Associate Professors: Anthony Dubovky (Architecture)
Stainless Ballotz, (Architecture)
Assistant Professor: Paul E. Groth (Landscape Architecture)

For a description of the programs in environmental design, see page 66.

Lower Division Courses
1. Introduction to Environmental Design. (3) Two 1 1/2-hour lectures and one 2-hour discussion/studio per week. Several introductory courses, environmental awareness and environmental design, Berkeley campus used for case study. (F)

4. People and Environment. (3) Two 1 1/2-hour lectures; one hour of discussion per week. Survey of relationships between people and environments, designed and non-designed; interpreted. (SP) Lerup

11A. Environmental Design I. (4) Students who have taken 6A in the quarter system may not receive credit for 11A. Two 1 1/2-hour lectures and two 3-hour studios per week. Prerequisites: ED 1 or 4. Introductory studio course: freehand drawing, perspective, color, and design; theories of representation and the use of visual means to analyze and convey ideas regarding the environment. (F,SP) Dubovky

11B. Environmental Design II. (4) Two 1 1/2-hour lectures and two 2-hour studios per week. Prerequisites: Protected 11A. Continuation of 11A: review of basic drafting methods; typologies, methods and formal systems of structuring and order in design, architecture, and landscape architecture. (F,SP)

71. History of the Environment. (3) Three 1-hour lectures per week; four 8-hour field trips. Study of development and change in the natural and constructed environment of California, Wilkinson.

Upper Division Courses
104. Site Planning. (3) Two 1-hour lectures and two 2-hour studios per week. Prerequisites: LA 101 or Arch 100A. Integration of landscape site and architectural structure. Emphasis on the role of natural and physical factors in shaping site development and design. Elements to be investigated include site inventory and analysis, program organization, and conceptual design approaches. Sponsoring department: Landscape Architecture. (SP)

105. Ecological Design. (4) Students who have taken ED 5 may not receive credit for 105. One 1 1/2-hour lecture, one 1 1/2-hour discussion, and three hours of studio per week. Prerequisites: 11A, 11B and Arch 100A. Design problems from an ecological perspective. Design studies of relationships among ecosystems, energy, and resource flows, human social and cultural values, and technological variables as they interact to produce the human environment. (F) Van der Ryn

135. Photography as Creative Expression. (3) Two 4-hour laboratories per week. Theory of aesthetics, lighting, and color in visual design, camera techniques, exposure and perspective control. All assignments will be photographed with 35 mm single lens reflex camera, exposure meter, tripod, and cable release. Sponsoring department: Landscape Architecture. (F,SP)

169A. History of the U.S. Cultural Environment, 1783-1800. (3) Three hours lecture and two hours discussion per week. The evolution and Interpretation of American landscapes—our everyday homes, highways, farms, stores, and recreation areas—with an emphasis on how to read them as records of social and cultural processes. Sponsoring department: Landscape Architecture. (F,SP) Groth

195. Senior Thesis. (4) Course may be repeated once for credit. Prerequisites: Limited to students with approved individual major in College of Environmental Design. Major topic directed leading to preparation of a senior thesis. (F,SP)

Environmental Sciences
(College of Letters and Science)

Group Major Office: Division of Special Programs, 301 Campbell Hall, 642-2628

Instructor: Doris Sloan.

Major Advisers: William B.N. Berry, Head Adviser; Ass't, I, Physical Science: Mark Christensen; Area II, Biological Science: Herbert G. Baker, William Z. Sidle; Area III, Social Science: James Anderson, Orman E. Granger.

Group Major in Environmental Sciences

A student may elect to follow one of three distinct areas in the group major in environmental sciences: physical science, biological science, or Environental Sciences. Typically, a major of 60 or fewer credit units is required. The general requirements appear below. Each program emphasizes broad and comprehensive training in the fundamentals of mathematics, physical science, and biology, and in those areas of social science directly related to environmental questions. Such training is indispensable for those who wish to acquire more than a superficial understanding of the impact of science and technology on society, and who wish to contribute to the solution of anthropogenic problems.

Although many environmental issues have an urban focus, this field encompasses rural as well as urban problems. It is concerned with the interaction of urban people with the physical and biological environments created by cities but stops short of the whole of urban metabolism. From the interaction of people with other people in cities; such matters must be left to the fields of urban and ethnic studies.

The senior seminar, Environmental Sciences 196A-196B, is an important feature of the group major in environmental sciences. Typically, a group of 25 or fewer seniors, including students from each of the three areas, works intensively under faculty guidance for two semesters on a specific environmental problem.

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters. This is where major students file their ACE Schedule Request Forms.

Major Requirements

Because of the continual addition of new courses and the demise of others, in exceptional cases advisers may consider the substitution of certain other courses for those officially listed under the three major options.

Area I: Physical Sciences

Lower Division Courses. Biology 1A-1B, or 11 and either 150 or Forestry 170; Chemistry 1A-1B, 8A; Computer Science 7 or 8; Mathematics 1A-1B; Physics 8A-8B or 7A-7B.

*Not offered 1988-89
*On leave, spring
*Recalled to active service
†Recipient of Distinguished Teaching Award
Upper Division Courses.

Upper Division Courses.
- Energy and Resources 102.
- Environmental Sciences 125, 195A-195B; Biotechnology 130.
- Additional courses from the following list to make a total of 30 upper division units. Anthropology 148; Chemistry 130; Civil Engineering 103, 114; Conservation and Resource Studies 130, 132; Economics 100A; Engineering 150, 160, 161, 162; Geology 117; History 115; International Relations 132; Biomedical & Environmental Health Sciences 150; Plant and Soil Biology 100, 101; Energy and Resources 100, 151.

Area II: Biological Sciences

Lower Division Courses.
- Biology 1A-1B, or 11 and either 150 or Forestry 170; Chemistry 1A-1B; Computer Science 7 or 8; Mathematics 16A-16B; Physics 8A-8B.

Upper Division Courses.
- Energy and Resources 102.
- Environmental Sciences 125, 195A-195B; Anthropology 148 or Geography 125.
- Additional courses from the following list to make a total of 30 upper division units. Anthropology 106, 108; Botany 115, 125, 154, 154L; Civil Engineering 114; Conservation and Resource Studies 131, 132; Entomology 103-103L, 106, 108, 130; Forestry 117, 122, 125, 141-141L, 142, 143, 170, 177, 178; Geography 130, 131, 138, 148; Nutritional Sciences 100; Physical Education 105A, 105B; Pest Management 151; Plant Pathology 120; Biomedical and Environmental and Health Sciences 150, 156; Plant and Soil Biology 100, 101, 161; Zoology 107, 108, 131, 140, 141, 142.

Recommended Electives.
- Conservation and Resource Studies 131; Economics 125; Geology 50, 108; Biomedical and Environmental Health Sciences 130A, 130B; Energy and Resources 100.

Area III: Social Sciences

Lower Division Courses.
- Biology 1A-1B or 11 and either 150 or Forestry 170; Chemistry 1A-1B; Computer Science 7 or 8; Economics 1; Mathematics 16A-16B; Physics 8A-8B.

Upper Division Courses.
- Energy and Resources 102.
- Environmental Sciences 125, 195A-195B; Anthropology 140 or 148; Biology 150; Economics 100A or 100B or 101A or 101B; Geography 130.
- Additional courses from the following list to make a total of 30 upper division units. Anthropology 101, Anthropology 140 or Geography 100 or 101; Anthropology 144, 164; City and Regional Planning 110; Landscape Architecture 103 or 113; Conservation and Resource Studies 110, 115, 130 or 131, 132, 150 or 151; Environmental Design 196A; Economics 100B or 101B; Economics 125 or Forestry 110A or 110B; Energy and Resources 100; Geography 136 or 139 or 148 or Conservation and Resource Studies 163 or Forestry 115 or 116; Biomedical and Environmental Health Sciences 150; Mass Communications 102 or Journalism 141 or Political Science 162; Political Science 106; Public Policy 175 or Energy and Resources 151; Forestry 117; Statistics 131A or 131B.

Recommended Electives.
- Economics 121, 175; Environmental Sciences 10; Geology 10; Civil Engineering 144; Statistics 2, 20 or 131A-131B-131F.

Lower Division Courses.
- 10. Introduction to Environmental Science. (3) Three hours lecture per week, no laboratory. Survey of biological and physical environmental problems, focusing on geologic hazards, water and air quality, water supply, solid waste, introduced and endangered species, resource selection of wetland ecosystems. Integration of technical, social, and political approaches to environmental management. Emphasizing Bay Area problems. (F) Sloan

Upper Division Courses.
- 125. Environments of the San Francisco Bay Area. (3) Three hours lecture per week with field trips. The weather and climate, plants and animals, geology, landforms and soils of the Bay Area, with an emphasis on the interaction of these physical elements, their modification by humans, and problems deriving from human use. Environmental Science majors should take this course in the sophomore or junior year. (F) Staff
- 196A-196B. Senior Seminar in Environmental Sciences. (3) Formerly 126. Three hours of seminar per week with outside guest lecturers. Students, selected by Senior standing in the ES major and ES 125. Seminar giving detailed consideration to a specific current environmental problem in the Bay Area. (F,SP) Sloan

Ethnic Studies

(Special Studies or College of Letters and Science)

Department Office: 3404 Dwinelle Hall, 442-0240
Chair: Allen C. Saragoza, Ph.D.
Professors:
- Paula G. Allen, Ph.D. (Native American Studies)
- Ronald T. Takaki, Ph.D. (Asian American Studies)

Associate Professors:
- Mario Barrientes, Ph.D. (Chicano Studies)
- Claudia Sue Kowaliw, Ph.D. (Native American Studies)
- Elaine H. Kim, Ph.D. (Asian American Studies)
- Marguerita B. Salazar, Ph.D. (Chicano Studies)
- Carlos M. Muñoz, Jr., Ph.D. (Chicano Studies)
- Alex Saragosa, Ph.D. (Chicano Studies)
- Gary A. Soto, M.F.A. (Chicano Studies)
- L. Ling-chi Wang, M.A. (Asian American Studies)
- Terry P. Wilson, Ph.D. (Native American Studies)

Assistant Professors:
- Norma Alarcon, Ph.D. (Chicano Studies)
- Arando Y. Cabezas, Ph.D. (Asian American Studies)
- Rory Snowarow Faustett, J.D. (Native American Studies)
- Sao-Ing C. Wong, Ph.D. (Asian American Studies)

Undergraduate Major Advisers: Mr. Saragoza, Ms. Megino.

Choice of Program

A student can complete the group major in ethnic studies in the College of Letters and Science or in the Department of Ethnic Studies each with an A.B. degree. Students in each program are subject to the requirements of the respective college or department.

The Group Major in Ethnic Studies

The group major in ethnic studies provides a core curriculum designed to develop a comparative and multidisciplinary understanding of the experiences and communities of Afro-Americans, Asian Americans, Chicano, and Native Americans. Students majoring in ethnic studies study the history, culture, politics, and sociology of Third World communities in the United States within the general context of American society and institutions. Thus, they pursue knowledge vital for a critical understanding of contemporary society and for social changes to improve the lives and communities of racial minorities. Ethnic studies majors also prepare themselves for advanced graduate study in either academic or professional fields.

Breath Requirements—Special Studies

(For College of Letters and Science breadth requirements, see the college announcement)

1. Demonstrated proficiency in reading and composition, one year at college level.
2. Demonstrated competence in a language other than English. This may be fulfilled by two semesters of college-level courses or three years of high school courses in a given language.
3. Completion of a course in mathematics, statistics, logic, or computer science.
4. Completion of a course in one of the natural sciences.
5. Completion of six courses outside the student's declared area of emphasis.

Major Requirements

Lower Division.

2. Completion of a course in the history of Western Civilization or American history, or an equivalent course. A list of equivalent courses may be obtained from the adviser.

3. Completion of an introductory course in one of the four ethnic studies programs (including Afro-American studies).

Upper Division.
- 1. Completion of three core courses in ethnic studies: 130, 141, and 195.

2. Completion of two additional courses in ethnic studies.

3. Completion of six additional courses which form the basis of the declared area of emphasis. Two of the courses must be taken in two different ethnic studies programs (including Afro-American studies).

Honors. The Department of Ethnic Studies provides a program leading to the A.B. degree with honors. A student will be recommended for honors if the student has completed at least 30 units in two semesters with an average GPA of at least 3.3 for all work undertaken in the Department of Ethnic Studies and has been approved specifically for honors by the department chair upon recommendation by the faculty adviser for the group major. The honors student will be required to complete Ethnic Studies H196, Senior Honors Seminar for Ethnic Studies Majors. In order to graduate with an A.B. degree with honors, a student must obtain at least a 3.3 GPA for all course work undertaken at the University.

The Minor

Requirements:
- Five upper division courses
  1. History: Ethnic Studies 130.
  2. Electives: Two courses in ethnic studies.
  3. Electives: Two courses in Native American studies, Chicano studies, African American studies, or Afro-American studies.

Lower Division Courses.
- 20. Introduction to Ethnic Studies. (3) Two 1½-hour lectures per week. The University, its relationship to corporate structures, legislative bodies, community people, and specifically Third World people will be analyzed. The University's values will be critically examined. The history of Ethnic Studies programs in this country, their development and struggles will be discussed. (F) Wang
- 21. A Comparative Survey of Third World Experiences in the United States. (3) Three 1-hour lectures and one 1-hour discussion per week. A comparative analysis of the four racial minority groups—Afro-Americans, Chicanos, Asian Americans, and Native Americans—within the United States focusing on social, cultural, economic, and political aspects of their historical experience. (F) Staff

30. Third World Cultural Patterns. (3) Two 1½-hour lectures per week. A comparative analysis of Third World groups and cultures in America, with emphasis on patterns of thought, different cultural maps used by various groups in responding to common pan-cultural life situations.
98. Supervised Group Study and Research. (1-3) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Limited to members of the Ethnic Studies graduate group, Ethnic Studies majors who have been admitted to the Graduate Group and concentrators in Ethnic Studies. One 4-hour seminar per week. Students may obtain information regarding the requirements and curriculum from the graduate secretary of the Ethnic Studies Graduate Group.

Staff

Upper Division Courses

100. Third World Literature in America. (3) Two 1 1/2-hour lectures per week. Analysis of how selected works of poetry, short stories, novels, drama, and oral literature reflect Afro-American, Chicano, Asian American, and Native American consciousness and experiences. (SP)

130. Racial Inequality In America: A Comparative Historical Analysis. (3) Three 1-hour lectures and one 1-hour discussion per week. A comparative and historical study of racial inequality from 1600 to the present. Readings and lectures will focus on white racist attitudes and the subordination of Afro-Americans, Asians, Chicanos, and Native Americans within the context of American society and culture. (F) Staff

*131. Responses to Racial Inequality in America: A Comparative Analysis. (3) Two 1 1/2-hour seminars per week. Prerequisites: 130. Seminar on the political, economic, cultural, and social responses to racial inequality in the United States. (SP)

132. Race, Family, and Historical Change. (3) Three 1-hour lectures per week. Prerequisites: Consent of instructor: Comparative analysis of the impact of industrialization and its socio-cultural effects on sex roles, family, and social change. Three 1-hour seminars per week. A study of Afro-Americans, Chicanos, and Native Americans. Emphasis on 1880 to present to attention to diversity of historical experiences of these minorities in male/female relations, family structure, and childhood socialization. (SP)

135. Contemporary U.S. Immigration. (3) New course. Two 1 1/2-hour lectures per week. The myth, reality and history of U.S. Immigration. This course discusses issues raised by the recent Immigration in a comparative, historical approach. An examination of theories, of the politics and policy of U.S. Immigration restriction. (F)

141. Politics of Race and Class in America. (3) Three 1-hour lectures and one 1-hour discussion per week. A comparative analysis of politics in the Chicano, Black, Asian, and Native American communities with particular focus on the effect of dominant American political institutions, organizations, and local levels of those communities. Understanding of political ideologies, values, and structures of political institutions. (SP)

143. Electronic Images of Third World Communities. (3) One 2-hour lecture and three hours of laboratory per week. Students will examine theory and methods of future research in in television media-making and its impact on Third World communities. Designed to increase awareness of and move towards a measure of control over the effect of TV and the production of TV. Students will gain experience in the concept and production of electronic images. (F) Ding

*144. Law and Race: The Criminal Justice System. (3) Three hours of lecture per week. The course will explore the relationship between race, class, law, and criminal justice both in a historical and a contemporary context. Topics include: racism and the law, police, courts, prisons, youth gangs, and other related issues. (SP)

145. Religion and Ethnicity. (3) New course. Three hours of lecture per week. A comparative analysis of religion as practiced by Latinos, Blacks, Asians and Native Americans and of the interplay of ethnicity and religion. (SP) Melville

146. The Effects of Racism on Child Development. (3) Two 1 1/2-hour seminars per week. Prerequisites: Consent of instructor. This course will explore the effects of racism on Third World children. Included will be direct effects on physical growth and development. Also considered will be the indirect effects via institutional racism in schools and government agencies. (SP)

147. Third World Women. (3) Two 1 1/2-hour lectures per week. An examination of the contributions of Third World women in various fields: literature, art, politics, history, philosophy and science. An analysis of the roles and experience of Third World women within the family as an institution will also be made. (SP) Staff

*148. Economic Development in Third World Communities. (3) Two 1-hour lectures and one 1-hour discussion per week. A comparative analysis of various theories about economic development in Third World communities, explores current status, progress, barriers to, and advocacy for, and features of minority economic development in the United States. Also discussed will be labor supply, small business development, and effects of American institutions. (F)

149. Comparative Ethnic and Race Relations. (3) Three hours of lecture per week. Prerequisites: Sophomore standing. A comparative analysis of race and ethnic relations in various countries. The course is interdisciplinary and theoretical and emphasizes the interrelationship between ethnicity and social structure. (F) Barrera

150. Advanced Seminar in Third World Studies. (3) Course may be repeated for credit as topic changes. Two 1-hour seminars per week. Prerequisites: 20 or consent of instructor. Advanced seminar in Third World Studies with topics to be announced at the beginning of each semester. (F,SP) Staff

*194. Quantitative Methods for Community Research. (3) Two 1 1/2-hour lectures and one 1-hour discussion per week. To provide an understanding of quantitative research methods for studying social, economic, and political issues affecting race and ethnic minorities. At the end of the course students will be able to design experiments, interpret data, and conduct research in community milieus. Prerequisites: Consent of instructor. Three 1-hour seminars per week.) Staff

195. Research Seminar: Selected Issues and Topics. (4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Seminar on issues related to Third World experiences and communities in the United States. Students will examine theories of society and do research on topics from different methodological perspectives. Issues will vary from semester to semester. (F) Staff

196. Senior Honors Seminar for Ethnic Studies Majors. (3) Three hours of seminar per week. Prerequisites: 195. Research seminar designed to support guided writing of a senior thesis. For senior Ethnic Studies Majors who have been admitted to the honors program. (F,SP) Staff

197. Field Work in Third World Communities. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Upper division standing and consent of instructor. Supervised community field work. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

198. Supervised Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised research by lower division students. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Upper division standing and consent of instructor. Individual research on an area which leads to the writing of major paper. Regular meetings with the faculty sponsor. (F,SP) Staff

Ethnic Studies Graduate Group (Special Studies)

Group Office: 3407 Dwinelle Hall, 642-6643 Chair: Barbara Christian, Ph.D.

Professors:
William M. Bankole, Ed. D. (Afro-American Studies)  
Gerald Bigman, Ph.D. (Anthropology)  
Barbara Christian, Ph.D. (Afro-American Studies)

*Not offered 1988-89  
On leave, spring, fall  
On leave, fall

Paula Gunn Allen, Ph.D. (Native American Studies)  
Henry Jones, Ph.D. (Afro-American Studies)  
Lawrence Levin, Ph.D. (History)  
Leon Litwack, Ph.D. (History)  
Laura Nadar, Ph.D. (Anthropology)  
Michael Rogin, Ph.D. (Political Science)  
Richard Seliger, Ph.D. (History)  
William Simon, Ph.D. (Anthropology)  
Richard Suchet, Ph.D. (Geography)  
Ronald Takaki, Ph.D. (Asian American Studies)  
Olive M. S. (Music)

Associate Professors:
Mario Barrera, Ph.D. (Chicano Studies)  
James Kettner, Ph.D. (History)  
Jennifer Bell, Ph.D. (Native American Studies)  
Elaine H. Kim, Ph.D. (Chicano Studies)  
Colin Henry, Ph.D. (Afro-American Studies)  
Percy Hintz, Ph.D. (Afro-American Studies)  
Michelle Lagrada, Ph.D. (Chicano Studies)  
Margaret M. McElvile, Ph.D. (Chicano Studies)  
Charles M. Munro, Jr., Ph.D. (Chicano Studies)  
Elizabeth Peters, Ph.D. (Afro-American Studies)  
Carolyn Porter, Ph.D. (English)  
Michael Reich, Ph.D. (Economics)  
Alex M. Saragoga, Ph.D. (Chicano Studies)  
Gary A. Soto, M.F.A. (Chicano Studies)  
Eric Sundquist, Ph.D. (English)  
Paul Thomas, Ph.D. (Political Science)  
Richard Walker, Ph.D. (Geography)  
Sheila Walker, Ph.D. (Afro-American Studies)  
L. Ling-chi Wong, M.A. (Asian American Studies)  
Margaret Wilkerson, Ph.D. (Afro-American Studies)  
Terry P. Watson, Ph.D. (Native American Studies)

Graduate Adviser: Ronald T. Takaki.

The Ethnic Studies Graduate Program Studies comparatively the histories, cultures, and communities of racial minorities in the United States. It seeks to analyze how the experience of various racial minorities were similar to and different from each other, how developments such as slavery and racial discrimination set apart Americans of color from Europeans of European ancestry, and how race and class intersected in American society. Multidisciplinary in approach, it utilizes a broad range of social science and humanities methods to examine the critical area of race in American life. The curriculum focuses on racial minorities, particularly on Afro-Americans, Asian Americans, Chicanos, and Native Americans within the context of American society in general—its culture, economy, and institutions—in order to understand more deeply the origins, nature, and meaning of America’s racial diversity.

The curriculum for the Ethnic Studies Graduate Program is taught by faculty from Afro-American, Asian American, Chicano, and Native American Studies as well as faculty from Sociology, History, Economics, Political Science, Geography, Anthropology, Music, and English.

Students may obtain information regarding the requirements and curriculum from the graduate secretary of the Ethnic Studies Graduate Group.

Graduate Courses

200A. Major Issues in Ethnic Studies Scholarship: U.S. (4) One 4-hour seminar per week. Study of major issues in Ethnic Studies Scholarship will be on theories of race and class in American society as they relate to Afro-Americans, Asian Americans, Chicanos, and Native Americans. A term paper utilizing a comparative approach required. (F)

200B. Major Issues in Ethnic Studies Scholarship: World Context. (4) One 4-hour seminar per week. Prerequisites: 200A or consent of instructor. Study of the major issues of Ethnic Studies Scholarship focusing on other countries such as South Africa, Brazil, and Cuba. Emphasis will be on cross-national comparative analysis to understand race and class within a world context. A major essay required. (SP)

250. Research Seminar: Selected Issues and Topics. (4) Course may be repeated for credit. One 4-hour seminar per week. Prerequisites: 200A or consent of instructor. A seminar course designed to involve Ethnic Studies students directly in the research process. Emphasis on examination and analysis of primary sources, and

*On leave, spring  
Recipients of distinguished teaching award.
methodology, and the development of theoretical con- structs. A major research paper is required. (F,SP)

296. Directed Dissertation Research. (4-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual instruction. For qualified students directly working on the doctoral dis- sertation. (F,SP)

297. Directed Reading: Group Major in Film. (2-4) Course may be repeated for credit. Individual instruction. Prepared by students for major's examinations. (F,SP)

298. Directed Reading: Race Minority in the United States. (2-4) Course may be repeated for credit. Individual instruction. For qualified students directly working on the doctoral dissertation. (F,SP)

299. Major Works in Afro-American Studies. (2-4)

300. Major Works in Asian American Studies. (2-4)

301. Major Works in Chicano Studies. (2-4)

306. Special Topics. (2-4)

601. Individual Study for Master's Students. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual instruction. For students to prepare for master's examinations. (F,SP)

602. Individual Study for Doctoral Students. (2-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 200A-200B. Individual conferences. Course is designed to prepare students for the doctoral oral examination. A student will be permitted to accumulate a maximum of 16 units in 601 and 602, respectively, toward examination preparation. Units earned in these courses may not be used to meet academic residence or unit requirements for the master's or doctoral degree. (F,SP)

Professional Courses

301. Professional Training: Teaching. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour classes and one 2-hour seminar per week. Prerequisites: Appointment as a graduate student instructor. To develop teaching skills, especially in undergraduate courses. (F,SP)

Film

(College of Letters and Science)

Group Major Office: Division of Special Programs, 301 Campbell Hall, 642-6584

Advisory Committee: William Nestrick, Head Adviser (English and Comparative Literature), Berndt Augst (French and Comparative Literature), Seymour Chatman (Rhetoric), Carol J. Glover (Scandinavian), Anton Kaes (German), Gary给别人 (Italian).

Group Major in Film

The group major in film is administered by the Division of Special Programs. It has been designed to place the history and theory of film in the larger context of humanistic studies.

Lower Division

Film 1A-1B (freshmen only)—English Composition in Connection with Film Texts and Film Techniques (not offered every year) or Film 2—Basic Film Techniques.

History of Film: two courses, one on film from its beginnings, covering the silent period and the con- version to sound (to 1930) (Film 25a, Comparative Literature 25a) and the other on the classical period through the New Wave and the emergence of new ethnic and national cinemas (1930-1971) (Film 25b, Comparative Literature 25b).

Language Requirement: In addition to the language used for the entrance to the college, students will choose a second language. The choice of a language is to be made so that, between the entrance re- quirement and the second language, both groups of the following language are represented:

Group One: French, German, Italian, Japanese, Russian, or Swedish.

Group Two: Czech, French, German, Polish, Por- tuguese, Serbo-Croatian, or Spanish.

The student is to attain the level of three semesters in one language and two semesters in the other language. (Three years of a language in high school with minimum two semesters two semesters of a language in college. For further information see the Announcements of the College of Letters and Science. Courses taken to fulfill the language re- quirement for the major may be taken passed/not passed, but if they are also fulfilling the college requirement the last semester must be taken for a letter grade.

Upper Division (30 units of upper division credit are required)

Film Theory: One course on the history of film theory (e.g., 108, 175, 180, 132).

Auteur: One course on an individual auteur (e.g., Film 151, Italian 175, Rhetoric 127, Scandinavian 330).

Genre: Two courses on film genres (e.g., Film 108, English 176).

Film Electives: (Approximately 15-18 units) required to complete the major requirements of 3 upper division units (e.g., Afro-American Studies 142A, Italian 175, 179, Native American Studies 158, South and Southeast Asian Studies 137. Note: The class topics may change; be sure they apply to film, and if you are in doubt please check with your instructor.

Honors Program. To be eligible for admission to the honors program in Film, a student must have attained senior standing with a grade-point average of 3.3 or higher on all University work and a 3.5 grade-point average or higher in courses in the major. The levels of honors is as follows: Honors—3.50 GPA, High Honors—3.67 GPA, and Highest Honors—3.84 GPA. Students in the honors program are to take Film 108 for a letter grade to complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis and the film submitted as a documentation or example, it is expected that the thesis will be a substantial piece of writing on film criticism or film history.

Lower Division Courses

1A. English Composition in Connection with Film Texts and Film Techniques. (4) Three hours of lecture plus three hours of film laboratory per week. Prereq-uisites: Subject A. The historical evolution of editing practices will be studied in conjunction with classical writings on film. Compositions will deal with the kinds of language present in silent film texts and the ideological and reportage aspects of documentary. This course is not open to students who have already completed the Reading and Composition requirement.

1B. English Composition in Connection with Film Texts and Film Techniques. (4) Three hours of lecture plus three hours of film laboratory per week. Prereq-uisites: 1A is prerequisite to IB. Writing in conjunction with the issue of translating a novel, a drama, and a poem into film. Topics will include readings on and examples of the avant-garde and experimental film.

2. Basic Film Techniques. (4) May not be taken in addition to 1A-1B. Four hours of lecture per week and one hour of lab interspersed within the lecture. Prereq-uisites: Limited enrollment and consultation of instructor. A course for intended film majors. Offers an introduction to the writings of early film theorists along with the historical evolution of editing practices in the silent, documentary and experimental film. Readings include technical discussions of lenses, film labs, lighting and special effects. (F,SP)

25A. History of Film. (4) Three hours of lecture and three hours of film laboratory per week. Prereq-uisites: 1A-1B or 2. From the beginnings through the silent period. In addition to the development of the silent film, the course will conclude with an ex- amination of the technology of sound conversion and examples of early sound experiments. (F)

25B. The History of Film. (4) Three hours of lecture and three to four hours film laboratory per week. Prereq-uisites: 1A-1B or 2. The study from a historical per- spective, of major theorists of film. (SP)

Upper Division Courses

100. History of Film Theory. (4) Three hours of lecture and three to four hours film laboratory per week. Prereq-uisites: 1A-1B or 2. The study from a historical per- spective, of major theorists of film. (SP)

106. Special Topics in Film Genre. (4) Course may be repeated for credit. Three hours of lecture and three to four hours film laboratory per week. The study of film by "kind." Focus on a particular genre such as the documentary, the western, the animated film, film noir, the musical. (SP)

151. Auteur Theory. (4) Course may be repeated for credit. Three hours of lecture and three to four hours film laboratory per week. Prerequisites: 100 or equivalent. The works of a single director. (SP)

150. Honors Thesis. (4) Independent. Prerequisites: Senior standing with a 3.3 GPA on all University work and a 3.5 GPA in courses in the major. Students in the honors program are to take 195 for a letter grade to complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis and the film submitted as a documentation or example, it is expected that the thesis will be a substantial piece of writing on film criticism or film history. (F,SP)

194. Directed Group Study. (1-4) Course may be re- peated for credit as topic varies. Must be taken on a pass/fail/pass basis. One to four hours of lecture per week. Prerequisites: 100 or equivalent and consent of instructor. Group studies of selected topics which vary from year to year. Field shall not coincide with that of any regular course and shall be specific enough to allow students to write an essay based upon the study. (F,SP)

195. Supervised Independent Study for Advanced Undergraduates. (1-4) Must be taken on a pass/fail basis. To be arranged. Prerequisites: 100 or equivalent. Open to majors with consent of instructor and major adviser. Reading and conference with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable the student to write an essay based upon his/her study. (F,SP)

Folklore

(College of Letters and Science)

Program Office: 201 Kroeber Hall, 642-2092

Chair: Alan Dundes, Ph.D.

Professors: Karel Brada, Ph.D. (Anthropology)
James Deetz, Ph.D. (Anthropology)
Alvin Dundes, Ph.D. (Anthropology)
Daniel F. Mella, Ph.D. (Rhetoric)
John F. Lindsey, Ph.D. (Scandinavian)
Bonnie Wada, Ph.D. (Music)
Wolfram Eberhard, Ph.D. (Emeritus) (Sociology)

Associate Professors: Daniel F. Mella, Ph.D. (Rhetoric)
Michael N. Nagler, Ph.D. (Classics)
John D. Sies, Ph.D. (English)

The Folklore Program

This program is designed to provide graduate stu- dents with a competent knowledge of both the ma- terials of folklore and the various methods of studying these materials. The program is an interdisciplinary one in which faculty members from both the hu- manities and the social sciences participate. The scope of the courses is international. However, stu- dents may specialize in a particular genre, e.g., folktale, or in a particular area such as Russian folklore.

The Major

There is no undergraduate major in folklore.
Preparation for Graduate Study

The best preparation for the graduate program in folklore is a strong undergraduate record in one of the breadth fields with which folklore is closely affiliated. Since it is a study of the human expression which is handed down by tradition rather than by writing, it is related to all departments that deal with literature, art, music. Since folklore also deals with the entire range of mankind's experience, it has close affiliations with anthropology, design, history, linguistics, philosophy, psychology and sociology. Consequently, a good undergraduate record in any of these disciplines is highly desirable though not necessarily required.

The Graduate Program

The requirements for the M.A. in folklore include 20 units of which at least 10 must be graduate level (200 number) in folklore, and an M.A. thesis based upon field work or some other research project. No course credits are allowed for the thesis. Students must take at least one course in two of the following three areas: folk narrative, folk or ethnic music, folk and primitive art. As an introduction to the discipline, students must take Anthropology 100, The Form of Folklore. In addition, all students are required to take the interdisciplinary Folklore 250A-250B, Folklore Theory and Techniques. The student must also demonstrate proficiency in reading at least one foreign language. German is perhaps the most useful language for folklore studies, but French, Spanish, or some language intimately connected with the M.A. thesis will satisfy this requirement. Questions on the requirements for the M.A. in folklore should be addressed to the graduate adviser, Folklore Program, in 201 Kroeber.

Graduate Courses

250A-250B. Folklore Theory and Techniques. (4-4) Two hours of seminar and 7-hours outside class per week. Prerequisites: Consent of instructor. An interdisciplinary consideration of diverse topics related to folk and related materials occurring in plant material, with emphasis on woody plant structures. Qualified undergraduates may take this course. Offered even-numbered years. (SP) Zavarin

286. The Folktales and Allied Forms. (4) One 3-hour section per week. The study of folk narrative, including folk forms and types, classificatory systems, theories of myth and folklore, and methods of analyzing prose narrative.

Readings In Folklore. (3-6) Course may be repeated for credit. Individual conferences to be arranged. (F,SP)

Directed Research. (3-6) Course may be repeated for credit. Individual conferences to be arranged. (F,SP)

Staff

Forest Products

(College of Natural Resources)

Department Office: 145 Mulford Hall, 642-3765; If no answer, call 478 Richmond Field Station, 231-8458

Undergraduate Adviser: T. Rials.

The major in forest products is designed for students interested in the wise utilization of the many products obtained from trees and in obtaining an education embracing the broad field of renewable natural resources. Emphasis is placed on technical properties of the material to maximize benefits from the harvested tree. Courses provide a basic understanding of wood and its uses, the interactions with forest management and the importance of effective utilization in the management and conservation of forests. Students may select elective courses that are relevant to their individual interests and career objectives.

Career areas for men and women with a B.S. degree in Forest Products include supervision of production, planning of processing methods and facilities, and quality control; research and development of products and processes; and marketing, sales, and technical services. Students who desire careers in research or teaching may also prepare themselves for graduate studies leading to the M.S. or Ph.D. degrees with specialization in areas such as wood chemistry, wood physics, forest products pathology, wood anatomy, and pulp and paper chemistry.

During their freshman and sophomore years, students are expected to complete the following: biology, 3 units; chemistry, 8 units; calculus, 3 units; physics, 8 units; statistics, 3 units; English, 8 units; economics, 5 units; and approximately one-half of 18 units of restricted electives in social science or humanities. Students in their junior or senior years must complete specified courses in forest products and forestry, the remainder of the restricted elective requirement, and sufficient elective courses to satisfy total unit requirements.

Lower Division Courses

10. Wood As a Renewable Natural Resource. (3) Three 1-hour lectures per week. Surveys the role of wood as a renewable, biodegradable resource in meeting needs of society for shelter and consumer products. Comparative review of renewable and non-renewable resource systems, and properties and uses of wood relative to ecological and environmental considerations.

Upper Division Courses

131. Wood Structure and Identification. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: Upper division students from other departments must consent of instructor. Gross and minute characteristics of wood in relation to identification and examination of wood anatomy, identification of commercial woods, relation of principal physical and mechanical properties to conditions of timber growth.

132. Physical Properties of Wood. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 131; eight units of physics. Density, physical stability, and durability of wood as influenced by such factors as wood characteristics and moisture content; thermal, electrical, and acoustical properties of wood.

133. Mechanics of Wood. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 131; eight units of general physics; upper division students from other departments must consent of instructor. Strength and stiffness of wood and structural lumber, factors affecting strength, derivation of working stresses, structural elements of wood and wood composites.

134. Chemistry of Wood and Bark. (3) One 2-hour lecture plus one 3-hour laboratory per week. Prerequisites: 3 units of organic chemistry; upper division students from other departments must consent of instructor. Chemical nature of wood and bark and the analysis and important reactions of their constituents, including cellulose, hemicelluloses, lignin, and associated materials. (F) Quaries

135. Biological Deterioration of Wood. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Study of the deterioration of wood in use by fungi, bacteria, and insects, and its control or prevention. Offered in odd-numbered years. (SP) Schniewind

136. Chemical Processing of Wood. (2) One 2-hour lecture per week. Prerequisites: Consent of instructor. Study of the deterioration of wood in use by fungi, bacteria, and insects, and its control or prevention. Offered in odd-numbered years. (SP) Willcox

141. Mechanical Processing of Wood. (2) Two 1-hour lectures plus one 3-hour laboratory per week. The theory of converting logs into sawn, peeled, or other machine-produced products.

142. Bonding Processes for Wood. (3) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Principles of bonding, selection of wood adhesives and bonded wood products. The manufacture, quality control, testing, and the uses (performance) of particleboard and other glued products, including furniture. Plant visits. (F) Lemaster

143. Chemical Processing of Wood. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 134 or consent of instructor. The technology and associated chemistry of processing wood and its derivatives, including: pulping, pulp bleaching, papermaking, hydrolysis to sugars and lignin, pyrolysis to organic products, gasification to syngas, and other chemical conversions of wood. Energy and environmental aspects will be considered. (SP) Brick

190. Performance of Wood In Structures. (3) Three 1-hour lectures per week. A survey of wood properties and wood products of importance to building design with emphasis on wood dimension. Case studies of wood products in structures to avoid wood biodegradation failures. (SP) Wilcox

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/not pass basis. Meetings to be arranged. Prerequisites: Consent of instructor. Group study of special problems in forest products. (F,SP)

Graduate Courses

231. Wood Formation and Structure. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: 132 or equivalent, or consent of instructor. Biology of wood formation including meristematic activity in formation of primary growth of woody plants and initiation of secondary cambium. Developmental studies of cambium, and regulation through hormone action. Formation of microfibrils in cell wall. Offered odd-numbered years. (F) Dodd

232. Advanced Wood Physics. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 132 or equivalent. Absorption of water, liquid, and gases by wood. Shrinkage and swelling in water, aqueous solutions, and non-aqueous liquids. Fluid flow including permeability and diffusivity. Physical properties with modes of heat transfer. Important in wood processing and usage. Offered even-numbered years. (F) Quaries

233. Advanced Wood Mechanics. (3) Three 1-hour lectures per week. Prerequisites: 133. Deformation and fracture of wood, mechanics of the cell wall and current topics from literature. Offered odd-numbered years. (SP) Schniewind

234. Chemistry of Polysaccharides, Lignin, and Extractives. (3) Three 1-hour lectures per week. Prerequisites: 134 (may be taken concurrently) or equivalent. Aspects of nomenclature, structures, biosynthesis, reactions, and distribution of terpenoids, fat, flavonoids, tannins, lignins, monosaccharides and polysaccharides, and related materials occurring in plant material, with emphasis on woody plant structures. Qualified undergraduates may take this course. Offered every-numbered years. (SP) Zaviran, Brink

235. Special Topics In Wood Science and Technology. (1-3) Course may be repeated for credit. To be arranged. Minimum of four hours of work per week per unit. Prerequisites: Consent of instructor. Offered even-numbered years. (F) Staff

236A. Wood Anatomy. (1-3) Advanced study in wood anatomy primarily for advanced graduate students.

236B. Wood Chemistry. (1-3) Advanced study in wood chemistry primarily for advanced graduate students.

237C. Chemical Processing Of Wood. (1-3) Advanced study in chemical wood processing primarily for advanced graduate students.

238D. Wood Mechanics. (1-3) Advanced study in wood mechanics primarily for advanced graduate students.

238E. Wood Physics. (1-3) Advanced study in wood physics primarily for advanced graduate students.

238F. Physical/Mechanical Processing Of Wood. (1-3) Advanced study in physical and mechanical processing of wood primarily for advanced graduate students.

239G. Wood Products Pathology. (1-3) Advanced study in wood product pathology primarily for advanced graduate students.

239H. Wood Adhesion and Adhesives. (1-3) Advanced study in wood adhesion and adhesives primarily for advanced graduate students.

239I. Production Management. (1-3) Advanced study in forest products production management primarily for advanced graduate students.

239J. Wood Formation and Quality. (1-3) Advanced study in wood formation and quality primarily for advanced graduate students.

*Not offered 1988-89
*On leave, spring, fall
*On leave, fall
*Recalled to active service
*Recipient of Distinguished Teaching Award
Forestry and Resource Management
(College of Natural Resources)

Department Office: 145 Mulford Hall, 642-3765

Professors:
- David L. Brink, Ph.D. University of Minnesota. Chemical properties and assessment
- Lawrence S. Davis, Ph.D. University of California at Berkeley. Remote sensing
- Don C. Erman, Ph.D. Utah State. Fisheries ecology
- John A. Hauser, Ph.D. University of Washington. Silviculture
- William L. McKillop, Ph.D. University of California at Berkeley. Forest genetics
- Robert E. Martin, Ph.D. University of Michigan. Wildland fire control and management
- Joe R. McBride, Ph.D. University of California at Berkeley. Forest economics
- W. Wayne Wilcox, Ph.D. University of Wisconsin, Madison. Mechanical behavior of wood
- Eugene Zavarin, Ph.D. University of California at Berkeley. Wood chemistry
- Emanuel Fritz, M.F. (Emeritus) Yale University. Wood technology
- Robert N. Colwell, Ph.D. (Emeritus) University of California at Berkeley. Range ecology and management
- Lee C. Wensel, Ph.D. University of Minnesota. Sampling
- Gregory S. Biging, Ph.D. University of Wisconsin, Madison. Forest mensuration
- Barbara H. Allen, Ph.D. University of California at Berkeley. Range management
- Russell G. Congalton, Ph.D. Virginia Polytechnic Institute and State University. Remote sensing
- Michael L. Morrison, Ph.D. Oregon State University. Wildlife ecology
- Jeffrey M. Ruess, Ph.D. Cornell University. Forest and wildlife ecology
- Donald P. Gasser, M.S. University of California at Berkeley. Forest harvesting systems

Graduate Programs

Wildland Resource Science. The department offers the Master of Science and Doctor of Philosophy degrees in Wildland Resource Science. Students may choose to specialize in one of a variety of fields, including agroforestry, biometrics, ecology, economics, fisheries, forestry, genetics, management, photogrammetry and remote sensing, range planning and policy, silviculture, sociology, soils water and wildlife. Graduate programs can also be designed to develop knowledge in a combination of fields. This integrative approach can be useful in providing new knowledge and innovative approaches to problems.

Master of Forestry. The department also offers a Master of Forestry degree. This is a professional degree in forestry designed to enable students to gain the skills and experience to perform the tasks of a professional forester. Graduates of the Department of Forestry and Resource Management are employed by the U.S. Forest Service, the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management, the U.S. National Park Service, various state and local forestry, wildlife, and park departments, international development and implementation agencies, private timber companies, consulting firms, and environmental organizations.

Options. Within the forestry major, students select one of three options. These options are: 1) Forest Management; 2) Wildlife Management; or 3) Range Management.

Program Flexibility. One third of the upper division course work for the major consists of core courses that provide a common base of knowledge essential for all of the options. Another third of the upper division course work is chosen by the student from the set of restricted electives for the option. The final third of the upper division course work is made up of free electives. In consultation with a faculty advisor, students choose these free electives to further their individual interests and to broaden their education.

Accreditation and Licensing. Established in 1914, the forestry major at Berkeley was the first forestry degree in California to be accredited by the Society of American Foresters. Completion of the Bachelor of Science degree requires the student to complete 4 years of credit towards meeting the required seven years of qualifying education or professional experience for licensing as a professional forester in California. An additional year of junior-senior licensing must be obtained before completing the Master of Forestry degree. Students taking the Wildlife Option can obtain the necessary course work for certification as an associate wildlife biologist by the wildlife society. By careful selection of electives, students who complete the Bachelor of Science in forestry degree can meet the U.S. Civil Service and state requirements for a forester, range conservationist, or wildlife biologist.

Preparatory Program. During the freshman and sophomore years students study to combine a broad general education with the principles of forestry and to relate these principles to professional and career goals. A minor consists of a total of 18 semester units, 8 units of biology, 8 units of chemistry, 3 units of economics, 3 units of units surveying, 8 units of English, 4 units of geology, 6 units of calculus, and 3 units of statistics. Additionally, freshmen and sophomores students will take a course in computer programming. Sophomores may also elect to take F121 (Dendrology), F170 (Wildlife Ecology), or F141 (Principles of Range Management) provided they meet the prerequisites for these courses.

Minor in Forestry and Resource Management. A minor in forestry and resource management is for students who are interested in learning about renewable resource management as an adjunct to their chosen fields. Students in many diverse majors such as zoology, business administration, and civil engineering may find this minor complementary to their professional and career goals. A minor consists of any least 12 semester units (including both upper and lower division courses) which must be taken for a letter grade. A minimum grade-point average of 2.0 must be obtained in the chosen courses.

Summer Field Program. In the summer between the sophomore and junior years, students may complete the eight-week, 10 unit summer field program in the northern Sierra Nevada. The program emphasizes the acquisition of practical field skills and the integration of knowledge about soils, water, trees, wildlife, forest and recreation to manage forests and wildlands. About 80 percent of each day is spent outside, and the program includes several field trips to the surrounding pine and fir forests of the Plumas National Forest.

Summer Employment. Students are encouraged to further their professional training by taking summer positions in forestry, wildlife, or range management. The department has an employment coordinator to assist students in securing such positions in their freshman and junior summers.

Graduate Programs

Wildland Resource Science. The department offers the Master of Science and Doctor of Philosophy degrees in Wildland Resource Science. Students may choose to specialize in one of a variety of fields, including agroforestry, biometrics, ecology, economics, fisheries, forestry, genetics, management, photogrammetry and remote sensing, range planning and policy, silviculture, sociology, soils water and wildlife. Graduate programs can also be designed to develop knowledge in a combination of fields. This integrative approach can be useful in providing new knowledge and innovative approaches to problems.

Master of Forestry. The department also offers a Master of Forestry degree. This is a professional degree in forestry designed to enable students to gain the skills and experience to perform the tasks of a professional forester.
of society for wood, water, forage, and recreation, and the resulting conservation policies. (F) Zinke

11. Introduction to Forestry and Resource Management. (2) Must be taken on a passed/not passed basis. One 1-hour lecture and one 3-hour laboratory per week. Introduction to the basic principles of natural resource management and the opportunities in forest and resource management. Basic skill development in tree, land, and other resource measurement and inventory. Field evaluation of public and private land management. (SP) Teaguearden

51. Forestry Computer Programming and Applications. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: High school algebra. Introduction to computer operating systems, programming, and applications. Programs related to forests. Includes the BASIC programming language and computer exercises drawn from forestry applications. (F) Biging, Gilless

90. Senior Faculty Seminar. (1) Must be taken on a passed/not passed basis. One 2-hour seminar every other week. Prerequisites: Forestry major or consent of instructor. Selected topics in forest and wildland management. Readings, meetings, and discussion with senior and emeriti members of the faculty. (F,SP) Staff

Upper Division Courses

100A. Resource Ecology. (4) Fifty hours of lecture and field exercises per week for three weeks (including Saturday field sessions), Prerequisites: 8 units of biological science. Field identification and ecological framework for management of trees, shrubs, forbs, and grasses. Insects, pathogens, and soils in the forest and associated meadows, riparian zones, and shrub fields typical of the Northern Sierra. Introduction to ecosystem processes and vegetation analysis. Experiments in forest communities. (SP) Zinke

100B. Forest Measurements, Aerial Photography, and Surveying. (2) Fifty hours of lecture and field exercises per week for two weeks (including Saturday field sessions), Prerequisites: 100A. Procedures for measuring the forest resource. Introduction to land surveying, aerial photography, forest inventories, and measurement of trees and forest growth. Experiments in forest ecosystems. Co-requirement: 100A. (SP) Davis

100C. Use and Production of Forest Resources. (2) Fifty hours of lecture and field exercises per week for two weeks (including Saturday field sessions), Prerequisites: 100A. Evaluation of forest regeneration, use of improved genetics, use of silvicultural systems, harvesting, and access systems, wood quality, and utilization of forest products. Visits to industrial and Forest Service operations to evaluate land management practices and sawmill operations. Experiments in forest ecosystems. Co-requirement: 100A. (SP) Davis

100D. Multi-Use Forest Resource Management. (2) Fifty hours of lecture and field exercises per week for one week (including Saturday field session), Prerequisites: 100C. An introduction to integrative planning. The interactions of water, wood, wildlife, range, fisheries, and recreation resources are examined to develop an environmental assessment report and multiple-use management plan for selected study areas. On-site analysis, presentation, and review of reports and plans is conducted. Experiments in forest ecosystems. Co-requirement: 100A. (SP) Zinke

101. Forest and Wildland Resource Inventory. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 20, 20A, or consent of instructor. Subject of ecological and practical concepts presented to introduce concepts of forest and wildland resource inventory systems. Statistical designs include random, stratified, double and two stage sampling methods. Methods of inventory estimation. Applications include timber sale; compartment, forest, and rangeland stocking estimates, as well as estimates of change or growth. (SP) Wensel

102. Forest Photogrammetry and Photo Interpretation. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 101A or 101B. Practical and conceptual presentation of techniques for using remote sensing, specifically aerial photography, for natural resource management. Includes photo measures of scale, parallax area, and object height; flight plans and geometry; an introduction to the electromagnetic spectrum; and photo interpretation and mapping. Course concludes with an introduction to digital remote sensing data. (SP) Congalton

103. Forest Harvest Systems. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Upper division standing in forestry or consent of instructor. Design and operation of tools and systems for forest extraction systems development for forest management. The appropriate application of technological means for forest thinning and extraction are explored in light of biological, political, economic, and personnel aspects of forest operations. (F) Gasser

104. Forest Measurements. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 100B and 101, or consent of instructor. Measurement and estimation of growth and yield of forest stands using basic techniques from statistics and mathematics. (SP) Biging

105. Wildland Fire Science and Management. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Consent of instructor. History and effects of fire in forests and ranges, fundamentals of fuels, combustion, and fire behavior; organization of fire management; fire use; computer, laboratory, and field exercises. (SP) Martin

106. Forest Insects and Diseases. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 110 or consent of instructor. Quantitative techniques of forest economics. Analysis of forest products markets. Assessment of investment opportunities in forestry. Forest taxation and asset valuation. (F) Gilless, McKillop

111. Advanced Forest Economics. (3) Three 1-hour lectures per week. Prerequisites: 110 or consent of instructor. Problems of multiple-use forest management and development. Techniques of economic analysis. Market models for forest products. Allocation of resources between public and private interests. Impacts of governmental resource ownership and regulation. (F) Gilless, McKillop

113. Forest Management, (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 101, 110, and 125. Management of forest properties to meet owner objectives for income, timber, wildlife, forage, amenities, and other outputs. Classification and organization of land data and yield-response information for quantitative analysis. Fundamentals of multiple goal decision analysis and forest management scheduling. Evaluation of alternate management plans. (SP) Zinke

114. Forest Resource Planning and Decision-Making. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 110, 111, and 113. Principles and case studies in forest planning and decision-making. Use of mathematical models, benefit cost analysis, and consensus techniques. Decision-making with unpriced values and multiple objectives. (SP) Teaguearden

115. Forest and Wildland Resource Policy. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: Senior standing. Evolution of forest and wildland policy and management in the U.S.; processess and groups involved in formulating wildland resource policies and programs; administration of policies; current issues in wildland resource conservation. (SP) Romm

116. Forest Recreation Use and Management. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Junior standing. Economic forest and wildland recreation use and management by local, state, and federal agencies in a variety of ecological and social settings. Offered odd-numbered years. (SP) Staff

117. Sociology of Natural Resources. (3) Three 1-hour lectures and one 1-hour discussion per week. Sociological perspective on the relationship between societies and wildland resource management: Social definition of natural resources; identification of publics; social organization of resource use; public involvement; and social impact analysis. (SP) Foremann

120. Forest and Range Soils. (2) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Soils and soil chemistry and geography and general chemistry. The properties of soil in relation to the influence of forest and wildland vegetation. The relationship of these soil properties to forest management, and the use of soil data for site selection, pest control, and the maintenance of forest and range productivity. Offered odd-numbered years. (F) Zinke

121. Trees: Taxonomy and Growth Structure. (3) New course. Two 1-hour lectures and one 3-hour laboratory per week. Study of trees and associated woody vegetation and their taxonomy and distribution, modes of growth and diameter growth, and stem structure. Modes of growth and stem structure will be considered in relation to habitat and life cycles, and for timber value. Two required field trips (one over eight). (F) Dodd

122. Forest Influences. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: Introductory chemistry, biological science, and geology. The influence of the forest and wildland vegetation on energy and temperature; estuarine and intertidal; on hydrology, the local water balance, and watershed processes involving water yield and water quality. Principles applicable to watershed and environmental management for forest ecosystems. Experiments in forest ecosystems. Offered odd-numbered years. (SP) Staff

123. Forest Ecology. (4) Three 1-hour lectures and one 4-hour field lab exercise per week plus two-day (weekend) field trip. Prerequisites: 100A, eight units of biological science, and 8 units of chemistry. The ecology of forests from the perspectives of ecosystem and cell to ecosystem levels. Topics include physiological plant ecology, and vegetation dynamics. Major emphasis on the understanding of forest ecology as a basis for management of forest ecosystems. Field laboratory exercises to illustrate ecological principles and develop techniques for the assessment of forest ecosystems. (SP) Staff

124. Wildland Systems Ecology. (3) Students who have taken 123A and 123AL during the 1983-84 or 1984-85 academic year will receive no credit. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: One biology course. Study of whole system properties, processes, and models; how ecosystems develop; principles of ecosystem maintenance, management, and restoration. (SP) Zinke

125. Principles and Practices of Silviculture. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 123 or course in community ecology. Three Saturday field trips will be scheduled in lieu of several labs. Principles and practices of establishment, growth, composition, and quality of forest trees and stands. The manipulation of forests and control of stand structure to enhance forest productivity. (F) Heilms

126. Forest Ecology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 123. Review of the principles of plant ecology in the context of forest ecosystem. Emphasis placed on current research in the field of forest ecology and forest types in California. (SP)

127. Forest Genetics and Tree Improvement. (2) Two 1-hour lectures and 1-hour of discussion per week, plus field trips. Prerequisites: Biology 1 or equivalent, 123. Focuses on genetic and evolutionary theory in the context of tree improvement methods. Class will include general treatments of tree genetics, examples of forest trees are given, and the implications of this knowledge for forest management are presented. Classical tree-improvement is reviewed and critically evaluated. Classical tree-improvement is presented as a standard of comparison for tree improvement. (F)

131. Laboratory in Wood Identification. (2) One 3-hour laboratory per week and three hours of reading per week. Prerequisites: Forestry 121 (may be taken concurrently). The use of gross and minute characteristics of wood for identification. (SP) Dodd

141. Principles of Rangeland Management. (4) Formerly 141L incorporated into 141. Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: 4 semester units of biology. Application of plant and animal

"On leave, spring
"Recalled to active service
"Recipient of Distinguished Teaching Award
ecology to the understanding of rangeland ecosystems with emphasis on grazing dynamics and management options to improve production of rangeland goods and services. Lab focus is on the development and use plan for a small UC rangeland property. Field evaluation of the site, use of a GIS, ID team work and formulation of a final plan are integrated activities in the lab. Occasional field trips may go beyond scheduled lab time, TBA in class. (F) Allen

142. Range Plants. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Systematic relationships and identification of range grasses, forbs and shrubs; their distribution, growth, forage values, and responses to use. (SP)

143. Range Animal Nutrition. (2) Two 1-hour lectures plus one 2-hour laboratory per week. Prerequisites: General chemistry and biology. Nutritional principles of feeding practices of animals grazing rangelands. Covers of relevant areas in nutrition; carbohydrate, protein, lipid, mineral, vitamin nutrition; composition of feeds; nutrient requirements. Consideration of reproduction, growth, etc. relative to environment and nutritional factors. Supplementation ration formulation. Offered odd-numbered years. (F) Staff

144. Range Ecology. (3) Three 1-hour lectures per week. Prerequisites: One course in ecology. The ecological basis for range management activities, considered in the context of western range ecosystem types. Specific range improvement and management practices are discussed. (SP) Bartolome

150. Agroforestry Systems. (3) New course. Two 1-hour lectures and one 3-hour lab per week. Prerequisites: Upper division standing. Agroforestry principles. Agroforestry systems in use worldwide are examined, with the emphasis on contemporary agroforestry systems design and management. Economic, biological, social, and political conditions for success of agroforestry systems are analyzed. Some laboratory sessions will be field trips that will extend beyond the scheduled lab time. (SP) Gassner

170. Wildlife Ecology. (2) Two 1-hour lectures per week. Introduction to wildlife ecology and its relationship to management programs. Includes population, community, and ecosystem levels of organization, followed by selected case studies. (F) McCullough

171. American Wildlife: Identification and Conservation. (2) One 1-hour lecture and one 3-hour laboratory per week. Identification and life histories of wildlife in North America, with emphasis on species with commercial or recreational value. The conservation of rare and endangered species is highlighted. (F) Morrison

176. Advanced Wildlife Management. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 101 and 170. An advanced coverage of management principles, procedures, and techniques of managing terrestrial wildlife with an emphasis on North American forest and rangeland ecosystems. (SP) Barrett

177. Case Histories in Wildlife Management. (2) Two 1-hour seminars per week. Prerequisites: 170. Seminar format with presentation and discussion by each student, with long term paper requirement. Examination in depth of current issues in wildlife management. (SP) Barrett, Morrison

178. Freshwater Ecology. (3) Two 1-hour lectures and one 1½-hour discussion lab per week. Prerequisites: 5 semester units of biology; upper division standing. Description of the biota and their interactions in lakes and streams. Outside reading for week. Prerequisites: Topics of entrophy, ecological succession, pollution, reservoirs, introduced species, spawning of salmonids. Laboratory is an independent research project. (SP) Barrett

180. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/fail basis. May be taken as a pass/not pass basis. To be arranged. Prerequisites: Consent of Instructor. Group study of special problems related to forestry and resource management. (F,SP) Staff

187. Supervised Independent Study and Research for Undergraduates. (1-4) Must be taken on a pass/fail basis. To be arranged. Prerequisites: Consent of Instructor. See regulations regarding restrictions on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

201. Advanced Forest Sampling. (2) Two 1-hour lectures plus one 1½-hour seminar per week. Prerequisites: 101, 104, or equivalent; or consent of instructor. Application of advanced sampling theory to the measurement of forest and wildland resources, estimates, sampling designs, remote sensing, and multiple surveys. (SP) Wenzel

203. Remote Sensing of Forest and Other Natural Resources. (2) One 3-hour lecture/seminar per week. Students who previously received credit for 202 may enroll for credit in 203. Advanced photographic systems including color and color infrared aerial photography, films and film processing, and photography. Non-photographic systems including multi-spectral scanner, thermal, and RADAIR. The use of image processing, geographic information systems, and accuracy assessment. Topics to be discussed in a 3-hour lecture including laboratories to be arranged. (SP) Congalton

204. Advanced Forest Munis. (2) One 2-hour lecture per week. Prerequisites: 101, 104; Statistics 20. Statistics 161 is recommended. An overview of research concerns concerning growth modeling of forest stands and trees. Statistical and mathematical forest modeling techniques. (F) Biging

205. Seminar on Fire as an Ecological Factor. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour lecture/seminar per week. Effect of fire on ecology of forest and rangeland. (SP) Martin

209. Research Concepts and Methods. (3) Two 1½-hour lectures/seminars per week. Prerequisites: Basic courses in statistics. Conceptual and methodological bases of research design, data analysis, and interpretation. Case studies and individual projects utilized. (SP) Staff

210. Seminar in Advanced Forest Economics. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Graduate level economic theory and economic analysis of a range of topics, including assessment of non-market values, analysis of forest products demand and supply, models of inter-regional trade, national and regional impact assessment, intertemporal allocation of forest resources, and role of forestry in economic development. (F) McKillop

211. Seminar in Analysis of the Forest Economy. (2) One 2-hour lecture/seminar per week. Prerequisites: 8 semester units of economics, resource economics, or forest economics. Theory and practice of benefit-cost analysis in forestry, with special reference to evaluation of investment projects, resource development programs, and land-use planning. (SP) Teegarden

213. Advanced Forest Management. (3) One 2-hour lecture and one 3-hour laboratory per week. Prerequisites: 113 and 114. Application of mathematical programming techniques to forest related harvest scheduling. Comparative evaluation of even-aged systems. Contemporary forest management issues. (F) Davis

214. Case Studies in Forest Management. (1-5) Course may be repeated for credit. Minimum of four hours per week. Prerequisites: 101, 102, 104, 113, and 125, or equivalent. Individual case studies involving the inventory, analysis, and management of forest resources. Intended primarily for Master of Science candidates. (F,SP) Staff

215. Seminar in Forest and Wildland Resource Policy. (3) Course may be repeated for credit. Two 1½-hour lectures/seminars per week. Prerequisites: Consent of Instructor. The seminar addresses (1) methods of policy analysis for wildland resource issues, (2) applications of analysis in policy formation, and (3) processes of policy formation. It proceeds through these phases for a specific policy problem selected each year. (SP) Romm

217. Seminar in Sociology of Forest and Wildland Resources. (2) One 2-hour lecture/seminar per week. Prerequisites: Consent of instructor. Individual projects and group discussions concerning social constraints to resource planning and management. Application of sociological theories to problems of managing wildland ecosystems. Students will examine topics of individual interest related to the management of wildland uses. Enrollimnt limited. (SP) Fortmann

221. Genetics of Forest Trees. (2) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: Genetics 110 or equivalent. Course examines as an overview course in even-numbered academic years and a special topics course in odd-numbered academic years. A range of topics appropriate to forest genetics and tree improvement are introduced in the overview years, while a single topic is pursued in depth in the alternate years. (SP) Libby

222. Seminar in Environmental Forestry and Watershed Management. (2) One 2-hour lecture per week. Prerequisites: 4 semester units of upper division standing. Emphasis on contemporary hydrology, soil-planning and production. Specifics of applications related to forest watershed and plans. (SP) McBride

224. Natural Resource Ecosystems. (2) One 3-hour lecture per week. Prerequisites: One ecology course or consent of instructor. Application of systems principles to the management of ecosystems; methodology for integrating biological and social aspects of ecosystem studies. (SP) Schultz

225. Advanced Silviculture. (2) One 3-hour lecture per week. Prerequisites: 125 or equivalent. Analysis and evaluation of current literature and experience. Format combines both lecture and discussion. Field trips may be included depending upon the topic. (F) Helms

241. Range Assessment. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 141 and Stat. 20 or equivalent required. Rangeland vegetation sampling techniques with emphasis on comparing the relative efficiency of different techniques of vegetation sampling. Includes weekly lab exercises on statistical sampling boards and field work. Juniors and seniors are encouraged. Offered even-numbered years. (F)Staff

243. Range Animal Management and Production. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 141, 143, or consent of instructor. Use of scientific principles and husbandry practices in producing animals on rangeland. Major concentration on beef cattle, sheep, and native ruminants. Special emphasis on reproduction, breeding, meats, and business considerations of range systems and animal management. Offered even-numbered years. (F) Operations

244. Seminar in Range Ecology. (2) Course may be repeated for credit. One 3-hour seminar per week. Prerequisites: Consent of Instructor. A seminar course dealing with selected topics in the ecology of rangelands. (SP) Staff

245. Seminar in Range Ecosystem Planning and Policy. (3) Course may be repeated for credit. One 3-hour lecture/seminar per week. Prerequisites: Consent of instructor. A seminar course dealing with selected current topics in range ecosystem planning and policy. (SP) Staff

270. Seminar in Wildlife Biology and Management. (2) Course may be repeated for credit. One 2-hour lecture/seminar per week. Prerequisites: 170 and 176.
271. Wildlife- Habitat Relationships. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Analysis of wildlife-habitat relationships, stressing problems inherent in the use of analytical methods. Topics include multivariate assessment of wildlife habitat, analysis of habitat preferences, indices of diversity, and community similarity. Writing and presentation of research proposal required. Offered even-numbered years. (SP) Morrison

276. Wildlife Management Planning. (2) One 2-hour lecture/meeting per week. Prerequisites: 176. Lecture on recent studies in wildlife biology and management plans. Students will prepare and present wildlife management plans for specific situations. Open to qualified graduate students from other departments. Offered odd-numbered years. (SP)

278. Seminar in Freshwater Ecology. (2) One 2-hour lectures per week. Prerequisites: Knowledge of ecology, taxonomy, and ecology. Discussions and student presentations on topics or problems related to fisheries and aquatic ecology. Detailed analysis of data on second production and trout spawning. (SP) Ermann

280. Individual Study. (1-7) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Meetings to be arranged. Prerequisites: Consent of instructor and graduate adviser. Individual study in consultation with a member of the faculty directed to analysis and synthesis of the literature of a specialized subject area in forestry and resource management. (F,SP)

288. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Sections 8-10: Lecture and meetings to be arranged. Prerequisites: Consent of instructor. Readings and conferences under direction of a member of the faculty for qualified graduate students. (F,SP)

289. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Meetings to be arranged. Prerequisites: Consent of instructor. Individual research on problems relating to forestry and resource management. (F,SP)

601. Individual Study for Master's Students. (1-6) May not be used to meet either unit or residence requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Sections 1-6: Meetings to be arranged. Prerequisites: Consent of instructor. Individual study for the comprehensive examination in consultation with the field adviser. (F,SP)

602. Individual Study for Doctoral Students. (1-8) May not be used for residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Sections 1-8: Meetings to be arranged. Prerequisites: Consent of instructor. Individual study in consultation with the major field adviser intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP)

150-189 excluding 180A-180D; one course from 112-120; three electives. Courses 140, 145, 146, and H195A-H195B do not count toward the major.

5. Two 1½-hour lectures per week. Prerequisites: Consent of instructor and appointment as graduate student instructor. Supervised teaching experience in a departmental course. (F,SP)

112-120, one course from 121-126; one course from 150-189; three electives. Courses 140, 145, 146, and H195A-H195B do not count toward the major.

8. 102, 103A or 103B, three courses from 150-189 excluding 180A-180D, one course from 180A-180D, one course from 112-120, three electives. Courses 140, 145, 146, and H195A-H195B do not count toward the major.

6. Professional Training in Research. (1-6) May not be used to meet either unit or residence requirements. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Meetings to be arranged. Prerequisites: Consent of instructor and appointment as research assistant. Training for students in planning and performing research under the supervision of a faculty member. This course is intended to provide credit for experience obtained. (F,SP)
equivalencies are determined on a course-by-course basis.

1. Elementary French. (5) Five 1-hour classes and one hour of laboratory per week. Elementary French. Beginner's course.

2. French for Graduate Students, Beginning. (0) Must be taken on a satisfactory/un satisfactory basis. Three hours of lecture per week. Preparation for graduate reading examinations in the field of English and in all other disciplines.

3. Elementary French. (5) Five 1-hour classes and one hour of laboratory per week. Prerequisites: 1 or equivalent. Elementary French. Continuation of French 1.


10. Seminarfor Lower Division Students. (3) One 3-hour seminar per week. Designed to introduce students to various critical problems in the study of French literature. Work in the course will include research and a research paper. Topics will vary from year to year. Enrollment limited to 15 students. Prospective students must consult with the instructor before enrolling in the course.

30. Woman's Voice in French Literature. (3) Three 1-hour classes per week. The dual theme of female sexuality and female writing through an examination of texts by modern French authors. In English.

43. Aspects of French Culture. (3) Three 1-hour classes per week. Various historical and esthetic themes and problems in the development of French civilization. In English.

46. Grammar Review and Composition. (3) Three 1-hour classes per week. Prerequisites: 4 or equivalent. Systematic review of grammar. Students with an A or B grade in French 4 at Berkeley may proceed directly to 102; those with a B- or lower grade must take this course. Junior transfer students must take a validation exam. French 102 and will be placed on the basis of the results of that exam.

Upper Division Courses

102. Writing Skills in French. (3) Three hours of lecture per week. Prerequisites: 4 or equivalent with A or B grade in French 4. Transfer students must pass validation examination. The principles and practice of expository writing: development of correct and effective expression in French. May be taken concurrently with French 103.

103A. Language and Culture. (3) Three hours of lecture per week. Discussion and composition based on the analysis of cultural texts.

112A-112B. Medieval Literature. (3,3) One course from 112A-112B may be repeated once for credit with a different topic and with consent of the undergraduate adviser. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Medieval Literature: from the Chanson de Roland to the Roman de la Rose.

114A-114B. Late Medieval Literature. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Late Medieval Literature. Joint work with Vilhon.

116A-116B. Sixteenth Century Literature. Marot to Montaigne. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Poetry and prose of the first half of the 16th century, in the context of the intellectual and aesthetic trends of the time, including humanism, evangelism, and the development of a new poetic language.

117A-117B. 17th Century Literature. (3,3) One course from 117A-117B may be repeated once for credit with a different topic and consent of the undergraduate adviser. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A. Authors from the first half of the 17th century. The Baroque; its chief exponents, literary attempts to resolve the crisis in Renaissance values, formulation of new concepts in philosophy and psychology, experiments with traditional forms in poetry, fiction, and drama. Johnson, Fox, and Racine. B. The development of the modern novel, the avant-garde, cubist poetry, Dada and Surrealism, the theater before the Second World War. Sartre and existentialism, theater of the absurd, nouveau roman. Bersani, Holller, Isaac, Smock.

119A-119B. Nineteenth Century Literature. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A. Authors from the first half of the 19th century, with emphasis on the origins of the philosophical movement and the development of modern art forms in the theater and the novel. Mehetel and the emergence of the Brontean aesthete. B. A study of authors of the second half of the 18th century stressing the importance of the Mouvement Philopolitique, and the development of Libertine values as well as the emergence of the pre-romantic aesthetics. Guy, Goy, and Baudelaire.

120A-120B. Twentieth Century Literature. (3,3) One course may be repeated once for credit with a different topic and consent of the undergraduate adviser. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A. The modern novel, the avant-garde, cubist poetry, Dada and Surrealism, the theater before the Second World War. B. Development of the novel, poetry and theater since World War I. Sartre and existentialism, theater of the absurd, nouveau roman. Bersani, Holller, Isaac, Smock.

121A-121B. Literary Themes, Genres, and Structures. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Topics vary from year to year.

122A-122B. Literary Criticism. (3,3) Course may be repeated once for credit. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. The course will focus on literary criticism by writers in the 20th century and discuss the various options proposed as well as the relationship between criticism and fiction or philosophy in a given writer's work.

123. Prose Fiction. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Studies in the French novel. Bersani

124A-124B. Modern Theater. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Studies in 20th-century theater.

125A-125B. Poetics and Poetry. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Studies in French poetics. Isaac, Smock.

126. Senior Seminar. (3) Course may be repeated once for credit with a different topic and with consent of the undergraduate adviser. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Intensive study of a major author.

130. Writing in French. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Advanced language, intended to enlarge vocabulary and increase ability with French through examples, illustrations and close study of short literary excerpts. In-depth corrections of compositions and occasional debates.

131A-131B. Translation and Debate. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. In-depth knowledge of the French language and accuracy in its use are the goals of this course. A textbook and systematic exercises will be used to assist in the demanding task of translating, mainly from English to French.

132. History of the French Language. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Mainly devoted to "external" history of French, tracing spread of Latin to what is now France, its breakup into different languages and dialects, emergence of French as standard. Influence of other languages on French vocabulary. Study of brief texts from different periods to illustrate evolution of pronunciation and grammar. Reischman.

135. French Dialectology. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. The varieties of French spoken in France as well as in French-speaking areas outside of Europe. Reischman.

137. French for Economics, Politics and Business. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Introduction to the French vocabulary and syntax specific to economics, politics and business. Oral and written comprehension, written communication (including correspondence), translation, training in oral expression. Conducted entirely in French. Sorgen.

140. Readings in French Literature. (3) Three hours of lecture per week. Prerequisites: Reading knowledge of French. Readings in French. Class discussions and examination in English. Does not count for the French major.


A. Middle Ages to the French Revolution

B. The Nineteenth Century


150A-150B. Women in French Literature. (3,3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A study of Francophone literature: traditional and French influences, structure, relationships between language and message.

152. Quebecois Literature and Culture. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A study of Quebecois culture and civilization: novels, films, society.
160A-160B. French Historical Writing. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. The development of concepts of history in French writing. The Chroniqueurs, the humanists. Bosio, Rousseau, of the authors who may be studied. Topics vary from year to year.

161A-161B. A Year in French History. (3-3) One course may be repeated once for credit with a different topic and with consent of undergraduate advisor. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A survey of French history from the Middle Ages to the end of the eighteenth century, in which we will study the greatest masterpieces of French literature to the Revolution.

164A-164B. French Literature in Its Cultural Context. (3-3) Formerly 127. Three hours of lecture/discussion per week. Prerequisites: 103A or 103B or equivalent. A study of the pressures on artistic, political, and economic structures at moments of crisis in French history. Problems of continuity and discontinuity in aesthetic and social history.

168A-168B. Perspectives on History. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. This course will study both contemporary and historical reflection on historical events or figures. Topics vary from year to year.

170. French Films. (3) Students who have taken 103F or equivalent. This course will study both contemporary and historical inquiry into French film. Four hours of lecture and two hours of studio work per week. Prerequisites: 102 or equivalent. Beginning French language. Prerequisites: Consent of instructor. Supervised field projects involving French films and related activities. Regular individual meetings with faculty sponsor and written reports required.

171A-171B. A Concept in French Cultural History. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. The examination of significant cultural concepts from a double point of view—political, sociological, intellectual, and artistic, as well as literary.

172A-172B. Psychoanalytic Theory and Literature. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. The relevance of psychoanalysis to literary texts. Concepts of fantasy, of the uncon- scious, of guilt and of desire applied to texts by Racine, Balzac, Lautreamont, Rimbaud and Proust.

173. Linguistics and Literature. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. An introduction to the interaction between language and literature. To include various works from the arts and human sciences.

174. Music and Literature. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A consideration of the ways in which certain writers, as well as some composers, have sought to relate what might be thought of as two manifestations of language: song and poetry, or musical score and literary text.

175A-175B. Literature and the Visual Arts. (3-3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. An investigation into the relationship between visual and written texts using various works from the arts and human sciences.

176. Introduction to French Linguistics. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent; 132 or consent of instructor. Recommended: 132 or any introductory linguistics course. An introduction to the major branches of linguistic analysis (phonology, morphology—including word-formation syntax, and semantics) as applied to the French language.

177A-177B. History and Criticism of Film. (3-3) Four hours of lecture and two hours of studio work per week. Prerequisites: 170 or equivalent. The development of French cinema. Discussions, oral and written reports will be based on the viewing of films from the work of major French film directors and studies in the interpretation of literary texts. One course from 180A-180B-180C-180D is required for completion of the Option B French major.

A. The Middle Ages.
B. The Ancien Régime.
C. The Nineteenth Century.
Freshman and Sophomore Studies
(College of Letters and Science)

Division Office: 237 Campbell Hall, 642-3635
Divisional Dean: To be announced

Freshmen and sophomores should contact this office for a complete list of courses offered to lower division students. These courses, usually seminars, are designed to maximize professor-student interaction in the classroom, are offered by a variety of departments, and address important intellectual questions and contemporary issues.

The Division of Freshman and Sophomore Studies also administers the Emeritus Seminar Program. The Letters and Science courses offered in this program are taught by emeriti in the Ph.D.

Professional Courses

301. Teaching French in College: First Year. (3) Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture and attendance at demonstration class for five hours per week. Prerequisites: For graduate students teaching French at college level. Required for all new graduate student instructors. Bi-weekly lectures on methodology, grading and testing, demonstration class with required attendance five times per week; language laboratory observations; supervised classroom practice.

302. French Teaching in College: Advanced First Year. (3) Formerly 301B. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture and attendance at demonstration class for five hours per week. Required of all graduate student instructors teaching French 2 for the first time. Bi-weekly lectures on methodology, grading and testing in French 2. Demonstration class with required attendance five times per week; language laboratory observations; supervised classroom practice. Additional seminars and discussion sections on methodology.

303. Teaching French in College: Second Year. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture and attendance at demonstration class. Three hours of lecture and one hour of lab per week. Prerequisites: 301, 302, or equivalent. Required of all graduate student instructors teaching French 3 for the first time. Lectures on the methodologies used in teaching second-year French, grading and testing; occasional attendance at a demonstration class; language laboratory observations; supervised classroom teaching.

304. Teaching French in College: Advanced Second Year. (3) Course may be repeated for credit. Three hours of lecture and attendance at demonstration class. Three hours of lecture and one hour of lab per week. Required of all graduate student instructors teaching French 4 for the first time. Lectures on methodologies used in teaching second-year French, grading and testing; occasional attendance at a demonstration class; language laboratory observations; supervised classroom teaching.

Letters and Science

Lower Division Courses

20A-20B. Problems of Contemporary Civilization. (5,5) Course must be taken on an IP basis only. Two 1½-hour lectures and two 1-hour discussion sections per week. This interdisciplinary social science course selects a number of problems and themes that pose major and persisting problems in contemporary society. Among the themes covered will be the fate of political democracy, inequality, the origins and consequences of social complexity, and the fate of intimacy in contemporary times. Each theme will occupy approximately six weeks of course time, and both historical and comparative dimensions of each theme will be addressed. (F,SP 1988-89 only).

22. Letters and Science. (1) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. Two hours of seminar per week. Seminars for lower division students conducted by professors emeriti. These seminars will usually reflect an interdisciplinary approach. (F,SP)

Genetics

(20 units)

Department Office: College of Natural Resources, 346 Mulford Hall, 642-5404

Group Major Office: Division of Special Programs, College of Letters and Science, 301 Campbell Hall, 642-2626

Chair: Patricia St. Lawrence, Ph.D.

Professors:

Seymour Fogel, Ph.D. University of Missouri. Recombinant DNA in yeast.

Michael Freeling, Ph.D. University of Indiana. Gene regulation in maize.

James W. Fristrom, Ph.D. Rockefeller University. Developmental biology of Drosophila.

William J. Lillie, Ph.D. University of California at Berkeley. Clonal genetics of forest trees.

Kenneth Reagen, Ph.D. California Institute of Technology. Gene regulation in animals.

Glenn Thomson, Ph.D. University of Melbourne. Mathematical human population genetics.

Everett R. Dempster, Ph.D. University of California at Berkeley. Genetics of man.

Associate Professors:

Patricia St. Lawrence, Ph.D. Columbia University. Gene regulation in Neurospora.


Zinnmay Renee Sung, Ph.D. University of California at Berkeley. Plant somatic cell genetics.

Assistant Professors:

Robert S. Goodenow, Ph.D. Stanford University. Molecular immunogenetics.

Anthony Otsuka, Ph.D. University of California at Berkeley. Developmental genetics of nematodes.

Students' Assistant: Ms. Sylvia, 341 Mulford.

Honor Program Adviser: Mr. Otsuka.

Undergraduate Programs

The major in genetics is designed to provide a broad foundation in biology, centered around a core of emphasis on genetics. The field of genetics encompasses most areas of biological research. Major requirements range from molecular to population levels and are designed to take advantage of the diversity of course offerings at Berkeley, allowing students with interests as varied as bacterial genetics, human genetics, or population biology to fulfill the requirements in a manner suited to their personal interests. The intent of the programs is to be rigorous in the breadth of its requirements and flexible in the means of fulfilling them.

Choice of College

A student can complete the major in genetics in the College of Letters and Science (A.B. degree) or can elect the genetics major in the College of Natural Resources (B.S. degree). The choice of college is determined by the college in which the student is enrolled. Students in each program are subject to the requirements of their respective colleges.

Genetics Major—College of Natural Resources

Requirements for the major are listed in the Announcement of the College of Natural Resources.

Group Major in Genetics—College of Letters and Science

The group major program in the College of Letters and Science is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

Lower Division Requirements (33 units):

Biology 1A-1B (4,4)

Chemistry 1A-1B (4,4)

Chemistry 8A-8B (3,4) or 112A-112B (5,5)

Mathematics 16A-16B (3,3) or 1A-1B (4,4)

Physics 8A (4)

Recommended: Physics 8B (4)

Upper Division Requirements (30 units):

I. Genetics 100A-100B-100C (3,3,3)

II. At least one course in each of the following categories:

A. Biology Laboratory: Genetics 100L (4), Biochem 102L (4), Microbiol 100L (3), Mol. Biol. 101 (4), Mol. Plant Biol. 175 (3) or 125 (3).

B. Genetic Biology: Genetics 170 (3), any graduate lecture course in genetics, Botany 138 (4), Microbiology 101 (3), Molecular Biology 120 (3).

C. Biochemistry: Biochemistry 102 (4) or 100A-100B (4,4,4)

D. Cell Biology: Zool 104 (4), Zool 110 (3,3), Bot. 130 (4), Bot. 130L (3,3), Bot. 130L (3,3).

III. Additional courses, as needed, to bring the total upper division work to a minimum of 30 units. Such work leading to the Ph.D. degree may be supervised.

Graduate Programs

Administered by an interdepartmental group, this program offers graduate studies at both the M.S. and Ph.D. levels. Genetics cuts across the conventional subdivisions of the biological sciences, requiring some familiarity with botany, zoology, bacteriology, biochemistry, and physiology. In addition, genetics has important applications in such diverse disciplines as anthropology, medicine, forestry, nutrition, and molecular biology. Therefore, graduate work in genetics may be supervised by faculty members from the various departments where work related to genetics is being done.

The interdepartmental group arrangement allows students of genetics to approach their field from several points of view: some may study the more purely theoretical aspects of the subject; others may focus on its application in particular disciplines (in forestry or physiology, for example). Genetics is also viewed as a unifying discipline, and each student, regardless of the area of specialization, must obtain a fundamental knowledge of genetics.

An undergraduate major in genetics or its equivalent in the biological sciences is the standard preparation. However, students with undergraduate degrees in such fields as mathematics, psychology, and chemistry are welcome, with the understanding that subject matter deficiencies must be removed early in the graduate work.

In addition to laboratory and other facilities for research, many field stations of the University are available for students interested in natural populations.

Lower Division Courses

10. Heredity, Evolution, and Society. (4) Two hours of lecture and two hours of section per week. Prerequisites: Primarily for students not specializing in biology: students majoring in or planning to major in biology, and humanities. Social implications of genetics and evolution. (SP) Freeing

99. Supervised Independent Study for Freshmen and Sophomores. (1-4) Course may be repeated for credit. Must be taken on a pass/no-pass basis. One unit per three to four hours of independent work per week. Prerequisites: 3.3 minimum GPA; consent of instructor. Supervised laboratory research by superior lower division students. (F,SP) St. Lawrence

Upper Division Courses

100A-100B-100C. General Genetics. (3-33) Students with credit in 102 or 105 will receive one less unit each in 100A and 100B. Prerequisites: 100A: Biology 1A-1B, Chemistry 8A-8B. 100B: 100A recommended that it be taken concurrently. 100C: 100A or 102 or 105 or consent of instructor. 100A: Three hours of lecture and one hour of discussion per week. 100B: Three hours of lecture and one hour of discussion per week. 100C: Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or consent of instructor. Experimental techniques with particular emphasis on molecular approaches to evolutionary genetics and dealing with a variety of organisms including Drosophila, bacteria, fungi, plants, and humans. Required of majors, but open to nonmajors.

100A. Mechanisms of inheritance: gene transmission and recombination; transposable DNA elements. (F) Freeing

100B. Gene structure, function, and regulation in prokaryotes and eukaryotes. (F) Otsuka

100C. Population genetics, evolution, and quantitative genetics. (SP) Goodnow

101L. Genetics Laboratory. (4) One hour of lecture, five hours of laboratory, and one hour of discussion per week. Prerequisites: 100A-100B or 102 or 105 or consent of instructor. Principles of genetics in human and other mammalian systems at the molecular, organismal, and population levels. For students interested in human biology. (SP) Fristrom

102. Survey of General Genetics. (3) Not open to students with credit in 100A-100B, 103. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or consent of instructor. Analysis of genetic variation in plant development at the genetic, cellular and tissue level, with particular emphasis on the experimental approaches. Both classical and modern techniques will be employed to analyze the principles and mechanisms of plant genetics. (SP) Sung

105. General Human Genetics. (3) Not open to students with credit in 100A-100B or 102. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or consent of instructor. Principles of genetics in human and other mammalian systems at the molecular, organismal, and population levels. For students interested in human biology. (SP) Goodnow

170. Plant Cell and Developmental Genetics. (3) Two hours of lecture, two hours discussion/demonstration per week. Prerequisites: 102 or equivalent. A consideration of plant genetics, cellular and tissue levels, with particular emphasis on the experimental approaches. Both classical and modern techniques will be employed to analyze the principles and mechanisms of plant genetics. (SP) Fristrom

198. Directed Group Study. (1-8) Course may be repeated for credit. To be arranged. Prerequisites: Consent of instructor. Graduate student presentations on selected topics of research in molecular, biochem, and cellular genetics. (F,SP)

290A. Graduate Seminar in Genetics: Molecular or Cellular Genetics. (1-3) Course may be repeated for credit. Seminar. Prerequisites: Consent of instructor. Graduate student presentations on selected topics of research in developmental genetics. (F,SP)

290C. Graduate Seminar in Genetics: Plant Genetics. (1-3) Course may be repeated for credit. Seminar. Prerequisites: Consent of instructor. Graduate student presentations on selected topics of research in plant genetics. (F,SP)

290D. Graduate Seminar in Genetics: Population Genetics and Evolution. (1-3) Course may be repeated for credit. Seminar. Prerequisites: Consent of instructor. Graduate student presentations on selected topics of research in population genetics and evolution. (F,SP)

290E. Graduate Seminar in Genetics: Human Genetics. (1-3) Course may be repeated for credit. Seminar. Prerequisites: Consent of instructor. Graduate student presentations on selected topics of research in human genetics. (F,SP)

298. Directed Group Study. (1-8) Course may be repeated for credit. Individually arranged. Four hours per unit. Prerequisites: Consent of instructor. Specially arranged topics in genetics. (F,SP)

299. Research in Genetics. (1-12) Course may be repeated for credit. Four hours per week, per unit. Prerequisites: Consent of instructor. Graduate research in genetics under the supervision of individual faculty. (F,SP)

691. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individually arranged. Individual study in consultation with field advisor in preparation for required master's examinations. Unis

*Not offered 1988-89
*On leave, spring
*Affective service
*Recipient of Distinguished Teaching Award
The undergraduate major in geography therefore includes the study of various aspects of human, physical, and regional geography as well as cartography, quantitative methods, and field work. Background in such applied sciences as history, and statistical methods will be found useful to the geography major, the emphasis depending on the student's particular interests.

The Major

Lower Division. Geography 1, 4, and 7. (Transfer students who have had introductory courses elsewhere should consult with the departmental and graduate advisor in order to avoid repeating lower division work.)

Upper Division. A minimum of 32 units. One course from each of the following groups: 100-109; 110-125; 130-140; 140-149; 150-160; and 160-169. Students must fill out their programs by completing three courses from within one of the following specialties: physical, cultural, urban-economic, environmental resources, and regional. All students are encouraged to take 180 or 181 and 189.

Honors Program. With the consent of the major advisor, a student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.5 or higher in courses in the major may apply for admission to the Honors Program. Acceptance in the program should be made by the beginning of the senior year. A senior in the honors program must complete Geography H195A and/or H195B, in which a thesis is required, and may take graduate seminars.

The Minor

Required: Five upper division courses, all taken for a letter grade. An overall grade point average of 2.0 is required in all courses applied to the minor. A minimum of three courses must be taken at Berkeley. One course each from five of the following six course groupings: 1. cultural (100-109); 2. urban-economic (110-125); 3. environmental resources (130-139); 4. physical (140-149); 5. prior enrollment in anthropology (150-160); 6. methodology (180-189). Under exceptional circumstances, where program relevance can be demonstrated, a more concentrated grouping of courses may be arranged.

Graduate Program

Geography deals with a broad spectrum of questions relating to society, environment, and spatial order. A variety of previous backgrounds may prove sound as a foundation for advanced work in the field. Although the department offers graduate training in physical, cultural, economic, urban, and regional geography, it places strong emphasis on the interdisciplinary relationships among these specialties and related approaches in other disciplines.

The M.A. program involves completion of not less than one year of residence, course requirements that vary with the background of the student, and an original thesis or a comprehensive examination. Ph.D. candidates must complete a minimum of two years of residence normally at least three years for those entering from other disciplines. In the oral qualifying examination. In the preparation of many theses they must also be prepared to spend a year in field or archival research following the oral examination. Further details, including foreign language requirements, are available from the departmental office.

Lower Division Courses

1. Introduction to Physical Geography. (4) Three hours of lecture per week. The study of the Earth's major physical and climatological patterns and their influence upon the characteristics of landforms, vegetation, and soils. Problems relating to the internal and external processes that have controlled physical factors in the principal natural regions of the Earth. (F,SP) Powell, Stoddart

4. Introduction to Cultural Geography. (4) Three hours of lecture and a 1-hour laboratory per week. Historical and contemporary cultural-environmental patterns. The development and spread of cultural adaptation, human uses of resources, transformation and creation of human environments. (F,SP)

7. The Local and the Global. (4) Three hours of lecture and a 1-hour obligatory section per week. An introduction to geographic economy. Variously scaled patterns of production, the household as an economic unit, and local patterns of economic development. Focus on national corporations, technology and the new service economy, the changing economic role of women, the shifting location of employment and community decline. (F,SP) Pred

90. Seminars for Lower Division Students. (3) Three hours seminar and one hour consultation per week. A reading and research seminar for freshmen and sophomore students. Topics to vary. (F) Staff

Upper Division Courses

100. Cultural Geography of Indigenous Peoples. (4) Three hours of lecture per week. Worldwide, 168 states claim the territories, resources and peoples of some 3000 Fourth World nations. This causes large-scale geographic changes in land and resource use, economies, and governments of indigenous peoples and their nations. Resultant state-national conflicts now account for most of the world's wars, refugees, genocide and terrorism. Emphasis is on the geographic base to indigenous nations and contemporary economic, ecological and military invasions and disruptions. (SP) Nietschmann

101. Cultural Geography of Urban Environments. (4) Three hours of lecture per week. Population, environment, and urbanization; religious geography and settlements; cities as expressions of varying cultural traditions. (SP) Reed

104. The City in the Third World. (4) Three 1-hour lectures per week. Major themes concerning the origins and cultural roles of non-Western cities: the genesis and impact of colonial urbanism; the contemporary city in the Third World. (SP) Reed

107. Geography of Religions. (4) Three hours of lecture per week. Impact of belief systems on landscapes and environments; distribution of religions, sacred places, and spaces; pilgrimages; religious influences on population dynamics; holy cities; religion and political geography. (F) Reed

108. Political Geography. (4) Three hours of lecture per week. The evolution and viability of selected nation states; regional blocs and spheres of influence. European imperialism and the "new nations"; sensitive frontiers. Internal coherence, capitals, core-areas, and centrifugal forces. A comparative evaluation of world power. (SP) Hooson

109. Prehistoric Agriculture. (4) Three hours of lecture per week. Agricultural origins in the light of recent biological and archaeological evidence. (SP) Byrne

110. Economic Geography of the Industrial World. (4) Three hours of lecture per week. Prerequisites: 7 or prior courses in economics or regional development strongly suggested. Industrialization, urbanization and regional development. Locaional effects of developments in manufacturing, services and trade, corporations, finance, and industrial restructuring. Industry, employment and the social fabric of cities and regions. The urbanization process. Emphasis on the U.S. (SP) Walker

117. Local and Regional Transformation (4) New lower-division course. Three hours of lecture per week. The simultaneous transformation of localized activities, power relations and forms of consciousness. Theoretical issues pertaining to human agency and the simultaneous making and breaking of social space. Fieldwork, case studies from rural and urban settings, from the present, from North America, Europe, and the "Third World." (SP) Reed

112. Historical Geography of Transportation. (4) Three hours of lecture per week. The influence of geographical factors in the creation, transformation, and maintenance of transportation technologies and patterns; the shaping of patterns of settlements and economy
by transportation innovation; the role of transportation in regional development in western Europe and Anglo-

America. (F) Vance

115. World Agricultural Systems. (4) Three hours of lecture per week. An examination of world systems, patterns of resource use, and their relation to development. Special attention is given to peasant economies, plantation agriculture, demographic growth, patterns of labor use, agroecology and rural industrialization. (SP) Watts

116. Economic Geography of the Nonindustrial World. (4) Three hours of lecture per week. Patterns and processes of economic change at the local level in the Third World. Topics include household production, marketing, trade systems, transportation, small-scale industry, the informal sector, and rural industrialization. (F) Watts

120. Morphogenesis of the Western City. (4) Three hours of lecture per week. Historical development of the physical structure of western cities and urban morphology from classical times through the Middle Ages to the present. The morphological expression of society in the medieval, early-industrial, and modern city. (F) Vance

125. Social Geography. (4) Three 1-hour lectures per week. The spatial expression of social relations in the U.S. from the 19th century to the present. Immigration, segregation, division of labor by gender, race, and class; work place-residence relationships. Feminist theory as a tool in social geographic research. (F) Nelson

130. Natural Resources and Population. (4) Three hours of lecture per week. Natural resources including water, mineral and land resources for the world's population. The role of natural resources in the world economy, national development and human welfare focusing on the Third World. The origins of scarcity and population explosion, population growth and migration, hunger and poverty. (F) Watts

133. Islands and Oceans. (4) Three hours of lecture per week. Physical and human geography of the sea. Ocean and island environments and ecology; ocean voyages and settlement of islands; cultural adaptations by seafaring societies; marine resources and environmental issues. (SP) Nietschmann

134. Natural Hazards and Problems. (4) Three hours of lecture per week. An ecological approach to the study of interactions between the natural events and human systems; perceptions of and adaptations to natural hazards such as floods, droughts, earthquakes, tornadoes, and volcanic eruptions. (SP) Watts

136. Water Resources. (4) Three hours of lecture per week. Water use, supply and public policy; history, institutions, cultures. Topics include water supply, urban water, energy, project evaluation, pollution, environmental impacts, artificial scarcity and over development. Emphasis on California. (F) Walker

140. Analysis of Landforms. (4) Three 1/2-hour lectures per week. Physical and human geography of the Bay Area and adjacent parts of Northern California. An introduction to the representation of landscapes in the field. Discussion of the historical, cultural, and environmental aspects of the Bay Area and adjacent parts of Northern California. (SP) Byrne

151. The American West. (4) Three 1-hour lectures per week. The 'American West, excluding California, as a settlement and resource frontier; historical and contemporary perspectives. Emphasis on the diversity of local and regional cultures and economic systems. (SP) Nelson

155. Spanish South America. (4) Three 1-hour lectures per week. The physical and cultural geography of Mexico, Central America, and the West Indies. Emphasis is on the area's cultural historical development and present-day ecological, demographic, and economic patterns. (SP) Nietschmann

158. The Caribbean Region. (4) Three 1-hour lectures per week. The physical, cultural, political and economic factors in the development of the region and of peoples and landscapes. Topics include the Caribbean Islands in the Western Hemisphere: a regional perspective, the physical geography, climates of the region, population, culture, and social structure. (SP) Granger

159. Alaska. (4) Three hours of lecture per week. Prerequisites: 1 or equivalent. Geomorphic processes and the origin of landforms in varying geologic and climatic environments. (SP) Oberlander

161. Sierra Nevada. (4) Three 1-hour lectures per week. Prerequisites: Upper division standing. A survey of Alaska's physical geography and human landscapes. (SP) Granger

165. Africa: Ecology and Development. (4) Three hours of lecture per week. An overview of selected issues in the development of sub-Saharan Africa. Topics include rural development, urban growth, agricultural development, and peasant economy. (SP) Watts

166. The Arid Lands. (4) Three 1-hour lectures per week. Varying physical environments and human activities in the arid regions of the world, and resulting economic and socio-economic problems in selected areas. (SP) Oberlander

167. The Middle East. (4) Three hours of lecture per week. The human geography of the Middle East, from Egypt to Afghanistan. Physical, historical, and cultural background to current social and economic problems of individual countries and the area as a whole. (SP) Granger

180. Field Geography. (4) One hour of lecture plus five hours (on Saturday) field work per week. A geographical survey of selected physical and cultural landscapes in the Bay Area and adjacent parts of Northern California. (F,SP)

181. Urban Field Study. (4) One hour of lecture plus nine hours (on one day) field work per week. Introduction to the metropolitan Bay Area: its history, economy, social makeup, and physical appearance. Evolution of spatial patterns, social justice and conflict in the city, buildings, location, real estate and housing, images and ideologies. (F) Walker

183. Cartographic Representation. (4) Two hours of lecture and six hours of laboratory per week. Problems in the representation of quantitative and qualitative data on thematic maps. (SP)

185. Air Photo Interpretation and Remote Sensing. (4) Three hours of lecture and six hours of laboratory per week. An introductory survey of current methodology in the field of air photo interpretation and remote sensing. Emphasis on the practical application of aerial photography and remote-sensing systems as applied to the detection, identification, measurement, and analysis of features in the natural and man-made environments. (SP)

186. History of Geographical Thought. (4) Three hours of lecture per week. Recurring themes, problems, approaches, and controversies in the evolution of geography from ancient times, but with most emphasis on the 19th and 20th centuries. Its place in knowledge, relations with other disciplines, and its image and role in various countries. (F) Stoddard

199A-199B. Honors Course. (1-4) Course may be repeated for credit. Prerequisites: Admission to Honors Program. Required for Honors in Geography. Students will write a thesis. One or two semesters; if two semesters, credit and grade to be awarded upon completion of the sequence. (F,SP)

199. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour lecture, three to six hours of laboratory per week. Prerequisites: Consent of instructor. Must be taken on a passed/not passed basis. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour lecture, three to six hours of laboratory per week. Prerequisites: Consent of instructor. Must be taken on a passed/not passed basis. (F,SP)

Graduate Courses

200. First Year Graduate Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour sem-

inar per week. Prerequisites: Required of and limited to first-year graduate geography students. A survey of faculty research interests. (F)

201. Philosophical and Methodological Issues in Human and Cultural Geography. (4) Three hours of dis-

cussion/seminar and one hour consultation per week. An introduction to the relations between geographic theory and wider issues in the social sciences. Emphasis on the work of recent human/cultural geographers and

*Not offered 1988-89

**On leave, spring

†Recipient of Distinguished Teaching Award
related work in social theory and philosophy. (SP) Pred, Watts, Walker

202. Current Research Themes in Human and Cultural Geography. (4) Three-hour seminar and one hour consultation per week. A survey of the literature in major areas of research in human and cultural geography. Nielteissmann, Reed

203. Current Research Themes in Physical Geography. (4) Course may be repeated for credit. Three-hour seminar and one hour consultation per week. A survey of the literature in major areas of physical geography. Oberlander

205. History of Geography. (4) Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. A critical review of the development of geographical scholarship and its various approaches in selected countries, in their historical contexts. Biographies of key personalities and the formation of schools and circles. Recurring areas of controversy and the principal protagonists. (SP) Pred

206. The Regional Approach in the History of Geography. (4) Two hours seminar and one hour consultation per week. A critical review of success and failure among practitioners of the genre. Students will review the literature in their chosen region and offer their own prescriptions.

212. Economic Geography and Development Theory. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. A reading course on contemporary theories of economic growth and underdevelopment in the Third World. Special topics include industrialization and capital flight to the periphery, peasant economy, agricultural policy, migration and ecological change. Watts

213. Cultural and Human Ecology. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Reading course in current topics in human and cultural ecology with an emphasis on parallel developments in ecological anthropology, ecology, economics, and social science. Special topics include adaptation and maladaptation, household reproduction, hazards research, subsistence ecology and field methods. Nielteissmann

230. Geography and Alternatives to Prevaling Urban-Industrial Models. (4) The course may be repeated for credit. Two hours seminar and one hour consultation per week. Reading course in current topics in human and cultural ecology with an emphasis on parallel developments in ecological anthropology, ecology, economics, and social science. Special topics include adaptation and maladaptation, household reproduction, hazards research, subsistence ecology and field methods. Nielteissmann

250. Topics in Urban Geography. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in urban geography. Vance

255. Topics in Political Geography. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in political geography. Hooson

256. Topics in Historical Geography. (4) Course may be repeated for credit. Three hours seminar and one hour consultation per week. Research seminar on selected topics in historical geography.

257. Topics in Climatology. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in climatology. Granger

258. Topics in the Geography of Food. (4) Course may be repeated for credit. Three hours seminar and one hour consultation per week. Research seminar on selected topics in the geography of food.

259. Topics in Social Geography. (4) Course may be repeated for credit. Three hours seminar and one hour consultation per week. Research seminar on selected topics in social geography. (SP) Nelson, Pred

260. Topics in Biogeography. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in biogeography. Byrne

262. Topics in Latin America. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in the geography of Latin America.

266. Advanced Field Study in Geography. (3-7) Course may be repeated for credit. One hour of lecture and eleven hours of field work per week. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

269. Geographical Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

286. Directed Dissertation Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

295. Geography Colloquium. (1) Course may be repeated for credit. Invited lectures on current research and field work. (F,SP) Staff

296. Directed Dissertation Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

297. Directed Dissertation Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

298. Directed Study for Graduate Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

299. Individual Research. (I-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Required of all graduate students not yet advanced to candidacy. Invited lectures on current research and field work. (F,SP) Staff

301. Professional Training: Teaching Practice. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. (F,SP) Staff

395. Seminar on the Teaching of Geography. (2) Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. Prerequisites: All new graduate student instructors are expected to enroll. The aims and methods of teaching geography at the college and university levels. Open to all graduate students in the department. (F) Staff

Interdepartmental Studies Courses

Undergraduate Courses


IDS 116L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Three hours of lab per week plus two weekend field trips in September and October. Prerequisites: Must be taken in conjunction with IDS 116. An introduction to the techniques of Quaternary pollen analysis; recovery of sediment cores from lakes and peat bogs, extraction of fossil pollen from sediment cores, collection of surface pollen, graphical presentation of results. Sponsoring departments: Geography and Paleontology. Byrne

Geology and Geophysics (College of Letters and Science)

Department Office: 301 Earth Sciences Building, 643-2624
Chair: George H Brimhall, Jr., Ph.D.

Professors:
Bruce A. Bolt, Ph.D., D.S.G. University of Sydney. Theoretical geophysics, earthquake studies
Yoshio Bremell, Ph.D. University of California at Berkeley. Ore-forming processes, geochronology
Ian S. Carmichael, Ph.D. University of California, Berkeley. Geology, geophysics, South America and the circum-Pacific tectonics
Garnets, H. Curtis, Ph.D. University of California at Berkeley. Geology, volcanology, field geology
Donald Keirsch, Ph.D. Cal. State University, Northridge. Geology, sedimentology
Harold C. Helgeson, Ph.D. Harvard University. Theoretical geophysics, geomagnetism
Raymond Jeanloz, Ph.D. California Institute of Technology. Geophysics
Lorne L. Johnston, Ph.D. California Institute of Technology. Theoretical geophysics
Johann W. Jordan, Ph.D. California Institute of Technology. Theoretical geophysics
David L. Jones, Ph.D. Stanford University. Cordilleran and Alaskan tectonics
Thomas V. McClellan, Ph.D. St. Louis University. Crustal structure, plate tectonics, geodynamics
Clyde Wahrhaftig, Ph.D. Harvard University. Theoretical geophysics, earthquake studies
Charles W. Wahrhaftig, Ph.D. University of California, Berkeley. Theoretical geophysics
Lionel E. Weiss, Ph.D. University of California, Berkeley. Theoretical geophysics

Associate Professors:
Mark S.T. Bukowinski, Ph.D. University of California at Los Angeles. Physiological mineralogy
William E. Dietrich, Ph.D. University of Washington. Hillslope and fluvial geomorphology

The Department of Geology and Geophysics offers the student excellent opportunities to acquire a broad background of knowledge and experience in the
study of the composition, structure and evolution of the earth. Three undergraduate degree programs are offered, each leading to the B.A. degree in the College of Letters and Science. See the section on the College of Letters and Science for the additional college requirements for graduation.

The Major in Earth Science

The major in earth science includes a broad spectrum of courses in natural science and is designed for students who desire a general background in the field of earth science. The upper division requirements are sufficiently flexible to serve a variety of special interests in the general field.

Lower Division Courses. Chemistry 1A-1B, Geology 50, Mathematics 1A-1B, Physics 8A-8B.

Upper Division Courses. Geology 100A, 100B, 101, and 26 units of upper division geology, science, engineering or mathematics.

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student's adviser not later than the end of the student's junior year. Candidates for graduation with honors in earth science are required to take additional courses in addition to the regular program, six units of Geology 195.

The Major in Geology

The major in geology includes basic courses in physical science and mathematics. It provides the background necessary for graduate study in geology and also satisfies the minimum academic requirement for registration as a geologist in the State of California.

Geology 50 and most other lower division requirements must be completed before declaring the major.


Upper Division Courses. Geology 100A, 100B, 101, 102, 131, 118 and Geophysics 108; Twelve additional units from Group A (Geology 106, 116, 124, 135, 151, 161) and Group B (Geology 107, 152, 156, Paleontology 111), with at least one course from each group.

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student's major adviser not later than the end of the student's junior year. Candidates for graduation with honors in geology are required to take six units of Geology 195.

The Major in Geophysics

The major in geophysics is designed for students with facility in mathematics and physics and an interest in geology and geodynamical processes; it provides a general background in the physical sciences, with emphasis on the physics of the earth.

Lower Division Courses. Mathematics 1A-1B, Mathematics 50A-50B, Physics 7A-7B-7C, Chemistry 1A-1B.


Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student's major adviser not later than the end of the student's junior year. Candidates for graduation with honors in geophysics are required to take Geophysics 199 and either write a research paper or take a comprehensive examination.

The Major in Engineering Geoscience

The College of Engineering with the cooperation of the Department of Geology and Geophysics offers a curriculum in geoscience leading to the degree of Bachelor of Science (see section on Engineering Science in this catalog).

Graduate Programs

The central objective of the graduate program is to encourage creative thinking and develop the capacity for independent and original research.

Student Background. The student is expected to have as a background:

1. Two years of college mathematics including at least one year of calculus at the level of Mathematics 50A-50B; an introductory course in computer programming is highly recommended.
2. One year each of college chemistry and physics at the level of Chemistry 14 and Physics 7A-7B-7C.
3. For geology students, broad undergraduate training in geology including paleontology, geophysics and geochemistry.
4. For geophysicists students, additional mathematics and physics at the upper division level.

Students may be admitted with deficiencies in their prior training, but they are expected to correct these during their first year of graduate work.

Geology. Incoming students must choose between a master's and Ph.D. program by the beginning of the first semester. Students should plan to cover a broad spectrum of advanced courses, selected with the approval of the graduate adviser. Courses taken within the Department of Geology and Geophysics should include at least one course of study related to the student's major research interest.

Two master's degree programs are offered. Requirements for the Master of Arts degree consist of 24 semester units of upper division and graduate courses followed by a comprehensive oral examination. The Master of Science degree is granted upon completion of 20 semester units of upper division and graduate courses and submission of a Master's thesis. The M.A. program requirements include at least 12 units in the graduate (200) series; for the M.Sc., at least eight units must be in the 200 series. The master's thesis should be completed within four semesters (two years).

Candidates for the Ph.D. degree must prepare and defend a research proposition at the oral qualifying examination by the end of the third semester; the student's general mastery of geology is also tested at this examination. Students are encouraged to take graduate courses in mathematics and physical sciences as well as in earth sciences according to individual needs. The dissertation need not be related to the qualifying project; a master's degree is not a prerequisite for a Ph.D.

Geophysics. Incoming students must choose between a master's and Ph.D. program by the beginning of the first semester. The M.A. degree is awarded after successful completion of an oral examination to be taken no later than the third semester. In addition, candidates must complete the 200 series of upper division and graduate course work of which at least 12 must be purely graduate units.

Candidates for the Ph.D. degree must prepare and defend a research proposition at the oral qualifying examination during the third semester; the student's general mastery of geophysics is also tested at this examination. There is no formal course requirement, but students are encouraged to take graduate courses in mathematics and physical sciences as well as in earth sciences according to individual needs. The preparation of a Ph.D. dissertation requires at least a full academic year and the dissertation need not be related to the qualifying project. A master's degree is not a prerequisite for a Ph.D.

Center for Isotope Geochemistry. The Center for Isotope Geochemistry, under the directorship of Professor Donald DeFatti, consists of a combined isotopic measurements facility in the Department of Geology and Geophysics and instrumentation development laboratory at Lawrence Berkeley Laboratory. Research using the Nd-Sm and Pb-Sr methods includes the origin of magmas, the growth of the continental crust, and the evolution of sea water.

Seismographic Stations. The University operates 16 seismographic stations in northern California to study the seismicity here and in adjacent parts of Nevada and Oregon to conduct other research in seismology. Research includes the study of earthquake wave propagation, the nature of the waves, their relation to earth structure, the nature of earthquake sources, and evolutions of the earth, and the theory of the seismograph. Offices are in the Earth Science Building; seismographs and laboratories are in Haviland Hall and in an underground vault in Shrawder Center.

Center for Computational Seismology. The University at its Lawrence Berkeley Laboratory houses a research facility for modern seismological research which relies heavily upon intensive computational analysis (e.g., imaging last earthquakes). The center is used in a number of Ph.D. research studies.

Geology

Lower Division Courses

50. Introduction to Geology. (3) Students who have taken 10 may not receive credit for 50. Two 11-hour lectures per week. Prerequisites: Geology 50S may be taken concurrently, except by declared geology majors. An introduction to the physical and chemical processes that have shaped the earth through time, with emphasis on the theory of plate tectonics. (F,SP)

Jones, Alvarez

90L. Introductory Geology Laboratory. (1) Three hours of lab per week. Prerequisites: Must be taken concurrently after completion of Geology 50L. A self-paced course for independent and original research. (F,SP)

Upper Division Courses

100A. Introduction to Minerals. (2) Two 1-hour lectures and two 3-hour laboratories for first 7 1/2-weeks; mini-course. Prerequisites: 50 or consent of instructor. Elementary crystallography, crystal chemistry, classification and physical properties of common minerals; identification in field and lab. (Spring) Curtiss

100B. Introduction to Rocks. (2) Two 1-hour lectures and two 3-hour laboratories for last 7 1/2-weeks; mini-course. Prerequisites: 100A or consent of instructor. Introduction to the origin of igneous, sedimentary and metamorphic rocks; identification of rocks by photomicroscopy and petrographic microscope techniques. (F) Curtis

101. Field Geology. (3) One hour of lecture and two 8-hour field trips per week. Prerequisites: 50, 100A-100B. Geologic mapping and field observation in the Berkeley Hills; interpretation of geologic history from structural and stratigraphic investigations. (SP) Curtis

102. Optical Properties of Minerals and Rocks. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: Chemistry 1A; 100A-100B, 302. Geological mapping and field observation in the Berkeley Hills; interpretation of geologic history from structural and stratigraphic investigations. (SP) Curtiss

105. Ore Deposits. (4) Two 1 1/2-hour lectures, three 1-hour labs per week, and two field trips. Prerequisites: Chemistry 1A-1B, Geology 100A-100B. Origin of the chemical elements, fractionation, crustal abundance patterns, systems and evolution of supracrustal one.
Upper Division Courses

101. Seminar in Geochemistry. (3) One 3-hour discussion per week. Prerequisites: Consent of instructor. Principles and problems in geochemistry. (SP) Staff

102. Advanced Ore Petrology. (3) Two 1-hour lectures per week and one 3-hour laboratory per week. Prerequisites: 100A and 100B. The physical and chemical evolution of ore deposits: applications of mineral assemblages in ore deposit evaluation; economic geology; ore deposits and recent mineral exploration. (SP) Staff

104. Mathematical Methods in Geophysics. (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisites: Mathematics 50A-50B; Physics 7A-7B; senior standing in geology, geophysics, or related field; familiarity with differential equations; linear algebra; Fourier analysis. Theory of linear systems and applications in geophysics. Fourier series and transforms; probability and scientific inference; significance tests; time-series analysis; spherical harmonics; fast-Fourier transformations; differential equations of geophysics. (F) Bolt

201. Seminar in Geochemistry. (3) One 3-hour discussion per week. Prerequisites: Consent of instructor. Evolution of the earth in response to internal, external, and tectonic forces. Weathering, diagenesis, metamorphism, hydrothermal processes, etc. (SP) Jones, Berry

209. Accretionary Tectonics in the Circum-Pacific Region. (3) Course may be repeated for credit. One 3-hour seminar per week. Selected topics in the tectonic evolution of the Circum-Pacific region. Course content will vary from year to year, depending upon interest of participants. (SP) Staff

212. Advanced Stratigraphy and Tectonics. (3) One 3-hour seminar per week, Prerequisites: Consent of instructor. Evolution of the earth in response to internal, surtropical, and extratropical processes. (SP) Frick

215. The Earth. (4) Three hours of lecture and one 2-hour discussion per week. Prerequisites: Calculus through differential equations, one year of college physics. The earth as a whole; its internal constitution and evolution. (SP) Staff

103. Introduction to Theoretical Geochemistry. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Chemistry 1A-1B, 101, senior or graduate standing in geology. Geometric, algebraic, and logical tools in geochemistry, with examples in the solution chemistry of the elements. Geochemical principles of mineralogy, geochemistry, and petrology. (SP) Staff

217. Fluvial Geomorphology. (4) Course may be repeated for credit. Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Consent of instructor. Principles of hydraulic geometry and river morphology; fluvial pattern and process; alluvial systems and processes; sediment dynamics and bed-load transport. (F,SP) Staff

220. Research. (2-12) Course may be repeated for credit. Individual conferences to be arranged. Provides supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

300. Professional Preparation: Supervised Teaching of Geology and Geophysics. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Course content will vary from year to year, depending upon interest of participants. (F,SP) Staff

402. Electron Microscopy and X-Ray Diffraction. (2) Course may be repeated for credit. The use of the electron microscope, X-ray diffraction apparatus, and ancillary equipment. (SP) Staff

Geophysics

Lower Division Courses

20. Earthquakes. (3) Three hours of lecture and one 3-hour discussion per week. Prerequisites: Consent of instructor. Introduction to earthquakes, their causes and effects. General discussion of basic principles and methods of seismology and geological tectonics, distribution of earthquakes in space and time, mechanisms of earthquakes, effects of earthquakes and earthquake hazard and risk. (F) Johnson

104. Mathematical Methods in Geophysics. (4) Three 1-hour lectures and one hour of computer laboratory per week. Prerequisites: Mathematics 50A-50B. Linear algebra in the earth sciences: least squares; the generalized inverse matrix and Lagrange constraints; splines; probability and scientific inference; significance tests; time-series analysis; spherical harmonics; fast-Fourier transformations; differential equations of geophysics. (F) Bolt
108. Geodynamics. (4) Three 1-hour lectures and one 1-hour of discussion per week. Prerequisites: Physics 7A, Mathematics 50A-50B. Basic principles in studying the physical properties of earth materials and the dynamic processes of the earth. Examples are drawn from mechanics, genetics of earthquakes, etc., to allow cross-connections. (F) Johnson

121. Seismology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: 108, or course in continuum mechanics; Physics 7A-7B; Mathematics 50A-50B. Elastic waves in the earth; forward and inverse problems of wave velocity distribution; reflection and refraction methods of seismic exploration. Theory of the seismograph; interpretation of seisms; causes, effects and distribution of earthquakes; mechanics of earthquakes; earthquake hazard and risk. (SP) Wang

122A. Physics of the Earth and Planetary Interiors. (4) Three 1-hour lectures and one hour of discussion per week. Prerequisites: Physics 105. Density distribution in the earth and planets. Equation of state of solids at high pressures; phase transitions; inferences on the constitution of the earth and planetary interiors. Gravity fields of the earth and planets; the concept of isostatic equilibrium and inferences on the dynamic nature of the earth and planetary interiors. (SP) Johnson

122B. Physics of the Earth and Planetary Interiors. (4) Three 1-hour lectures and one hour of discussion per week. Prerequisites: Geophysics 108, Physics 110A; Internal structure of the Earth. Chemical composition of the mantle and core. Temperature distribution and energy of earth's interior. The geomagnetic field; paleomagnetism; the geodynamo. (SP) Bukowinski

*130. Strong Motion Seismology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 50A or equivalent and consent of instructor. Modified waveform; modeling, synthetic seismograms. Instrumentation to measure strong ground motion. Estimation of seismic motion at a site. Ground motion spectra. Influence of soils and geologic structures. Seismic risk mapping. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Individual conferences. Enrollment is restricted by regulations listed on page 81 and 82 of this catalog. Additional restrictions established by the instructor supervising the work. (F,SP)

Staff

Graduate Courses

204. Elastic Wave Propagation. (3) Three hours of lecture per week. Prerequisites: 104 or equivalent; 121; Physics 105. Wave propagation in elastic solids; solids of practical engineering interest; representation theorems; reflection and refraction; propagation in layered media; finite-difference and finite-element methods. (SP) Bolt

*205. Theoretical Seismology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 204 or consent of instructor. Advanced treatment of the generation and propagation of elastic waves in realistic earth models. Lamb's problem; waves in inhomogeneous media; eigenfunctions; seismic source models; synthetic seismograms. (SP)

*206. Geophysical Inverse Methods. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Geophysics 104 or equivalent. Survey of various inverse methods available for geophysical problems. Deterministic and statistical, under- and over-determined, and linear and non-linear problems. Concepts of existence, uniqueness, construction, appraisal, resolution, and trade-off curves. Applications to gravity, magnetics, conductivity, seismology, and planetary physics.

*208. Mechanical Properties of Earth Materials. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Geophysics 108 or course in continuum mechanics. Mechanical properties of rocks and minerals. Finite deformation and thermodynamics of solids under and at high temperatures; high-temperature creep, and fracture of rocks. Properties of polycrystals and aggregates; the nature of grain boundaries; dislocations and other crystal defects and microstructures.}

209. Mineral Thermodynamics. (3) Three hours of lecture and one hour of discussion per week. Physical basis of the thermodynamic properties of minerals, including the use of elastic constants, spectroscopic, and related data. The emphasis is on high-temperature phenomena, including thermal and magnetic properties, and non-equilibrium processes, particularly diffusion and the theory of phase transformations, are also discussed.

210. Bonding in Minerals. (3) Three hours of lecture and one hour of discussion per week. An introduction to the theoretical and experimental study of bonding forces in minerals, including simple models, and the results of rigorous calculations, from quantum mechanics; spectroscopic data, group-theoretical analyses, and crystal field theory; equilibrium of state and high-pressure phenomena.

217. Advanced Seismology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Theory of the pendulum and other seismographs. Techniques of modern seismology, including signal conditioning and data acquisition systems. Laboratory exercises stress mechanical details and signal flow consideration in seismograph design and calibration.

218. Seminar in Seismology. (3) Course may be repeated for credit. One 3-hour discussion period per week. Critical study of selected current seismological research. Topic will vary from semester to semester. (F,SP) Johnson, McEvitty

219. Seminar in Geophysics. (3) Course may be repeated for credit. One 3-hour discussion period per week. Critical study of problems in current geophysical research. Content will vary. (F,SP) Bukowinski, Wang

285. Research. (2-12) Course may be repeated for credit. Individual conferences. Individual conferences to be arranged. Provides supervision in the preparation of an original research paper or dissertation. (F,SP)

298. Directed Group Study for Graduate Students. (1-4) Course may be repeated for credit. Individual conferences and occasional group meetings. (F,SP)

601. Individual Study for Master's Students. (1-6) Units may not be used to meet either unit or residence requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: For candidates for master's degree. Individual study for the comprehensive or language requirements in consultation with the field advisor. (F,SP)

602. Individual Study for Doctoral Students. (1-8) May not be used for unit or residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: For candidates for Ph.D. Individual study in consultation with the major field advisor. Provides an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP)

Professional Courses

404. Modern Seismological Observatory Techniques. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two or three hours of laboratory and one hour of discussion per week. Prerequisites: 204 and graduate standing. Advanced instruction in interpretation and reduction making use of the instrumental and computer facilities of the Seismological Laboratory. Course is designed to enable graduate students to learn to use analog and digital observations of seismic waves in their research. (F) McEvitty

*Not offered 1989-90

*On leave, spring

*On leave, fall

1On leave, spring, fall

2On leave, fall

German

(College of Letters and Science)

Department Office: 5317 Dwinelle Hall, 642-7444
Chair: Joseph Millican, Ph.D.

Professors:

Richard Brinkmann, Ph.D. University of California at Berkeley

Joseph Millican, Ph.D. University of California at Berkeley

Herbert Penz, Ph.D. University of California at Berkeley

Associate Professors:

Bluma Goldstein, Ph.D. University of Wisconsin

Robert C. Holub, Ph.D. University of California at Berkeley

Kenneth D. Weisinger, Ph.D. University of California at Berkeley

Assistant Professor:

W. Daniel Wilson, Ph.D. Cornell University

Senior Lecturer:

Klaus A. Mueller, M.A. Columbia University

Jeanne van Oosten, Ph.D. University of California at Berkeley

Visiting Associate Professor:

Volker Gransow, Dr.phil., Free University of Berlin

Major Adviser: D. Wilson.

Graduate Advisers: Literature: R. Holub (A-K) and H.C. Seeba (L-Z); Linguistics: I. Rauch.

The Department of German offers undergraduates the opportunity to obtain a broad background in the field of German language, literature, and culture, and introduces them to the principles of literary and cultural criticism. German language instruction ranges from elementary courses to advanced courses in German style. Upper division courses cover German literature from the earliest times to the present, as well as the linguistic study of German. The graduate program in literature emphasizes seminars that provide an in-depth study of more specialized areas. The graduate offerings in linguistics constitute a complete program of study in Germanic languages. Instruction in methodology is provided for graduate student instructors and prospective teachers. The curriculum of Dutch Studies focuses upon the language, literature, and culture of The Netherlands and Flanders.

The Major

Lower Division. German 1, 2, 3, 4, or their equivalent.

Upper Division. 30 units from Group II (a minimum of 14 units must be taken at Berkeley). The following courses are required: 100, 101A, 101B, and 102A or 102B. Courses must be taken in the literature or culture of at least two different centuries (courses numbered 105 or higher). Consult the major adviser for graduate study in consultation with the major adviser. Students who have not achieved at least a B average in that part of the German 1-4 sequence taken at Berkeley and must normal requirements for the minor in German 101A before continuing with other upper division courses (German 102 is excepted from this rule). If you are transferring from another institution and wish to declare a major in German, see the major adviser or the undergraduate adviser.

Honors Program. A grade point average of 3.5 in the major and an overall GPA of 3.3 are required.
for participation in the program during the senior year. Any course in the 195 series and an honors thesis (H196) must be completed. The Honors Committee, consisting of the major adviser and the thesis director, approves the topic and evaluates the thesis.

The Minor
Lower Division. German 1, 2, 3, 4 or their equivalent.

Upper Division. Five courses (of which three must be taken at Berkeley), as follows:

Required: One course on German culture and institutions (German 110, 111, 112, or 158).

Electives: Four courses from Group II: only 2 units from German 102 may be applied to the minor. One course from another department related to German studies, or a course in Dutch or Yiddish from the German Department, may be credited as one of the four electives with prior approval of the minor adviser.

A letter grade of C or better is required for each upper division course applied to the minor.

Graduate Program
Aims of the Graduate Program. The graduate program of the Department of German is designed to assist the scholars and teachers in each of the fields of German language, literature, and linguistics. It aims at a comprehensive historical knowledge of German literature and/or linguistics and is designed to encourage inde- pendence and creative initiative. The program leads to the Master of Arts and Doctor of Philosophy degrees in literature or Germanic linguistics. Graduate students in German may wish to pursue Dutch Studies as their secondary field of study.

Prerequisite for Admission to Full Graduate Standing. A Bachelor of Arts degree (or its equivalent) in German is required. (Eight semesters of undergraduate study are required for students from abroad.) Students admitted on the basis of their overall scholarship records, but with deficiencies in their preparation in German, are expected to make these up by additional course work.

Proficiency in German of entering students is determined by examination. When necessary, remedial measures are recommended by the graduate adviser.

Master of Arts: Literature
The program is designed to acquaint students with the major periods of German literature. Candidates for the degree must demonstrate factual knowledge and critical understanding of the major periods, au-thors, and problems of German literature and intellectual history and should be able to formulate their views clearly and intelligently in both English and German.

Course Work. The Proseminar (200), Middle High German (203), and at least one seminar in literature and one course in linguistics are required for the M.A. The normal load per year for teaching assistants is five academic courses (upper division and graduate). With the exception of at least one research seminar in literature of the period omitted in the M.A. examination, no specific courses are required at the graduate level.

English (Option II) before they take the Ph.D. qualifying examination. The languages, or languages—chosen in consultation with the graduate adviser—should contribute to the study of German literature in general and/or to the individual research interests of the student in particular. Latin and French are considered most useful.

Students are encouraged to begin working on the languages requirement as early as possible, preferably in the first two years of graduate study.

Option I consists of a reading knowledge of two languages. a) both passed by examination (current practice specifies a passage of at least 300 words and a time limit of 90 minutes with or without dictionary) or b) one passed by examination, the other through evidence of a four-semester (five-quarter) sequence of courses with an average grade of C or better (course sequences at other institutions must be validated by the Graduate Division; the last course in such a sequence must have been completed within four years of the student's date of admission to graduate study).

Option II demonstrates native fluency in and adequate knowledge of the grammatical structure of one academically appropriate language: a) passed by special department examination through evidence of native ability in the language, demonstrated by secondary school or university transcripts. It should be noted that merely being a native speaker of a language other than English does not meet the requirement.

Teaching Requirement: Two semesters of lower division language instruction will be required of all degree candidates. This instruction may take place before or after the M.A. and preceding the qualifying examination.

Ph.D. Qualifying Examination: By the end of the third semester of Ph.D. work the student will submit a written prospectus that argues a particular issue, perspective or critical approach and involves major periods of German literature in the Middle Ages to the present. This prospectus is to be developed in consultation with various members of the faculty, should have implications toward a dissertation topic. At the same time, the student will submit to the graduate adviser a reading list that reflects the breadth of general literary and cultural history as well as literary criticism as they relate to the student's prospectus. The qualifying examination is normally taken at the end of the fourth semester of Ph.D. work.

Before taking the qualifying examination the student must also acquire competence in an outside field complementary to the major field of concentration in German literature; the outside field is tested in the oral examination.

The qualifying examination consists of four essay questions that relate to the candidate's prospectus and involve the different periods of German literature. Three hours are allotted for answering two of the four questions, and an additional three hours are permitted for revision. The written examination is followed within one month by a three-hour oral examination that explores broader issues arising from the candidate's prospectus. The written examination may be recommended for reexamination. A third examination is not permitted.

Master of Arts: Linguistics
The department offers a program in German linguistics for the M.A. and Ph.D. degrees. Although there is no undergraduate concentration in linguistics, courses 103 (The Structure of the German Language) and 104 (Introduction to the Linguistic Study of German) provide an opportunity for interested undergraduates to learn about the field; these courses may also be taken by beginning graduate students in order to orient them to the discipline. At the graduate level the program offers a broad range of courses in contemporary and historical languages and the methods of German and Germanic linguistics, including recent directions in
such approaches as discourse grammar and semiotics. The Bay Area German Project (BAG) offers linguistic field work in German as it is spoken by native speakers in the Bay Area.

Course Work: Thirty-six units, 28 of which must be graduate, are required for the M.A. degree; 4 of the 24 graduate units may be in literature. Candidates are to become familiar with the structure and the history of the German language through regularly scheduled courses in modern and historical German linguistics, seminars in the 250 series, and courses not given on an annual basis such as 273 (Gothic). A knowledge of Middle High German as well as proficiency in and written New High German is assumed. Metalinguistics, i.e. contemporary methods in German linguistics, is integral to every German linguistics course in the curriculum. Seminars in the 250 series have varying topics and are intended to acquaint the student with the factual and theoretical background by focusing on issues and areas such as the dialects of Modern German, German semantics, German morphology, contrastive grammars, German syntax, the German(ic) verb, problems in German phonology and semiotics.

The M.A. Examination: Normally the M.A. examination is taken by the end of the second year of graduate study; students are encouraged to consult closely with their adviser on their progress and to think through well in advance to arranging and preparing for this examination. The M.A. examination is a three-hour written examination with an additional three hours for revision. It concentrates on grammatical structure of the Modern German language, its genetic provenance, the history of the Germanic language, and current linguistic methods in German studies. Students who fail the examination may be recommended for reexamination. A third examination is not permitted.

Doctor of Philosophy: Linguistics

An M.A. in German linguistics or its equivalent is a prerequisite for admission to the Ph.D. program. Students are expected to consult with their graduate advisers in order to set up their best plan of study for the Ph.D. For their dissertation research, students may choose to concentrate on contemporary or historical German language. They are expected, however, to be knowledgeable in all periods of the history of the German language as well as in all components of its grammar: phonology, morphology, syntax, semantics, pragmatics. As part of their training, students are encouraged to work in public lectures both on and off campus, and to learn to write publishable research papers.

Language Requirement: Students must acquire a useful reading knowledge of two European languages other than German and English (Option I) or intensive knowledge in one European language other than German and English (Option II) at latest by the end of the semester before they take the Ph.D. qualifying examination. The language or languages chosen in consultation with the graduate adviser—should contribute to the study of German linguistics in general and/or to the individual research interests of the student in particular. English and French are considered most useful. Students are encouraged to begin working on the language requirement as early as possible, preferably in the first two years of graduate study.

Option I consists of a reading knowledge of two languages acquired by examination. The practice specifies a passage of at least 300 words and a time limit of 90 minutes with or without dictionary or b) one passed by examination, the other through evidence of a four-semester (five-quarter) sequence. Students are expected to pass these examinations by the end of their first year; the second must be completed by the end of their second year. A third examination may be taken before or after the M.A. and preceding the qualifying examination. The Ph.D. Qualifying Examination: The qualifying examination for students specializing in German linguistics normally takes place at the end of the fourth semester of Ph.D. work. It consists of two three-hour written examinations, each of which may be extended by three additional hours for revision, and an oral examination in the second hour. This examination deals primarily with advanced problems in the linguistic study of the German language, its contemporay and historical dialects and periods, comparative Germanic, and challenging and innovative methods in German and Germanic linguistics. Preparatory to the examination, students will compile a reading list in consultation with their advisers. Students select an outside complementary field that is examined as part of the oral examination.

Dutch Studies

A description of the group major in Dutch Studies can be found in the Dutch Studies section of the catalog. Descriptions of the courses presenting the language, literature, history, and culture of the Netherlands, offered by the Department of German, follow German courses.
by P. Weiss, R. Hochhuth et al. will be read.

Goldstein

160B. German Fascism. The aim of this course is to explore politically and culturally German fascism and the National Socialist state under Hitler. Goldstein

160C. Marx, Nietzsche, and Freud. This course will explore the central themes and philosophical concerns of three of the most influential thinkers in the German speaking world, and will examine in detail several works in which problems of history and morality are considered. (SP) Goldstein

160D. Kafka and Mann. This course will concentrate on the major novels, novellas, and discursive works of two of the most important writers of the first half of the twentieth century. Goldstein

160E. Readings in Contemporary German Culture and Society. Within the context of socio-political developments since 1945, key literary texts and social documents will be analyzed. Lectures will be supplemented by class discussions, individual student reports, and small group projects. Tubach

160F. Mass Media and New Technologies in East and West Germany. Three hours of lecture per week. This course represents three major trends in the introduction of mass media and new technologies in the two Germanies. 1) The spread of mass media and new technologies within the Federal Republic of Germany since 1949. 2) A rethinking of mass communications after the introduction of new technologies. 3) A comparison of mechanisms to technological challenges in democratic social systems. Gransow

160G. Introduction to European Mysticism. New course. The main trends of European visionary and speculative mysticism, with emphasis on texts by Meister Eckhart. Introduction of comparative religious perspectives, coupled with a close reading and interpretation of specific texts from such mystics as Hildegard von Bingen, Juan de la Cruz, and Mechthild von Magdeburg. Gransow

160H. Culture in the Federal Republic of Germany. This course will analyze cultural developments in a structure characterized by the division of the country, free enterprise and public ownership, immigration, parliamentary democracy and cultural federalism. Special attention will be given to the new social movements from a politico-cultural viewpoint. Gransow

160I. Jewish Writers and Thinkers of the German-Speaking World. A study of the works of those Jewish writers who have written about the problems of being a Jew in German-speaking countries. Goldstein

160K. Postwar Literature. New course. This course will focus on major authors and movements in German literature (from all German-speaking countries) since the Second World War. Special attention will be given to writers who have written on fascism and the reconstruction of Germany after the war. Tubach

161. The Historical Folk-Narrative of Europe. (3) Three hours of lecture per week. The analysis of European folk-narratives (Märchen) using various methods of approach (geographic-historical, sociological, mythological, psychological, structural). Tubach

162. Contemporary German Culture and Political Institutions. (3) Three hours of lecture/discussion per week. A study of the main trends in the cultural history of Germany since WWII, with particular emphasis on the political division of Germany and its impact on cultural and literary development in the Federal Republic of Germany and the German Democratic Republic. Tubach

163. Yiddish Literature and Culture. (3) Courses may be repeated for credit as topic varies. Three hours of lecture/discussion per week. This course, with recourse to narrative prose, drama, and poetry, focuses upon the cultural history of the Yiddish-speaking Jews who moved to the New World and attempted to continue their cultural pursuits. Goldstein

164. German Cinema. (4) Three hours of lecture and two hours of film screening per week. Films have English subtitles. Kaes

164A. From Expressionism to Social Realism: German Cinema of the Twenties. A comparative and interdisciplinary approach to the history of early German film between 1918 and 1933, designed to introduce the student to the analytical study of film in general. We will closely analyze the major films of the period and relate them to Weimar culture and society. 164B. Film of the Third Reich. A study of the function of propaganda in the films made under Hitler. Using fiction and documentary films, we will try to develop some understanding of the semiotics of fascist art. We will also examine the social context of film art in the Third Reich and analyze how German postwar films have depicted the Hitler period. Kaes

164C. New German Cinema: Film after 1962. The course will concentrate on films by Straub, Herrzog, Fassbinder, Wenders, Syberberg, Schlöndorff and lesser-known filmmakers in terms of their distinct visual styles, narrative principles, and thematic preoccupation. Discussion of modernism and postmodernism will help place these films in larger contexts. (F) Kaes

Group II

Prerequisite: Unless otherwise stated, four lower division German language courses (20 units) or their equivalent.

100. Introduction to German Literature. (3) Three hours of lectures/discussion per week. The course is intended to acquaint students with basic literary genres and major figures in German literature from the eighteenth century to the present, and to familiarize them with literary methods and historiographical requirements of all German majors. (F,SP) Staff

A. Language/Linguistics Courses

101A-101B. Advanced German Grammar and Composition. (3-3) Three hours of lecture/discussion per week. Required of all German majors. (F,SP) Staff

101A. Prerequisites: German 4 or consent of instructor. This course is designed to develop communicative skills, to enlarge the vocabulary and to improve pronunciation. Discussion of current events affecting Germany and the U.S., analyses of culturally significant texts. Participants are expected to make several oral presentations. No midterm or final examinations. (F,SP) Staff

101B. Prerequisites: 101A or consent of instructor. Three hours of lecture/discussion per week. A discussion of current events affecting Germany and the U.S., analyses of culturally significant texts. Participants are expected to make several oral presentations. No midterm or final examinations. (F,SP) Staff

102. German Conversation. (2,2) Either 102A or 102B may be repeated for credit, but only 4 units may be applied toward the major. Three hours of lecture per week. Not open to native speakers. (F,SP) Staff

102A. Intermediate German Conversation. Prerequisites: German 4 or consent of instructor. This course is designed to develop communicative skills, to enlarge the vocabulary and to improve pronunciation. Discussion of current events affecting Germany and the U.S., analyses of culturally significant texts. Participants are expected to make several oral presentations. No midterm or final examinations. (F,SP) Staff

102B. Advanced German Conversation. Prerequisites: 102A or consent of instructor. This course is designed to develop oral proficiency in German. Discussion of current events affecting Germany and the U.S., analyses of culturally significant texts. Participants are expected to make several oral presentations. No midterm or final examinations. (F,SP) Staff

103. The Structure of Modern German. (3) Three hours of lecture per week. An introduction to the structure of modern German for undergraduates, covering the fundamentals of German phonetics and phonology, morphology and syntax. (F) Shannon

104. Introduction to the Linguistic Study of German. (3) Three hours of lecture per week. Basic overview of the field of German linguistics, including modern German in its various aspects, the historical development of language, and concluding with a discussion of the modern dialects. (SP) Shannon

105. Middle High German for Undergraduates. (3) Not open to graduate students for credit. Three hours of lecture, translation, and discussion per week. Prerequisites: 105 or equivalent. Reading course designed to increase students' Middle High German repertoires. May not be substituted for but may be taken concurrently with German 203. Tennant

106. Literary Translation. (3) Three hours of lecture/discussion per week. Prerequisites: Two upper division courses in German literature. This course introduces students to the problems of literary translation from German to English. Kudszus

B. Cultural History Courses

110. From 800-1648. (3) Three hours of lecture/discussion per week. The social, political, and historical development from the Carolingian Empire to the Empire of Charles V. Turbach

111. From 1500-1800. (3) Three hours of lecture/discussion per week. The social, political, and historical background to German literature from the Reformation to the Age of Reason. Hilten

112. From 1800 to the Present. (3) Three hours of lecture/discussion per week. The social, political, and historical background to German literature since the French Revolution. Hilten

C. Literary History Courses

120. The Literature of the Middle Ages. (3) Three hours of lecture/discussion per week. Introduction to medieval German or English translation to major literary monuments of the Holy Roman Empire. Intended for undergraduates with no knowledge of Middle High German. Tennant

121. Renaissance, Reformation, and Baroque. (3) Three hours of lecture/discussion per week. The period that gave rise to Classicism and Modernist literature. Tennant

122. Enlightenment and Sturm und Drang. (3) Three hours of lecture/discussion per week. The period that produced Goethe and Schiller. Tennant

123. Classicism. (3) Three hours of lecture/discussion per week. Problems of Weimar Classicism, particularly in the light of contemporary discourse, will be discussed. Weisengruber

124. Romanticism. (3) Three hours of lecture/discussion per week. Literature, philosophy and aesthetics of the Romantic period. Goldstein

125. 19th Century Literature. (3) Three hours of lecture/discussion per week. Major trends and problems in 19th century German literature. (F) Holub

126. Modern Literature. (3) Three hours of lecture/discussion per week. Introduction to philosophical, biological, and aesthetic trends at the turn of the century. Analyses of literary texts by T. Mann, F. Kafka, S. George, R. M. Rilke, G. Benn, B. Brecht.

127. Contemporary Trends. (3) Three hours of lecture/discussion per week.
D. Approaches to Literature

131. Philosophical Approaches to Literature. (3) Three hours of lecture per week. Prerequisites: 100.
131A. Philosophy and Literature of the Romantic Period. Three hours of lecture/discussion per week. Kant, Fichte, Schelling, Hegel, and works by Novalis, F. Schlegel, and Die Nachtwachen von Bonaventura. (SP) Goldstein
133. Sociological Approaches to Literature. (3) Three hours of lecture/discussion per week. Prerequisites: 100.
133A. Das Bürgerliche Trauerspiel. Three hours of lecture/discussion per week. Middle-class tragedy of the 18th and 19th centuries and its theory in terms of the relationships between literature and society: patriarchy, class ideology, political significance. Wilson
135. Psychological Approaches to Literature. (3) Three hours of lecture/discussion per week. Prerequisites: 100.
135A. Robert Walser. The course will focus on the major works of Walser and the various ways in which his stories are presented. Meeck

E. Author Courses

140. Goethe. (3) Three hours of lecture/discussion per week. An introduction to Goethe's prose, drama, and poetry. Grantow
141. Schiller. (3) Three hours of lecture/discussion per week. A Study of Schiller's Major Dramas. Some attention given to dramatic theory, prose, and poetry. Wilson
142. Heine. (3) Three hours of lecture/discussion per week. Study of Heine's prose and poetry. Holub
143. The Poetry of Rilke and Hofmannsthal. (3) Three hours of lecture/discussion per week. An introduction to the work of Rilke and Hofmannsthal. Staff
144. Thomas Mann, Franz Kafka, Hermann Hesse. (3) Three hours of lecture/discussion per week. Introduction to three internationally renowned German writers of the 20th century, with particular emphasis on their decidedly different persons, their common concerns but different attitudes to and resolutions of life's problems, and their different modes of expression. Meeck
145. Thomas Mann. (3) Three hours of lecture/discussion per week. This course will dwell primarily upon the short stories and novellas that Mann wrote before the First World War. Attention is given to Mann's evolving mode of narration, and to the intimately personal nature of the matter of his tales. (F) Meeck
146. S. George and R. M. Rilke. (3) Three hours of lecture/discussion per week. Introduction to philosophical, ideological and aesthetic trends at the turn of the century; analysis of lyrical texts from 1890-1920. Hillen
147. Brecht. (3) Three hours of lecture/discussion per week. An introduction to Brecht's works. Goldstein
148. G. E. Lessing. (3) New course. Three hours of lecture/discussion per week. A study of his contribution as playwright, theorist, and philosopher. An introduction to 18th-century trends in philosophy and literary theory will precede the analyses of selected texts. (SP) Hillen

F. Special Topics

150. Literature of the German Democratic Republic. (3) Three hours of lecture/discussion per week. An introduction to the major writers of prose and drama. Holub
151. Austrian Literature. (3) Three hours of lecture/discussion per week. Viennese Literature and Culture at the Turn of the Century. This course will focus on literature, psychology, and philosophy of the turn of the century. (F) Goldstein
153. Feminist Perspectives in Literature. (3) Course may be repeated when topic changes. Three hours of lecture/discussion per week. For specific topic contact departmental office. (SP) Staff
155. Studies in Poetry. (3) Three hours of lecture/discussion per week. Prerequisites: 100.
155A. 18th and 20th Century German Poetry. Representative texts from 18th- to 20th-century German poetry will be studied closely. Methodological questions regarding the interpretation of poetry in general will also be discussed. Kudszus
156. Studies in Prose. (3) Three hours of lecture/discussion per week. Staff
156A. Experimental Contemporary Prose. (SP) Kudszus
157. Studies in Drama. (3) Three hours of lecture/discussion per week. Prerequisites: 100.
157A. German Drama from the Forties to the Seventies. The course will focus on major dramatic trends. Attention will be drawn to the dramatic theories underlying epic theater, expressionistic theater, theater of the absurd, documentary theater, and neo-naturalism. Representative dramas by major playwrights will be studied both in terms of matter and manner. Kudszus
158. Introduction to Contemporary Germany. (3) Two hours of lecture and one hour of discussion per week. Introduction to the social, political, and historical background of the Federal Republic of Germany today. Open to all undergraduate and graduate students interested in contemporary Germany but particularly intended for students who will participate in the eAP to Göttingen in the following year. Prerequisite: 100.

G. Seminars and Special Study Courses

175. Undergraduate Seminars. (3) Three hours of seminar per week. Prerequisites: 100.
175A. Franz Kafka. Formerly 130A. The seminar will explore Kafka's short prose and his novels. We will consider the pursuits and misfortunes of Kafka's protagonists, the enigmatic world they try to inhabit, and the various ways in which their stories are presented in literary prose. Kudszus
195. Research Seminars for Undergraduates. (3) Three hours of seminar per week. One course in this series is required of all students participating in the departmental Honors Program.
195A. Novellists: Focusing on Heinrich von Ofterdingen, Grimmelshausen, Hillen
195B. Individual versus Collective Identity. Studies in contemporary German culture ("New Subjectivity") with special emphasis on the new quest for (personal or national) identity. Based on selected literary works (Günter Grass, Kempfeburt, Christa Wolf, Kasandra, Thomas Becker, Bürgerschatz, Martin Walser, Brandung), the discussion will focus on various approaches to literary analysis and cultural criticism. Readings and discussion in German. Seeba
195H. Büchner and Heine. This course will explore the chief works of the two most celebrated German writers of the early nineteenth century. Of particular interest will be their attitudes towards society, religion, and politics. Holub
H196. Honors Studies in German. (2-4) Prerequisites: one of the 195 courses. Supervised independent study and research course for honor students who are writing their theses for completion of the requirements for the Honors Program. (F,SP)
198. Directed Group Study. (2-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group study of selected topics which will vary from year to year. (F,SP)
199. Supervised Independent Study and Research. (2-4) Must be taken on a passed/not passed basis. Prerequisites: 15 units of upper division German with an average of no less than 3.0. Individual course. Supervised independent study and research. (F,SP)

Graduate Courses

A. Introductory Courses in Literature

200. Proseminar in German Literature. (4) Two hours of seminar plus one hour of tutorial per week. The seminar will give a brief introduction to the history of Germanic literature, its classification, and its role in the Western tradition. This course is designed for graduate students who wish to take a graduate seminar in German literature. Required of all M.A. candidates. (F) Holub
201. Major Periods in German Literature. (4) Three hours of lecture/discussion per week. Designed expressly for M.A. candidates. Final exam, no paper.
201A. Middle Ages. Survey of medieval German literature that concentrates on monuments of the Hohenstaufen period but also includes representative works from the later 13th and 14th centuries. Intended for M.A. candidates but open to all students with a working knowledge of Middle High German. (SP) Tubach
201B. 1500-1700. An introduction to major trends and authors of this period beginning with the Reformation. Emphasis on German analysis and interpretation of 17th-century literature. Texts by Luther, Muenzer, Opitz, Gryphius, Lohenstein, and Grimmelehausen. Hillen
201C. 18th Century. An introduction to major works of enlightenment, Sturm und Drang, and Classicism to Schiller's death. Wilson
201D. 19th Century. A study of major texts from Goethe to Fontane to explore the changing functions of literature, its ideological implications and social significance within 19th-century German thought. (SP) Brinkmann
201E. 20th Century. A critical overview of the major literary and intellectual currents of the modern period from about 1910 to the present. We will explore how social, philosophical, and aesthetic forces are inscribed in representative literary and theoretical texts of that period and discuss the changing status and social function of literature in Expressionism, Dada, Fascism and Exile, after 1945 and in post-modernism. Kease
203. Middle High German for Graduates. (4) Formerly 203A-203B. Four hours of lecture/discussion per week. Basic grammar, readings, techniques of editing of Middle High German texts, elementary paleography, and normalization. Not a continuation of German 106. (F) Sphar

B. Literary History Courses

205. Studies in Medieval Literature. (4) Two hours of seminar plus one hour of tutorial per week. Prerequisites: 106 or 203.
205A. Walter von der Vogelweide and his contemporaries. Tubach

Notes:
*Not offered 1988-89
1On leave, spring
2On leave, summer
3Recalled to active service
4Recipient of Distinguished Teaching Award

German / 213
214 / German

205B. Introduction to Medieval German Mysticism: A close reading of five sermons by Meister Eckhart will be supplemented by reports and papers on other important themes ranging in time from Hildegard von Bingen to Jakob Boehme. Tu Bach

205C. Wolfram's Parzival: The entire romance will be read in Middle High German. Each book will be analyzed from a literary standpoint. (SP) Spahr

205D. Nibelungenlied: The Nibelungenlied is read in its entirety in Middle High German and is used as the basis for approaching more general issues in medieval German literature. (SP) Spahr

205E. Tristan. Gottfried von Strassburg's Tristan is read in its entirety in Middle High German and is related to broader questions of medieval German literary history and aesthetics. (SP) Spahr

206. Literature of the Renaissance and Reformation. (4) Two hours of seminar plus one hour of tutorial per week. A study of a series of topics dealing with genres, authors, or themes. Whatever the topic, the high points of the century will be treated. Spahr

211A. Age of Enlightenment. Literary texts will be studied as historical documents illuminating changes in literary theory and in religious and philosophical thought during the Enlightenment. Texts by Lessing, Herder, and Lenz, and some Storm and Stress plays. (SP) Hillen

211B. The Writer and Enlightened Absolutism. A sociopolitical approach: the writer and the court, the stock tractes, patronage, academy projects, and political authority. Important works by Klopstock, Lessing, Wieland, Goethe, and others will be read from this perspective. Wilson

214. German Realism. (4) Two hours of seminar plus one hour of tutorial per week. This course will focus on the major novels and novellas of 19th-century German literature. Brinkmann

216. Naturalism. (4) Two hours of seminar per week plus one hour of tutorial. German naturalism. The main works of German naturalism, with particular attention to Gerhart Hauptmann and the German drama, will be read. Some attention will also be given to foreign models (French, Russian, and Scandinavian) and to naturalistic theory. Spahr

218A. Studies in Twentieth-Century Literature. (4) Two hours of seminar plus one hour of tutorial per week. A study of the literature of East Germany with emphasis upon Heiner Mueller, Christa Wolf, and Volker Braun. Holub

218B. Weimar Culture: The Problem of Modernity. The course will focus upon the manner in which the literature and culture of the Weimar Republic came to grips with the sociopolitical-historical process of modernization. Kaes

218C. Literature and Sociology in the GDR. This seminar has two goals: first, a discussion of literature and the sociology of literature; second, a discussion of the parallels and differences between literature and general sociology and special sociologies (e.g., industrial sociology, sociology of gender relations et al.). Readings will be selected from literature and sociology. Gransow

C. Genre Courses

220. Bildungsroman. (4) Two hours of seminar per week plus one hour of tutorial. Seeba

226. Drama of the Twentieth Century. (4) Two hours of seminar per week plus one hour of tutorial. 226A. From Gerhart Hauptmann and Naturallum zu Franz Xaver Kraetz and Neo-Naturalism. Attention will be drawn to the dramatic theories underlying naturalism, expressivism, epiphenomenalism, the avant-garde, documentary theater, and metatheater, and to the characteristic concerns and formal features of these trends. Representations of major playwrights will be studied both in terms of substance and of form. Miilek

228. 20th Century Novel. (4) Two hours of seminar per week plus one hour of tutorial. Modern German novel. Seeba

D. Author Courses

230. Lessing. (4) Two hours of seminar per week plus one hour of tutorial. Emphasis on the plays and their sociopolitical-cultural reference. Theological and anti-theological writings. The writer's relation to authority and the literary market. Hillen

234. Goethe. (4) Two hours of seminar plus one hour of tutorial per week. 234A. Early Goethe: Concentration on the works of Goethe's Sturm und Drang period and Faust I. Various interpretations of the works of the author will be examined in the course of research in this period. (F) Weisinger

234B. Goethe's Faust II: This and other works of Goethe's later period will be read and discussed in the light of contemporary criticism and literary theory. Weisinger

236. Schiller. (4) Two hours of seminar per week plus one hour of tutorial. A study of Schiller's plays with emphasis on problems of non-mimetic language and aesthetic representation within Kleist's concept of Gebruchlichkeit der Welt. Seeba

240. Heinrich von Kleist. (4) Two hours of seminar plus one hour of tutorial. A study of Kleist's dramas with emphasis on problems of non-mimetic language and aesthetic representation within Kleist's concept of Gebruchlichkeit der Welt. WEISSINGER

241. Heinrich Heine. (4) Two hours of seminar plus one hour of tutorial per week. A study of Heine's works in their political and social contexts. Holub

242. Hofmannsthal. (4) Two hours of seminar per week and one hour of tutorial. Seeba

247. Hermann Hesse. (4) Two hours of seminar per week plus one hour of tutorial. A study of Hesse's novels from Peter Camenzind to Das Glasperienspiel in terms of both matter and manner, and their evolution. Miilek

248. Thomas Mann. (4) Two hours of seminar per week plus one hour of tutorial. A study of Mann's novels and short stories with emphasis upon both matter and manner, and their evolution. (SP) Miilek

249. Franz Kafka. (4) Two hours of seminar per week plus one hour of tutorial. Kudzus

250. Thomas Mann, Franz Kafka, and Herman Hesse. (4) Two hours of seminar plus one hour of tutorial per week. A comparative study of some of the major shorter tales, with emphasis upon both matter and their manner. Miilek

E. Theory Courses

255. Interpretation and Criticism of Poetry. (4) Two hours of seminar per week plus one hour of tutorial. 255A. Topic: Hölderlin. Kudzus

255B. Georg Trakl. Kudzus

257. Historicity. (4) Two hours of seminar per week plus one hour of tutorial. A discussion of the relationship of history and literature as it affects the theoretical notions of the historicity of literature and the fictionality of historiography. Seeba

260. Literary Canon and Institutional History. (4) Two hours of seminar plus one hour of tutorial per week. A critical discussion of the canonization of classical texts in the institutional history of literarische Bildung. Seeba

259. Postmodernism. (4) New course. Two hours of seminar and 1-hour of tutorial per week. This seminar will explore the notion of "postmodernity" in its theoretical, historical, and interdisciplinary dimensions. Specifically we will analyze recent German prose writing, films, and theoretical texts, (2) place these German contributions in the larger context of European and American debates about postmodernism, and (3) focus our attention on recent "postmodernist" reformulations of questions of history, myth, intersubjectivity, and texts. Reading and representation. A substantial research paper will be required. Kees

257. Myth and Metaphor: Patterns of Imagistic Thought. (4) New course. Two hours of seminar per week plus one hour of tutorial per week. Discussion of the theories of myth and metaphor from Friedrich Schlegel to Hans Blumenberg and of the role of mythological patterns (e.g., Odysseus, Oedipus, Kassandra, Medea, Siegfried, hour of tutorial, Rauch von Habeburg) in German literary and intellectual history. Seeba

262. Aesthetic Theory. (4) New course. Two hours of seminar plus one hour of tutorial per week. This seminar will explore various aspects of aesthetic theory, concentrating on Kant's Kritik der Urteilskraft and Hegel's Überlieferungen über die Aesthetik. Special attention will be given to the ideological notion of aesthetic theory. (SP) Holub

263. Studies in Language and Consciousness. (4) Two hours of seminar plus one hour of tutorial per week.

263A. The process of translating. Questions of interpretation, writing, and intertextuality will be explored in connection with translating a 20th-century literary work.

265. Topics in Romanticism. (4) Course may be repeated for credit. Two hours of seminar per week plus one hour of tutorial. Variable topic.

268. Aspects of Literary and Cultural History. (4) Two hours of seminar per week plus one hour of tutorial. A comparison of literary and cultural developments in Germany and the United States. Emphasis is placed on individual research designed to develop teaching materials.

Graduate Courses in Linguistics

270. Introduction to the History of the German Language. (4) Two hours of seminar per week plus one hour of tutorial. The evolution and current status of the German language from prehistoric times to the present. Fundamental linguistic principles and societal movements integral to the various stages of German. (F) Rauch

271. Comparative Germanic. (4) Two hours of seminar per week plus one hour of tutorial. An advanced treatment of Germanic and the Indo-European languages. (SP) Rauch

273. Gothic. (4) Two hours of seminar per week plus one hour of tutorial. Study of the linguistic structures of the earliest Germanic dialect with a sizable corpus. Indo-European origins, Germanic relationships, and Gothic as a synchronic construct are considered. Rauch

276. Old High German. (4) Two hours of seminar per week plus one hour of tutorial. Reading of poetic and prose texts in Old High German. The synchronic and diachronic study of the dialects of the High German language from the eighth to the eleventh century within the framework of current linguistic methodology. (F) Rauch

278. History of the Dutch Language. (4) Two hours of seminar per week plus one hour of tutorial. The prehistory, emergence, development of Netherlandic, and its filiation with English and German. See also Dutch 107.

282. Old Saxon. (4) Two hours of seminar plus one hour of tutorial per week. Study of the most provocative of the major Germanic languages in terms of structural
Identification. The literary and ethnographic setting of the Heliand and its shared isogrammar. (SP) Rauch

285. Approaches and Issues in the Study of Modern German. (4) Two hours of seminar per week plus one hour of tutorial. Prerequisites: 103A. A survey of relevant contemporary issues and topics in linguistic research on the structure of modern German. (SP) Shannon

290. Seminar in German Linguistics. (4) Two hours of seminar per week plus one hour of tutorial.

290A. Semantics: Concentration on the essential categories of semantics via data from German and Germanic. Extensive discussion of semantic change, the semantics of prevarication, and the semantics of psychological language. Rauch

290B. Uniformitarianism in Linguistics: An examination of specific implications in methodology of 19th-century geology and linguistics on the uniformitarian principle by which the past can be inferred through observation of the present. Particular attention paid to the work of German Neogrammarians. Rauch

290C. The Language of German Media: Consideration of field work carried on in Germany. Special emphasis on the German language of advertising within a speech-act framework. Rauch

290D. Semiotics: Discussion of the principal figures from the basic disciplines of philosophy, biology, and linguistics influential in current trends in semiotics. Application of Peircean semiotics to a wide range of semiotic modalities. (SP) Rauch

290E. Contrastive Grammars: Theory and methods of contrastive linguistic analyses. Study of pairs of contrastive language sets in two time perspectives, Modern German with Modern English and Old Saxon with Old English. Rauch

290F. Diacritology: Discussion of modern methods and results in the investigation of present-day German dialects. Shannon

290G. Current Approaches to Modern German Syntax: Discussion of current syntactic theories as applied to a number of issues in modern German syntax with an eye toward their descriptive and explanatory potential. Typological comparison, especially with English. Shannon

290H. Linguistic Naturalness. May be repeated for credit. This seminar will grapple with the concept of naturalness as well as its opposite—markedness—as they have been proposed and developed in the recent linguistic literature, especially in Europe. The goal is to determine to what extent the concept of naturalness has fruitful value as a heuristic and as an explanatory model within linguistic theory. (F) Shannon

Group and Individual Study

298. Directed Group Study. (2-8) Course may be repeated for credit when topic changes. Must be taken on a satisfactory/unsatisfactory basis. Seminar. (F,SP)

299. Individual Study for Graduate Students in Literature and Linguistics. (2-12) Course may be repeated for credit. Individual conferences. Primarily for post-M.A. students engaged in exploration of a restricted field, involving writing of a report, and for students writing their doctoral dissertations. (F,SP)

602. Individual Study for Doctoral Students. (4) Course may be repeated once for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Primarily for post-Ph.D. candidates to prepare for the qualifying examination. (F,SP)

Courses in the Teaching of German

300. The Teaching of German in Elementary and Secondary Schools. (4) Three hours of lecture per week. For credential candidates. Staff

301A-301B. The Teaching of German in College. (2-2) Credit and grade to be awarded upon completion of two years of college German. Two hours of lecture per week. For all new graduate student instructors. This two-semester course provides an introduction to the theory and practice of foreign-language teaching and learning. Required for all new graduate student instructors. (F,SP) Taft

302. Teaching Practicum. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture/discussion per week. Prerequisites: Graduate standing and supervised teaching in lower division courses, including orientation workshop. (F,SP)

Yiddish

Lower Division Courses

1. Elementary Yiddish. (6) Three 2-hour lecture/discussion periods per week. Alphabet, reading and writing, conversation practice, introductory Yiddish linguistics, Yiddish expressions and songs, and discussion/reading/guest speakers on the Yiddish cultural context. (SP) Shannon

2. Elementary Yiddish. (6) Three 2-hour lecture/discussion periods per week. Reading and writing, conversation practice, Yiddish linguistics, Yiddish newspaper articles and simple literature, songs and expressions, and discussion/reading/guest speakers on the Yiddish cultural context. With a gradual increase, classroom interchange will be conducted in Yiddish. (SP) Shannon

Upper Division Courses

110. Advanced Yiddish. (3) Three hours of lecture/discussion per week. Prerequisites: 2 or consent of instructor. Reading in Yiddish of simpler works of literature by authors like Sholom Aleichem, Mendele, Peretz, Singer, in part to be decided on by the class. Discussion primarily in Yiddish. Advanced points of Yiddish linguistics will also be covered. (SP) Shannon

Dutch

For a description of the group major in Dutch studies, see alphabetical listing under Dutch studies.

Lower Division Courses

1. Elementary Dutch. (5) Five 1-hour class meetings and one hour of language laboratory per week. Beginning course. (F) Staff

2. Elementary Dutch. (5) Five 1-hour class meetings and one hour of language laboratory per week. Prerequisites: 1 or equivalent. (SP) Staff

3. Intermediate Dutch. (5) Five 1-hour class meetings and one hour of language laboratory per week. Prerequisites: 2 or equivalent. (SP) Staff

Upper Division Courses

107. The Structure of Modern Dutch. (3) Three hours of lecture/discussion per week. A basic course on the structural properties of modern Dutch, including phonetics and phonology, morphology, and syntax. Comparison with English and German. (SP) Shannon

110. Advanced Dutch. (3) Three hours of lecture per week. Prerequisites: 3 or equivalent. A thorough review of Dutch grammar, vocabulary and writing exercises, and an introduction to Dutch literature. (F) Van Oosten

120A. Dutch Conversation. (2) Three hours of lectures/discussion per week. Prerequisites: Dutch 110 or consent of instructor. A course in spoken Dutch intent upon expanding vocabulary and improving grammar and pronunciation, using newspaper and magazine articles dealing with modern Dutch culture. (SP) Van Oosten

120B. Advanced Dutch Conversation. Prerequisites: 120A, 130 or consent of instructor. A course in spoken Dutch intent upon expanding vocabulary and improving grammar and pronunciation, using newspaper and magazine articles dealing with modern Dutch culture. (F) Van Oosten

130. Advanced Grammar and Composition. (3) Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. A course in written Dutch ex-tending students’ knowledge of grammatical patterns especially those occurring primarily in the written language. Extensive reading and writing practice. (SP) Van Oosten

140. Topics in Dutch Literature. (3) Course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. Designed to analyze Dutch texts from Middle Dutch to contemporary literature. Topics vary semester to semester. (SP) Snapper

150. Introduction to the Literature of the Netherlands. (3) Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. An introduction to the study of literature in general and to the literature of the Netherlands in particular. Selected readings in Dutch poetry, prose and drama. Emphasis on different genres in literature. (SP) Snapper

160. Literature of the Lowlands in English Translation. (3) Three hours of lecture/discussion per week. Study of the major contemporary Dutch and Flemish writers and their works. (F) Snapper

165. Flemish Literature in English Translation. (3) Three hours of lecture/discussion per week. Study of major Flemish writers and their works. (SP) Snapper

165A. The Second World War: Novels, short stories, and poetry dealing with the war by such writers as Hugo Claus, Louis Paul Boon, and Wouter Suykens.

170. The Netherlands: Culture and Institutions. (3) Three hours of lecture per week. A historical study of the cultural contributions of the Netherlands and an analysis of the political system. (F) Van Oosten

175. General and Cultural History of the Southern Netherlands. (3) Three hours of lecture per week. This course focuses on the cultural and historical antecedents to the constitution of Belgium from the Netherlands (1830) and examines the political and cultural realities within the bilingual Belgian society.

180. Middle Dutch. (3) Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. Introduction to Middle Dutch texts including courtly epics, minnesongs, moral plays, and the Abele Spelen. (SP) Snapper

190. Senior Thesis. (4) One 2-hour consultation per week. A major research paper in the areas of Dutch literature, culture, or the area of linguistics: Required of all majors. (F,SP) Snapper

198. Directed Group Study. (2-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. One to four hours of seminar per week. Group study of selected topics that will vary from year to year. (F,SP) Snapper

199. Special Studies in Dutch. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Individual conference. Prerequisites: Overall GPA of 3.0. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Snapper

240. Graduate Readings in Dutch. (4) Course may be repeated for credit. Three hours of lecture/discussion per week. Various periods and genres in Netherlandish literature from the Middle Ages to the modern period. Offerings vary from semester to semester. (SP) Snapper

299. Individual Studies in Dutch for Graduate Students. (1-8) Course may be repeated for credit. Individual conferences. For graduate students enrolled in an exploration of a restricted field, involving the writing of a research paper. (F,SP) Snapper

*Not offered 1988-89
On leave, spring
On leave, fall
Recipient of Distinguished Teaching Award
Health and Medical Sciences Program
(Special Studies)

Program Office: Room 106, Building T-7, 642-5479
Chair: Donald Heyman, Ph.D.

Faculty:
Jeremy Berge, M.D.
Katharine Bell, M.D., Ph.D.
Washington Berne, M.D.
Lewis Butter, L.I.B.
Joseph Callen, M.D.
John Collin, M.D.
Beth Cottrell, M.S.
John Compaggio, M.D.
James Dechateau, M.D.
Richard Deutshe, M.D.
Eugene Eisenberg, M.D.
Paul Farmer, M.D.
Bob Freeman, M.D.
Ronald Gabbay, M.D.
Howard Gruber, M.D.
Neal Halton, M.D.
Jonathan Hollander, M.D.
Gordon Holmes, M.D.
Ernest Jones, M.D.
Marcia Kahn, M.D.
Tomasn Kawash, Ph.D.
Daniel Lee, M.D.
Paul Newshae, M.D., M.P.P.
Joseph Pochi, M.D.
Richard Poley, M.D.
Joy Richter, M.D.
Bernard Rapaport, M.D.
Lawrence Smith, M.D.
Richard Terry, M.D.
Judy Tyfles, M.S.W.
David Troxel, M.D.
Kay White, M.D.
James Yee, M.D.

Health and Medical Sciences is a pioneering program on the Berkeley campus whose aim is to develop new models of training for existing and emerging health professions. It consists of two health-related degree programs at the graduate level. These programs share an interdisciplinary orientation with an emphasis on the importance of behavioral, economic, ethical, psychosocial, and political issues in health care and the common orientation toward health maintenance.

UC Berkeley-UC San Francisco Joint Medical Program
A five-year program leading to the M.S. in Health and Medical Sciences from UC Berkeley and the M.D. from UC San Francisco. The master's portion of the curriculum consists of at least 20 units of academic course work and a thesis. The goal of the master's portion of the program is to help medical students maintain a high level of competence and analytical self-confidence in an academic field relating to health. Students are expected to acquire a solid familiarity with a selected area of interest and mastery of basic sciences that will enable them to do independent work in this area. The master's program is integrated with the required preclinical science courses during the first three years of medical school. The program seeks to achieve a five-year continuity in the clinical and academic aspects of the curriculum to reinforce the relevance of the chosen area of scholarship to the total training. The master's degree is awarded by Berkeley upon successful completion of the first three years of the program, the medical degree by UC San Francisco after satisfactory completion of the fourth and fifth years. Students selected for this program will develop focused intellectual interests in a field that would complement their medical training. They must also meet the rigorous academic requirements for entrance into medical school and have formed some commitment to the broader aspects of health care.

Genetic Counseling Program
A two-year program leading to the M.S. in Health and Medical Sciences. Students are trained to provide counseling, consultation, and public and professional education to individuals, families, and health professionals in facilities concerned with genetic diseases. An interdisciplinary curriculum offers biological sciences, counseling, consultation, and education techniques.

Admissions. Admissions requirements of the two graduate programs vary. As a minimum, applicants must be eligible for admission to the University in graduate standing, with an undergraduate upper division grade-point average of at least 3.0, along with a baccalaureate from an accredited college or university. Applicants to the Genetic Counseling Program must take the Graduate Record Examination. Applicants to the Joint Medical Program must have fulfilled the standard premedical requirements and have taken the Medical College Admission Test.

For more detailed information about the above programs, contact the Graduate Office, Room 106, Building T-7, University of California at Berkeley; Berkeley, CA 94720; (415) 642-5671 or 642-5479. For genetic counseling only, telephone 642-6553. For more information, telephone 642-5479.

Graduate Courses
205A-205B. Physical Diagnosis. (2,2) Five clinical hours per week. Prerequisites: Graduate standing in HMS Joint Medical Program; concurrent enrollment in 206A-206B.
A. Introduction to the patient. Physical examination of fellow students, lectures, demonstrations, and organization of demonstration cases. The organ system approach will be used.
B. The complete patient interview and complete physical examination with case presentation to staff and fellow students done on a weekly basis. A lecture on the examination of various organ systems will precede each ward experience (neurological, exam, etc.) (F)
206A-206B. 206C-206D. Introduction to Clinical Medicine. (3;3;3;3) Three hours of lecture and 21/2 hours of case presentation per week. Prerequisites: Graduate standing in HMS Joint Medical Program. A four-semester sequence introducing basic principles of clinical medicine taught by organ system and ending in integrated overview applying the basic principles to specialties areas. The course meets twice weekly. One session is didactic, meeting 1 1/2 hours; the second session is held at various hospitals, and has a 1 1/2-hour lecture followed by 2 1/2 hours of case presentation of hospitalized ambulatory patients who demonstrate the lecture topic. (F,SP)
208. Introduction to Clinical Psychiatry. (4) One 3-hour lecture and one 2-hour laboratory per week. Prerequisites: Graduate standing in HMS Joint Medical Program. Students will be taught specific skills of psychiatry, along with a body of knowledge about the human mind as it relates to the health and disease of other organ systems in the individual. Under supervision, students will interview psychiatric patients and present results in written form. (F)
209A-209B. Principles of Human Pathology. (55) Formerly B370. A course for the second year student. Three hours of lecture and two 2-hour laboratories per week. Prerequisites: Human anatomy, histology, physiology, biochemistry and consent of instructor. An in-depth study of general pathologic processes (cell injury and death; inflammation and repair; hyperplasia-neoplasia; and disorders of immunity) and a detailed study of the pathologic basis of diseases affecting specific organ systems. (F,SP) Troxel
210. Physical Basis of Radiology and Nuclear Medicine. (2) One 1/2-hour lecture per week plus occasional laboratory. Prerequisites: Graduate standing in HMS Joint Medical Program or consent of instructor. Provides the base in radiation physics necessary for intelligent use, understanding, and evaluation of clinical services given by radiologists and nuclear medicine clinicians. Topics: fundamental radiation physics, radiation biology, environmental radiation, introduction to physical basis of nuclear medicine, clinical, diagnostic, and therapeutic radiology. (F,SP)
211. Medical Neurobiology. (3) Two 1/2-hour lectures and one 2-hour laboratory per week. Prerequisites: Graduate standing in HMS Joint Medical Program or consent of instructor. A review of the basic principles of neurobiology concentrating first on the structural and functional properties of the components of the central nervous system (neuron properties; synaptic transmission; visual pathways and other special senses; the cerebellum). Later, a review of the general functional aspects and their relationship to activity and behavior, such as: consciousness; E.E.G.;
227. Introduction to the Clinical Process. (2) Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour lecture and one 1 1/2-hour laboratory per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. An interdisciplinary course to basic knowledge and skills necessary for health and professional-client interaction. Focus is on development of observational, information-gathering, and interpersonal communication skills. (F)
231A-231B. Principles and Practices of Counseling in Health Settings. (3;3) Credit and grade to be awarded upon completion of sequence. Three hours of lecture/sem. per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. The seminar for future health practitioners presents a multi-disciplinary analysis of counseling, organization, financing, and policy. Students will study policy questions and analyze health care problems regarding the social and political forces and institutions that affect health.
248A-248B. Seminar in Research Methodology. (2) Two hours of seminar per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. This seminar will review methodologies of research from different disciplines in both social and medical sciences. The first semester introduces students to general issues in research methods. The second semester introduces topics from a variety of disciplines and allows students to develop their own research protocol. The relationship between research, policy, and social, and public health sciences will be stressed. Credit and grade to be awarded upon completion of the sequences. (F,SP) Halton
250A-260B. Social, Ethical, and Legal Responsibilities of Medical Practice. (2,2) New course. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Medical students, law students, and advanced graduate students; instructor consent required. This course is divided into two parts. Part I: Responsibility of physicians to their patients: medical and legal; professional practice; doctor-patient relationships; communication; decision making; informed consent; and several specific legal and ethical problem areas. Part II: Responsibility of physicians to society: social organization; medicine; financing; public health; legal, economic, and judicial issues. Clinical field work will be utilized to highlight certain issues discussed in the seminar. (F,SP) Halton, Shultz
250A-290B. Seminar in Advanced Genetic Counseling. (3;3) Credit and grade to be awarded upon completion of sequence. Three hours of lecture per week. Prerequisites: 231A-231B or consent of instructor. Ongoing case discussion and analysis of genetic counseling field experiences. Primarily designed for students preparing to work as genetic counselors. (F,SP)
299. Colloquium on Health and Health Care. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1 1/2 to 2-hour meeting per week. Prerequisites: Graduate standing. A session of guest lecturers will discuss aspects and implications of health and health care from personal and professional perspectives and experience. Specific topics are developed in consultation with students and instructors. This course is designed for interdisciplinary study of health and health care and for understanding the many dimensions of the health and health care process, for personal and professional growth.
299. Final Project. (1-10) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Must meet with instructor. Prerequisites: Graduate standing. Designed to permit qualified graduate students to pursue special study under the direction of a faculty member. (F,SP)
298. Directed Group Study. (1-5) Sections 1-8 to be taken on a satisfactory/unsatisfactory basis only; Section 9-17 may be taken for a grade with department approval. Credit is granted on the basis of a graduate standing in HMS Program or consent of instructor. Group study for graduate students. Intensive examination of health related topics. (F,SP)

299. Independent Study and Research in Health and Medical Sciences. (1-12) Course may be repeated for credit. Credit is granted on the basis of independent study. Independent study, research, and writing in an area related to program of study, sponsored by an approved faculty member and approved by program adviser. (F,SP)

Professional Courses

475. Supervised Field Work and Counseling in Human Genetics. (3-6) Must be taken on a satisfactory/unsatisfactory basis. Field work. Prerequisites: Graduate standing in HMS Program or consent of Instructor. Full time training and supervised field work for one semester in a birth defects center. Primarily designed for genetic counseling students but open to qualified graduate students. (F,SP)

497A-497B. First Year Field Placement for Genetic Counseling. (3-5-6) Minimum 6 units required for academic year. Field placement. Must be taken on a satisfactory/unsatisfactory basis. Variable. 1 unit for each four hours per week scheduled at placement. Prerequisites: Limited to first year genetic counseling students; concurrent enrollment in 497A is required. Variable of field placements in health care settings. Field work moves from observation to work with clients. Weekly supervision provided by placement facility and option counseling course and counseling course instructor. (F,SP)

History

(3229 Dwinelle Hall, 642-1871)

Professors: Richard M. Abrams, Ph.D. Oxford University. Recent U.S., political, economic, business Thomas G. Barnes, Ph.D. Oxford University. Britain since 1300, Tudor-Stuart, legal

Gunther Barth, Ph.D. Harvard University. Recent U.S., urban, political

William J. Bouwsma, Ph.D. (Sather Professor) Harvard University. Ancient China, modern India, U.S. economic

Robert J. Brentano, Ph.D. Harvard University. Medieval, English, Italy, Church

Gael Newton, Ph.D. (Shepard Professor) Princeton University. Early modern Europe, Renaissance Italy

Garrett Matsumoto, Ph.D. Duke University. Medieval Europe, Intellectual

James H. Mechling, Ph.D. University of California at Berkeley, European economics

Paula S. Fass, Ph.D. University of California, America since 1607, social and family immigration and geriatric

Gert J. Malia, Ph.D. Harvard University. Medieval Europe, Germany, political

Erich S. Gruen, Ph.D. (Gladys Reed Wood Professor) Harvard University. Ancient Greece and Rome

Samuel Haber, Ph.D. University of California at Berkeley. Recent U.S., intellectual, social

Roger Hahn, Ph.D. Cornell University. History of science, economics

Tufo Halperin, Ph.D. Buenos Aires University. Latin America, Chile

John L. Heilbruhn, Ph.D. (The Class of 1938 Professor of History and History of Science) University of California at Berkeley. History of science, physical science

Richard D. Brown, Ph.D. University of Chicago. Early and late modern Europe, science and technology

Ely A. Hunt, Ph.D. Stanford University. Early and late modern Europe, France

Eugene F. Inckich, Ph.D. University of Chicago. South Asia, modern India

Martin E. Jey, Ph.D. Harvard University. Late modern Europe

David G. Johnson, Ph.D. University of California at Berkeley. History of science, China

David N. Keightley, Ph.D. University of California, East Asia, China

Raymond K. Kent, Ph.D. University of Wisconsin, Africa Ira M. Lapidus, Ph.D. Harvard University. Middle East, Islam

Thomas W. Lagueur, Ph.D. Princeton University, British, history of medicine

Lawrence W. Levine, Ph.D. (Byrne Professor) Columbia University. Modern, social, labor

Eileen F. Llewellyn, Ph.D. (Morison Professor) University of California at Berkeley. Recent U.S., social, labor, Black

Lawrence W. Levine, Ph.D. Columbia University. Modern, social, labor

Eileen F. Llewellyn, Ph.D. (Morison Professor) University of California at Berkeley. Recent U.S., social, labor

Mark C. C. Pomeranz, Ph.D. Harvard University. Late modern Europe, Russia, intellectual

Walter A. McDougall, Ph.D. University of Chicago. Late modern Europe, Russia, political

Thomas R. Metcalf, Ph.D. Harvard University. South Asia, British imperialism

Robert L. McGrew, Ph.D. Yale University. U.S. Colonial, revolutionary

John T. Noonan, Jr., Ph.D. Catholic University, LLB. Harvard University. History of Law (Law)

Nicholas V. Resta, Ph.D. (Sidney Hallman Ehmann Professor) Oxford University. Late modern Europe, Russia, intellectual

Mary P. Ryan, Ph.D. University of California at Santa Barbara. U.S. women, family

Shelton Robins, Ph.D. University of California at Berkeley. British, social, intellectual

H. Franz Schoenbrunn, Ph.D. Harvard University. East Asia, China, political, intellectual

Raphael Seybolt, M.A. Oxford University. Ancient Greece, legal

William S. Strotmeyer, Ph.D. Harvard University. Early modern Europe, political, religious

John M. Smith, Ph.D. University of California, Middle East, Turkistan, Persia, Mongolia

Ronald Stahl, Ph.D. Harvard University. Early modern Europe, Russia, labor

Woodrow W. Borah, Ph.D. (Emeritus)

Deemer B. Brown, Ph.D. (Emeritus)

George P. Hammond, Ph.D. (Emeritus)

Lawrence A. Harris, Ph.D. (Emeritus)

Henry F. May, Ph.D. (Emeritus)

Wolfgang Bauer, Dr. phil. (Emeritus)

Hans W. Rosenau, Ph.D. (Emeritus)

Engel Sluiter, Ph.D. (Emeritus)

Kenneth M. Stampp, Ph.D. (Emeritus)

Associate Professors: Susanna A. Barrows, Ph.D. Yale University. Late modern Europe, France, social, cultural

Mary E. Berry, Ph.D. Harvard University, Japan

Diane S. Clemens, Ph.D. University of California at Santa Barbara. Recent U.S., diplomatic

James H. Kettner, Ph.D. Harvard University. U.S. Colonial, revolutionary, legal to 1800

John E. Lesch, Ph.D. Harvard University. History of science, physical science, technology, medical science

Linda Lewin, Ph.D. Columbia University. Latin America, colonial, economic

Assistant Professors: Jon N. Gjerde, Ph.D. University of Minnesota. 19th century U.S., intellectual, Social

Richard J. Salvucci, Ph.D. Princeton University. Latin America, colonial, economic

Major Advisers: Consult Undergraduate Office.

The Department of History offers a program of instruction ranging widely over the historical record of human experience. The chronological, geographical, and intellectual range affords great flexibility, and students working toward degrees in history and to those who wish to give a historical dimension to their studies in other disciplines. Lecture courses and seminars are available to students at introductory and advanced levels.

The Major

The major in history consists of 11 courses, usually for a total of 44 units.

Four lower division courses in history are required for admission to the major. One course must be completed in each of the following areas:

I. Western Civilization to 1400: 4A, 4B, 30A, Special Programs 44A, 44B.

II. European History since the Renaissance: 5, 15, 30B, Special Programs 44C, 44D.

III. History of the United States: 7A, 7B, 17A, 17B.


A freshman-sophomore seminar (History 39) may be substituted in one of the areas required for admission to the major.

In the upper division, history majors must complete at least seven history courses, including:

1. Four upper division lecture courses, chosen from at least two of the following—Ancient, Europe, Britain, United States, Latin America, Asia, Africa, History of Science. May include Economics 111A, 111B, 113, and 115.

2. Two premoderns (History 103) in two different fields of history as listed in 1 above (for purposes of this requirement sections of History 103 in European History pre-1600 and post-1600 may be counted as premoderns in different fields).

3. History 101 (Seminar in Historical Research and Writing for History Majors) in one of the fields selected for History 103.

Upper Division Honors Program. The program is intended for senior majors of high ability in history who have the necessary grade-point averages (at least 3.5 in the major and 3.3 overall) and who will profit from individual work with a faculty member and discussions with students of similar interests. Interested students should notify the head of the Departmental Honors Committee during their junior year.

All students must complete, in addition to major requirements:

1. History H102, Colloquium on Historical Thought.

2. An oral examination based on the student’s research and historical study.

3. An honors research essay under the supervision of a member of the Department who has consented to direct it. For this purpose students will take either:

a) History H195, Senior Honors. In some cases, the essay produced in H195 may be a development from (but not a revision of) the paper produced in History 101.

b) History 285, a graduate research seminar.

While the faculty supervisor will assign a grade for H195 or 285, the Honors Committee will determine whether or not the essay is of honors quality.

The Honors Committee will evaluate the candidate’s course work, performance in H102, the oral examination, and the research essay. If the student’s work is of honors quality in the committee’s estimate, the committee will award Honors, High Honors, or Highest Honors as warranted by the overall performance.

Further information is available in the departmental office.

Education at Home Program. Students with a specific interest in early American history and culture may wish to participate in the Education at Home Program. The program, conducted through the UC Riverside campus, is open to undergraduates from any campus in the UC system. Those selected for participation will spend nine weeks in Williamsburg, one in Philadelphia, and a concluding week in Washington, D.C.: it is a one-quarter program. For further information, brochures or application forms, call 767-3820 or write to the Educational Program, International Services Center, University of California at Riverside, CA 92521. UC Berkeley history majors should consult the department for information on major credit for the program.

Higher Degrees. Students planning to work toward the degrees of M.A. and Ph.D. should address inquiries to Graduate Admissions, Department of History. Candidates will be admitted for the fall semester only.
Further Information. The Schedule of Classes issued prior to each semester and the department course descriptions issued at the beginning of each semester provide further detailed information about the courses offered by the History Department, including when and by whom each course will be given.

**Lower Division Courses**

4. Origins of Western Civilization. Two hours of lecture and two hours of section per week. Introductory study of major historical events in the origins of western civilization. Emphasis on class discussions, readings in the sources, and writing of essays.

7A. From Colonial Settlement to the Civil War. (4)
7B. From the Civil War to the Present. (4)

8. Latin American History. Two hours of lecture and two hours of section per week.
8A. The Colonial Period. (4)
8B. The National Period. (4)

9. Asian History. Two hours of lecture and 2 hours of section per week. An introductory survey of the history of Asia.
9A. China. (4)
9B. Japan. (4)
9C. India. (4)
9D. Middle East. (4)

10. African History. (4) Two hours of lecture and two hours of section per week. An introductory survey of the history of Africa. (SP)

15. Topics in the History of Modern Europe. (2) Two hours of lecture and one hour of discussion per week. Selected topics, themes, and writings in the history of Europe from approximately the 15th century to the present. For descriptions of topics, consult the department catalog during enrollment each semester.

17A-17B. Studies in American History. (4-4) Four hours of reading and discussion per week. Intended to introduce students to the problems and methods of studying American history through the use of primary source materials.

30. Science and Society. Not to be taken by students who have previously enrolled in 130A-130B-130C. Two hours of lecture and two hours of discussion per week.

30A. Science From Antiquity Through Newton. (4) The emergence of science as an organized activity.


39. Seminars for Lower Division Students. (4) Course may be repeated once for credit with different instructor. One 3-hour meeting per week. Prerequisites: Consent of instructor. Seminars in the various fields of history designed to introduce beginning undergraduates to problems of historical methods and interpretations. Work in the course will include research and a research paper. For complete schedule of offerings, see department catalog during advanced class enrollment each semester. This course requires at least twelve hours per week of participation including time spent in class and in outside reading and preparation.

**Upper Division Courses**

100. Special Topics in the Various Fields of History. (4) Course may be repeated for credit. Four hours of lecture and discussion per week. Designed primarily to permit the instructors to deal with a topic with which they are especially concerned, usually more restricted than the subject matter of a regular lecture course. A combination of informal lectures and discussions, term papers, and examinations, with all grading by the instructor. Instructors and subjects to vary. Consult department catalog during advanced class enrollment each semester.

100X. Special Topics: Short Course. (1) Course may be repeated for credit. Must be taken on a passed/not-passed basis. Four hours of lecture and seminar per week. An abbreviated version of History 100, lasting four weeks only. Does not satisfy major requirement for history majors. Topics and instructors vary. Consult department catalog for details.

101. Seminar in Historical Writing and Research for History Majors. (3) Three hours of seminar meetings per week. Individual research projects carried out in seminar sections in various historical fields resulting in a lengthy paper, with readings and discussions on general problems of historical inquiry. In addition to regular class meetings, individual consultations with the instructor, research, and preparation totaling ten to twelve hours per week are required.

102. Colloquium on Historical Thought. (2) Two hours of seminar meeting. Prerequisites: Completion of 101, either junior honors standing or senior non-honor standing. Consideration of the nature and function of historical thought as manifested in major historical classics and selected historical problems. Required of honors program juniors; open, by permission of instructor, to non-honors program seniors upon completion of 101.

103. Proseminar: Problems in Interpretation in the Several Fields of History. Course may be repeated for credit with consent of instructor. Three hours of seminar and discussion per week. Prerequisites: Consent of instructor. Designed primarily to give majors in history elementary training in historical criticism and research. Emphasis will be placed on writing and discussion. For precise schedule of offerings, see department catalog during advanced class enrollment each semester.

103A. Ancient. (4)
103B. Europe. (4)
103C. England. (4)
103D. United States. (4)
103E. Latin America. (4)
103F. Asia. (4)
103H. Africa. (4)
103N. Canada. (4)
103S. History of Science. (4)
103U. Studies in Comparative History. (4)

105. Ancient Greece. Three hours of lecture and one hour of discussion per week.
105A. Bronze Age and Archaic. (4) Until ca. 500 B.C. The beginnings of organized activity in Greek cities.
105B. Classical. (4) From ca. 500 until the time of Philip II of Macedon. More complex relations between Greek cities.
105C. Hellenistic Age. (4) From Alexander the Great to Cleopatra. The course explores the achievements of Alexander, the struggle for power among his successors, the social, political and economic history of the new Hellenistic kingdoms, and the expansion of Greek culture into the Near East.
105D. Ancient Rome. Three hours of lecture and one hour of discussion per week.
105A. The Roman Republic. (4) A history of Rome from the foundation of the city to the dictatorship of Caesar. The course examines the evolution of Republican government, the growth of Roman imperialism, and the internal disruptions of the age of the Gracchi, Julia, and Caesar.
105B. The Roman Empire. (4) A history of Rome from Augustus to Constantine. The course surveys the struggles between the Roman emperors and the senatorial class, the relationship between civil and military government, the emergence of Christianity, and Roman literature as a reflection of social and intellectual life.

107. Topics in Ancient History. Three hours of lecture and one hour of discussion per week.

107A. Ancient Athenian Law. (4) This course will concentrate on the courts and procedural law in their historical development. Some attention will be given to distinctive features of Athenian law in comparison to other systems.

107B. The Age of Cicero. (4) Examination of events, trends, and issues involved in the fall of the Roman Republic in the crucial years between the deaths of Sulla and Cicero. Analysis of Cicero's speeches, essays, and correspondence. Political, social, and economic challenges faced in light of intellectual and cultural developments.

107C. Women in the Life and Thought of Ancient Greece. (4) Three hours of lecture and one hour of discussion per week. This course will examine the legal, social and economic status of women in ancient Greece as compared to the treatment of women in the imaginative literature authored by the ancient Greeks.

108. Byzantium. (4) Three hours of lecture and one hour of discussion per week. The social, cultural, and religious history of the Near East and eastern Mediterranean from late antiquity through the early middle ages. The survival of the Roman Empire in Byzantium, the Sassanian Empire in Iran, and the rise of Islam are the topics covered.

109A. Islamic History. (4) Three hours of lecture and one hour of discussion per week. The Middle East from the origins of Islam to the 13th Century. The Arab conquests, the Islamic Empire, the successor states, and the formation of Islam as a religion and culture.

109B. The Middle East, 1000-1750. (4) Three hours of lecture and one hour of discussion per week. The establishment of Turkish power in the Middle East; Seljuks, Mongols, Ottomans, and Safavids.

109C. The Middle East from the 18th Century to the Present. (4) Students who have taken 135B (quarter system) should receive 1/2 credit. Three hours of lecture and one hour of discussion per week. The breaking of pre-modern empires and the formation of national states in the Arab world, Turkey, and Iran; Islam and nationalism.

110. Inner Asia, (4) Three hours of lecture and one hour of discussion per week. Origins, development, and dynamics of nomadic societies; history of the Scythians, Hsiung-nu, Huns, Turks, and Mongols; their relations with China; the development of Inner Asia by Russia and China; impact of modernization, nationalism, and communism.

112. Africa. Three hours of lecture and one hour of discussion per week.
112A. Pre-Colonial Period. (4)
112B. Modern Africa. (4)

114. India. Three hours of lecture and one hour of discussion per week.
114A. Ancient and Medieval India to the Mughal Empire. (4)
114B. Modern India. (4)

115. Topics in the History of India. (4) Three hours of lecture and one hour of discussion per week. The emergence of modern empires and the formation of national states in the Arab world, Turkey, and Iran; Islam and nationalism.

116. China. Three hours of lecture and one hour of discussion per week.
116A. Early China. (4)
116B. The Middle Period. (4)
116C. Modern China. (4)

117. Topics in Chinese History. Three hours of lecture and one hour of discussion per week.
117A. Social History of China. (4) Social groups and organizations from the origins of Chinese civilization to the present. Especially stressed are Chinese feudalism, the medieval oligarchy, the rise of the gentry, peasant rebellions, late-imperial mercantilism, and modern student movements.
117. Modern Chinese Intellectual History. (4) Traditional Chinese roots of 19th-Century reformist thought are traced; modern Sino-Western revolutionary nationalism is analyzed through the overthrow of the Manchus, the rule of the Nationalists, and the rise of the Communists.

118. Japan. Students who have taken 185B (quarter system) should receive ½ credit for 118A or 118B. Three hours of lecture and one hour of discussion per week.

118A. Archaeological Period to 1800. (4) Emphasis on political, cultural, and intellectual history of the Early Imperial State, Japan's first military governments, early modern, and Meiji Japan.

118B. 1800 to the Present. (4) Emphasis on the social and intellectual history of Japan's pre-war reconstruction.

119. Topics in Japanese History. Three hours of lecture and one hour of discussion per week.

119A. Social History of Japan. (4)

119B. Economic History of Japan. (4) Japanese social and economic history from the middle Tokugawa period to the present.

121. The Colonial Period and American Revolution. Three hours of lecture and one hour of discussion per week.

121A. The Colonial Period. (4)

121B. The American Revolution. (4)

122. The United States, 1787-1845. (4) Three hours of lecture and one hour of discussion per week.

123. Civil War and Reconstruction. (4) Students who have taken 167A or 167B (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week.

124. The Recent United States. Students who have taken 168B (quarter system) should receive 1.5 units of credit. Three hours of lecture and one hour of discussion per week.

124A. The Nineteenth Century to the Eve of World War II. (4) The transformation of American society from a 19th century culture and political economy to the emergence of America as a modern mass society and world power.

124B. 1941-1980. (4) American culture and political economy amidst affluence and turmoil in war and cold war.

125. History of Black People and Race Relations in the United States. Three hours of lecture and one hour of discussion per week. History of Afro-Americans: their African background, slave experience, social and cultural experience since emancipation. The course will consider race relations, particularly between blacks and whites in America.

125A. 1550-1865. (4)

125B. 1865 to the Present. (4)

125A-125B. The West in United States History. (4) Three hours of lecture and one hour of discussion per week. A cultural and social history of westward migration from the 16th to the 20th Centuries.

127. California. (4) Three hours of lecture and one hour of discussion per week. The history of California from pre-European contact to the present, with emphasis on the diversity of cultures and the interplay of social, economic, and political developments.

130. Diplomatic History of the United States. Three hours of lecture and one hour of discussion per week. European diplomatic impact on emerging America's foreign policy, colonial, revolutionary, and constitutional periods. Nineteenth century expansionism to imperialism, Spanish-American War and aftermath. Twentieth century war and peace, Wilson and Roosevelt in World Wars I and II, the consequent Cold War to the present.

130A. 1493-1914. (4)

130B. 1914-Present. (4)

131. Social History of the United States. Three hours of lecture and one hour of discussion per week. The nature and development of social and economic institutions, classes, family and residential groups, sex roles, and cultural norms in the United States.

131A. 1607-1865. (4)

131B. 1865-Present. (4)

132A-132B. Intellectual History of the United States. (4) Three hours of lecture and one hour of discussion per week.

133. Religion In American Society. (4) Three hours of lecture and one hour of discussion per week. Pre-requisites: Previous work in American history essential; some knowledge of European history desirable. American religious history from the beginnings to the present: emphasis on the relation between doctrine and social effect. The course will treat varieties of Protestantism primarily, with some attention to Catholicism, Judaism, Eastern religions, and non-theist humanism.

134A-134B. The Age of the City. (4) Three hours of lecture and one hour of discussion per week. A cultural and social history of urban life in America, with emphasis on the nineteenth century.

135. American Economic History. (4) Three hours of lecture and one hour of discussion per week.

136. Women In American Society. (4) Three hours of lecture and one hour of discussion per week. A survey of the social history of American women, focusing on changes in women's roles in society and popular attitudes toward women over the course of three centuries.

138. Topics in United States History. Three hours of lecture and one hour of discussion per week.

139. Topics in United States History. (4) Three hours of lecture and one hour of discussion per week.

139A. Working Class in the United States. (4) The history of American workers from Colonial times to the present, emphasizing the changing patterns of technology and work experience, standards of living and social life, political values, ethnic interactions; and focusing as well on the development of an organized labor movement.

139B. Demographic History of the United States. (4) A survey of secular changes in American mortality, fertility, marriage and migration from colonial times to the present.

140. Mexico. (4) Students who have taken 160A (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week. The history of Mexico from the colonial inspection of Jose de Galvez (1765-1771) through the present. The liquidation and transformation of the ancient regime through rebellion, reform, and revolution.

141. Social History of Latin America. Three hours of lecture and one hour of discussion per week.


142. The Andean Region. (4) Students who have taken 157A or 157B (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week. History of the Andean region, the area that now comprises modern Peru, Bolivia, and Ecuador, from the Indian period (fifteenth century) to the present.

143. Brazil. (4) Students who have taken 162A or 163B (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week. From 16th Century conquest and settlement to the emergence of an industrial economy during the post-1954 period of military rule. Emphasis on dependence of colony on empire, on plantation agriculture, entrepreneurial society, and the transformation from agrarian to industrial society.

144. Modern Argentina. (4) Three hours of lecture and one hour of discussion per week. Post-independence rise of Buenos Aires and of the cattle export economy. The creation of the national state: immigration, modernization, agricultural expansion. The exhaustion of the export economy; growing social and political conflicts.

150. Medieval England. Students who have taken 150B or 150C should receive ½ credit for 150B. Three hours of lecture and one hour of discussion per week. Emphasis on interpretation of primary sources.

150A. The Anglo-Saxon Period. (4) From the Romans through the Norman conquest to (Comessey Book and Eadmer).

150B. From the Conquest to the Fifteenth Century. (4) Government, observation of government, community, religion, and social change, with stress on the twelfth and fourteenth centuries.

151. Modern Britain. Three hours of lecture and one hour of discussion per week. Prerequisite: An elementary knowledge of the history of Western Europe. Survey history of Britain from approximately the Tudor period to the present.

151A. 1485-1660. (4)

151B. 1660 to the Present. (4)

152. Topics In British History. (4) Three hours of lecture and one hour of discussion per week.

153. British Empire and Commonwealth. (4) Three hours of lecture and one hour of discussion per week.

154. Canada. (4) Three hours of lecture and one hour of discussion per week. A survey of Canadian history from exploration and first settlement through colonial times to confederation and nationhood to the present.

155. Medieval Europe. Three hours of lecture and one hour of discussion per week.

155A. From the Late Empire to the Investiture Conflict. (4) Foundation of a West European civilization; stress on tribal settlements, the Carolingian Empire, and Christian foundations.

155B. From the Investiture Conflict to the Fifteenth Century. (4) Crusades; empire, papacy and the Western monarchies; social change, the rise of towns and hierarchy; religious and learning. Medieval civilization at its height.

156. Topics In Medieval History. Course may be repeated. Three hours of lecture and one hour of discussion per week. Students who have taken 117A-117B (quarter system) may receive credit with consent of instructor.

156A. History of Christian Thought. 200-800 A.D. (4) Emphasis on the syllogism (rather than the syllogistical) mentality which pervaded the patristic and early medieval periods. Deals in its entirety with the period of the Church Fathers from Tertullian and Origen to Gregory the Great; particular stress on the thought of St. Augustine.

156B. Medieval Intellectual History. c. 1050-1270. (4) Emphasis on the interplay between the syllogistical-nominalistic thinking found mostly in monastic circles and the growth of new forms of scientific, linear or sequential thinking (scholasticism) found in the new cathedral schools and universities.

157. The Renaissance and the Reformation. (4) Students who have taken 120 or 121 (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week. European history from the fourteenth to the middle of the seventeenth century. Political, social, and economic developments during this transitional period will be examined, together with the rise of Renaissance culture, and the religious upheavals of the sixteenth century.

158. Modern Europe. Students who have taken 122, 123, or 124 under the quarter system will receive only ½ credit. Three hours of lecture and one hour of discussion per week.

159A. Old Regime and Revolutions to 1815. (4)

158B. 1815-1914. (4)

159C. 1914 to the Present. (4)
159. European Economic History. Students who have taken 128A or 128B (quarter system) should receive ½ credit. Three hours of lecture and one hour of discussion per week.

159A. 1000 to 1750. (4) Survey of the economic and social developments of Europe up to the eve of industrialization, including the transformation of peasant-based, agrarian economies, capitalist organization, colonial expansion, and international trade.

159B. 1750-1914. (4) The Industrial Revolution and the rise of the European economy to world dominance in the 19th century, emphasizing the diffusion of the industrial system and some of its consequences, the world trading system, and the rise of modern imperialism.

160. The International Economy of the Twentieth Century. (4) Three hours of lecture and one hour of discussion per week. Development and crises of the advanced economies, with particular emphasis on trade relations with Third World countries. Economic impact of war, business cycles, and social movements.

161. Emergence of Modern Industrial Societies. (4) Four hours of lecture per week. Survey of the development of the modern political economies of the United States, Europe, and Japan; evolution and interaction of the major institutions of advanced capitalist societies; differences and similarities of their business communities, labor organization, and patterns of government relationships with the private sector.

162A-162B. European Diplomatic History. (4-4) Three hours of lecture and one hour of discussion per week. European international relations in the 19th and 20th centuries, with emphasis on the political and economic forces shaping foreign policy and the international system.

163. Modern European Intellectual History. Students who have taken 128A, 128B, 128C, or 128D will receive only ½ credit. Three hours of lecture and one hour of discussion per week. Thought and art considered in their social and political contexts.

163A. From the Enlightenment to 1870. (4)

163B. From 1870 to the Present. (4)

164. Social History of Western Europe. Three hours of lecture and one hour of discussion per week.

164A. European Society Before the Industrial Revolution. (4)

164B. European Society from 1750 to the Present. (4)

165. Topics in Modern European History. Three hours of lecture and one hour of discussion per week.

165A. State and Society in England and France since the Reformation. (4) Students who have taken 139A or 139B (quarter system) will receive only ½ credit.

165B. The Revolution in European Culture since the Late Eighteenth Century. (4)

166. France. Three hours of lecture and one hour of discussion per week.

166A. Medieval France. (4)

166B. The Old Regime, Revolution, and Reaction (1750-1848). (4)

166C. Modern France. (4)

167. Modern Germany. Three hours of lecture and one hour of discussion per week.

167A. 1648-1870. (4)

167B. 1870 to the Present. (4)

168. Spain and Portugal. Three hours of lecture and one hour of discussion per week.

168A. From Earliest Times to 1715. (4)

168B. From 1715 to the Present. (4)

169. Modern Italy. (4) Three hours of lecture and one hour of discussion per week.

170. The Netherlands. (4) Three hours of lecture and one hour of discussion per week. The Lowlands from the earliest times to the present monarchy; emphasis on the Golden Age of the 17th and 18th Centuries.

171. Russia. (4) Three hours of lecture and one hour of discussion per week.

171A. Russia to 1700. (4)

171B. Russia 1700-1917. (4) Students who have taken 136B or 136C should receive ½ credit for 171B.

171C. The Soviet Union, 1917 to the Present. (4)

172. Topics in Russian History. (4) Students who have taken 137A or 137B (quarter system) should receive only ½ credit. Three hours of lecture and one hour of discussion per week.

173. History of Eastern Europe. Students who have taken 140A will receive only two units of credit for 173A; students who have taken 140B will receive only two units of credit for 173B. Three hours of lecture and one hour of discussion per week.

173A. From Earliest Times to ca. 1500. (4) SP)

173B. From 1500 to 1900. (4)

173C. From 1900 to Present. (4)

174. Modern Jewish History, 1648 to the Present. (4) Three hours of lecture and one hour of discussion per week.

175. Topics in the History of Biology. (4) Three hours of lecture and one hour of discussion per week.

176. Topics in the History of the Physical Sciences. Three hours of lecture and one hour of discussion per week.

176A. Astronomy and Astrology in Medieval and Early Modern Europe. (4) Prerequisites: Strong grasp of plane geometry.


176C. Chemistry and Its Past. (4)

182A. Topics in the History of Technology. (4) Three hours of lecture and one hour of discussion per week.

183. Topics in the History of Medicine, (4) New course. Three hours of lecture and one hour of discussion per week.

185. History of Christianity. Students who have taken 108B (quarter system) should receive ½ credit for 185A and/or 185B. Three hours of lecture and one hour of discussion per week. Christianity as a cultural, social, and political force in world history and as it has responded to cultural, social, and political change from antiquity to the present.

185A. Beginnings to ca. 1250. (4)

185B. 1250 to the Present. (4)

H195. Senior Honors. (4) Independent. Prerequisites: Senior honors standing. Limited to senior honors candidates. Directed study centering upon the preparation of an honors thesis. Supervisors will be assigned to each student after consultation with the honors committee.

198. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Independent. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog.

Graduate Courses

200X. Special Topics: Short Course. (2) Course may be repeated for credit. Four hours of lecture and seminar per week. A four-week-long course permitting the instructor to cover in-depth a topic of particular interest. Topics and instructors vary; consult department catalog for details. (SP)

275. Core Courses in the Literature of the Several Fields of History. Course may be repeated for credit. Two to three hours of credit per week. To provide a broad survey of the literature and historiographical problems of the different fields in history.

275A. Ancient. (4)

275B. Europe. (4)

275C. England. (4)

275D. United States. (4)

275E. Latin America. (4)

275F. Asia. (4)

275N. Canada. (4)

275S. History of Science. (4)

280. Advanced Studies in the Sources and General Literature of the Several Fields of History. Course may be repeated for credit. Two to three hours of meeting per week. For precise schedule of offerings see department catalog during advanced class enrollment each semester.

280A. Ancient. (4)

280B. Europe. (4)

280C. England. (4)

280D. United States. (4)

280E. Latin America. (4)

280F. Asia (For M.A. Candidates). (4)

280G. Asia (For Ph.D. Candidates). (4)

280H. Africa. (4)

280N. Canada. (4)

280S. History of Science. (4)

280T. Economic History. (4)

280U. Studies in Comparative History. (4)

281. Palaeography and Other Auxiliary Sciences. (4) Course may be repeated for credit with different instructor. Two to three hours of meeting per week. Introductions to the scholarly handling of texts, whether ancient or modern, inscriptions or manuscripts, and instruction in the methodologies, tools, sources, and the editing and use of texts relevant to a particular field of history; instruction in any auxiliary science requisite for historical research.

282. Numismatics. (4) Two to three hours of meeting per week. The use of coins as a historical source; theory and practice.

283. Historical Method and Theory. (4) Two to three hours of meeting per week. Designed especially for candidates for higher degrees in History. Stress is laid on practical exercises. For precise schedule of offerings see department catalog during preenrollment week each semester.

284A-284B. Quantitative Approaches to History and Demographic History. (4) Two to three hours of meeting per week. Study and application to history of quantitative methods and theories (e.g., statistics, demography, computers); the use of population materials for the study of social history.

284L. Laboratory Section. (1) One hour of lecture and three hours of laboratory per week. Introduction to Computing. This course teaches the use and application of packaged statistical and text-editing programs, emphasizing special lines of particular interest to historians. The course can be taken concurrently with History 284, but is offered independently of other departmental courses.

285. Research Seminars. Course may be repeated for credit. Two to three hours of meeting per week. For precise schedule of offerings see department catalog during advanced class enrollment each semester.

285A. Ancient. (4)

285B. Europe. (4)

285C. England. (4)

285D. United States. (4)

285E. Latin America. (4)

285F. Asia. (4)

285H. Africa. (4)

285L. Legal History. (4)

285N. Canada. (4)
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285. History of Science. (4)
285T. Economic History. (4)
285U. Studies in Comparative History. (4)

296. Directed Dissertation Research. (3-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: Open to qualified students directly engaged upon the doctoral dissertation.

298. Independent Study for Graduate Students in History. (4-298) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: Consent of instructor.

299. Directed Reading. (2-12) Course may be repeated for credit. Independent. Prerequisites: Consent of instructor. Individual conferences to be arranged. Intended to provide directed study for a topic matter not covered in scheduled seminar offerings.

601. Individual Study for Master's Students. (1-6) May not be used for unit or resident requirements for the M.A. degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: For candidates for M.A. degree. Individual study, in consultation with the graduate adviser, to prepare for student's language examinations and the master's examination.

602. Individual Study for Doctoral Students. (1-8) May not be used for unit or resident requirements for the student's area of concentration. Must be taken on a satisfactory/unsatisfactory basis. Independent. Prerequisites: For candidates for doctoral degree. Individual study, in consultation with the graduate adviser, to prepare students for language examinations and the doctoral examination.

Interdepartmental Studies Courses

Upper Division Courses

IDS 100. History of American Technology. (4) Four hour program tailored to each student's interests and educational needs. The program has been developed to meet the needs of engineers who wish to enhance their competence in the design, analysis, and operation of complex systems in industrial, service, or public sectors, or to prepare for managerial positions by gaining a broader perspective on modern engineering practice.

Humanities (College of Letters and Science)

Field Major Office: Division of Special Programs, 301 Campbell Hall, 642-0108

Major Adviser: William V. Nestrick.

Humanities Field Major

The field major in Humanities provides students with an opportunity to acquire a broad background in the study of human beings as artists and as creators of values through the ages. The major is especially designed to combine such breadth by means of an interdisciplinary approach with an individual program tailored to each student's interests and educational needs. Students will be primarily responsible for developing their own programs of study, but this should be done with the advice of the adviser in the major. The courses chosen from those listed below must be taken on a satisfactory/unsatisfactory basis. The proposed major program is listed below.

Lower Division Requirement.

I. One year of Western Civilization (Special Programs 44 or its equivalent).

II. One year (two semesters) of an ancient or modern language appropriate to the individual program.

Upper Division Requirements.

I. Six courses (minimum 22 units) in at least three of the following fields or disciplines (two courses in the social sciences or natural sciences may be substituted when appropriate): art, classics, comparative literature, dramatic art, film, history, history of art, languages and literatures, music, philosophy, rhetoric, and women's studies; II. Humanities 100, the core course for the major; III. Humanities 190, the senior thesis course.

Honors Program. Upper division students with an overall grade point average of 3.3 and a grade point average of 3.5 in the major, upon approval of the adviser, enroll in the honors program. H195 will be substituted for Humanities 190. Eligibility for graduation in the honors program includes: I. 3.5 grade point average in all courses taken for the major and 2) a recommendation for honors based upon the high quality of the senior thesis.

Upper Division Courses

100. Methods and Motifs. (4) Course may be repeated for credit as topic varies. Two 2-hour lectures and one 2-hour discussion section per week. A core course for the Humanities Field Major intended to introduce techniques of research and writing through examination of a particular topic. Topic may vary from year to year. (F,SP) Staff

190. Senior Thesis. (4) Individual conferences. Prerequisites: Senior standing. Directed senior thesis on special topics approved by the student's area of concentration. (F,SP) Staff

H195. Humanities Senior Honors Thesis. (4) Individual conferences. Prerequisites: Senior standing and eligibility for honors program. Entails writing a bachelor's thesis pertaining to the student's individual area of concentration within the humanities field major. Each student must submit a detailed proposal with a preliminary bibliography to the prospective thesis supervisor. The completed thesis will be read by the thesis supervisor and one other faculty member. (F,SP) Staff

198. Humanities. (1-3) Course may be repeated for credit as topic varies. Must be taken on a passed/not passed basis. Meetings to be arranged. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Industrial Engineering and Operations Research

(College of Engineering)

Department Office: 4135 Etcheverry Hall, 642-5484

Chair: Shmuel S. Bren, Ph.D.

Professors:

Ian Adler, Ph.D. Stanford University. Mathematical programming
Richard E. Barlow, Ph.D. Stanford University. Reliability theory
Stuart E. Dreyfus, Ph.D. Harvard University. Dynamic programming
David Gale, Ph.D. Princeton University. Mathematical economics
C. Roger Glasssey, Ph.D. Cornell University. Production systems, mathematical optimization
William S. Jewell, Sc.D. Massachusetts Institute of Technology. Risk theory; Bayesian forecasting
Richard M. Karp, Ph.D. Stanford University. Combinatorial optimization
Robert M. Oliver, Sc.D. Massachusetts Institute of Technology. Forecasting and planning models

Associate Professors:

E. Paul DeCormo, M.S. (Emeritus) Raymond G. Garreis, M.S. (Emeritus)
James T. Lepsky, Jr., M.S. (Emeritus)

*Not offered 1988-89
*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award

Associate Professors:

Doris S. Hontenbaum, Ph.D. University of Pennsylvania. Combinatorial optimization, decision making systems
Robert C. Leachman, Ph.D. University of California at Berkeley. Production planning and scheduling

Assistant Professors:

Sadasiva Adiga, Ph.D. Arizona State University. Artificial intelligence, expert systems
Robert W. Wall, Ph.D. University of California at Berkeley. Logistics, distribution

Industrial engineering and operations research are closely related fields that deal with the design, analysis, and control of complex systems that include people, machines, material, and information, and the interactions of such systems with their environment. Formal models, often computer-based, are extensively used in systems analysis, while operational design, as in other fields of engineering, requires well-developed integrative skills and creativity. The theoretical foundations of optimization, stochastic systems, reliability, and engineering economics often form the basis for operations research studies. Industrial engineering frequently uses knowledge of production, man/machine systems, incentives, organizational behavior, and automation in the design and improvement of goal-seeking systems. These methods may be applied to a great variety of human activities in both public and private sectors, including manufacturing, banking, health care, communication, resource management, transportation, and logistics.

Undergraduates in Industrial Engineering and Operations Research receive broad training in engineering fundamentals, principles of economics and advanced mathematics and statistics in order to prepare them for elective sequences which stress the construction of systems models, the role of the human being in these systems, and the related mathematical and computer methods of optimization and control. A unified core program is offered both for students who wish to pursue the professional aspects of the field, and for those who, after further instruction at the graduate level, wish to specialize in teaching and research. In order to satisfy the needs of students with diverse objectives, considerable flexibility in planning individual programs is provided.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

Lower Division and Outside Course Requirements.

Mathematics 1A-1B, 20A-20B; Statistics 134, 135; Engineering 5A-5B; Physics 7A-7B; Chemistry A; Business Administration 120 or 125 (Accounting); English 1A; Technical Writing (Engineering 190; Electrical Engineering and Computer Science 40 or 190); Engineering 45 (Materials); Industrial Engineering; and Humanities with 3 units English composition, at least 6 upper-division and at least two courses in the same department.

Graduate Programs

Graduate programs leading to the M.S., M.Eng., Ph.D. and D.Eng. are offered in three interrelated areas of study.

Industrial Engineering. This program has been developed to meet the needs of engineers who wish to enhance their competence in the design, analysis, operations and operation of complex systems in industrial service, or public sectors, or to prepare for managerial positions by gaining a broader perspective on modern engineering practice.

Operations Research. This program prepares the student for advanced work in the theory and application of operations research to the development and use of quantitative models for the analysis, design, and optimization of complex systems. Students may choose to concentrate on interdisciplinary studies in preparation for doctoral level research, or on applications of state-of-the-art techniques to real world problems.

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
Upper Division Courses

110. Interactive Computer Programming and Modeling Applications. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Knowledge of a computer programming language, Programming and software design using the interactive APL language. Prior knowledge of APL is not required. Lecture topics include: Interactive-programmed APL mathematical functions, data manipulation operators, and file control functions. Important user-designed recursive functions and user-defined outer products as applied to computer simulations, file search, and optimization. (F, SP) Adiga

115. Industrial and Commercial Data Systems. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Computer Science 7 or consent of instructor. Review of data system and data processing functions, technology, and organization, emphasizing industrial and commercial application requirements and economic performance criteria. Introductory survey of system-analysis design, modeling and implementation tools and techniques. Design oriented term project. (SP) Adiga

120. Modeling and Simulation of Dynamic Systems. (3) Three hours of lecture per week. Prerequisites: 110 may be taken concurrently; Mathematics 50A-50B; Statistics 134. Concepts of dynamic control systems, including feedback and stability. Characteristics of linear and nonlinear systems. Practice in modeling and analysis in discrete time of systems of moderate complexity. Simulation of nonlinear and stochastic systems. (SP) Glassy

131. Computer Simulation of Industrial Engineering Systems. (3) Three 1-hour meetings per week. Prerequisites: Statistics 134, 135. Introductory course on the design, programming, and statistical analysis of a simulation study. Discussions will include the types of problems that can effectively be solved by such methods. The programming material will also include the theory behind random variable generation for a variety of common types of random variables. Techniques to reduce the variance of the resultant estimator as well as the efficiency of the output of the simulation are considered. A final project will be required. (SP) Ross

140. Work Methods and Measurement. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Statistics 136. Process, operation, and work measure analysis. Performance standards, job evaluation, work sampling, and process capability. (F) Wilson

150. Production Systems Analysis. (3) Three hours of lecture per week. Prerequisites: 162; Engineering 120; Statistics 134. Operations analysis of integrated production systems; use of operations models and quantitative methods of operations research. (F) Hall

153. Facilities Planning and Design. (3) Two hours of lecture and 2 hours of discussion per week. Prerequisites: 150. Consideration of mathematical models of layout construction and deployment systems. Analysis of techniques of facility systems involving problems of storing, recalling, delivery, inventory, and computer control. Design of automated warehousing and order-picking systems simulation. (SP) Adiga

160. Operations Research I. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 18. Deterministic methods and models in operations research. Unconstrained and constrained optimization. Linear programming. Error analysis. Sequential decisions; dynamic programming. Resource allocation, equipment replacement, inventory control, production planning. (F) Adler


162. Linear Programming. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 20A. Formulation to linear programs. Optimal allocation and control problems in industry, environmental studies. Convex sets; properties of optimal solutions. The simplex method; theorems of duality; complementary slackness. Problems of post-optimization. Special structures; network problems. Digital computation. (F, SP) Hochbaum, Leachman

164. Introduction to Inventory Control and Queuing Models. (3) Three hours of lecture per week. Prerequisites: Statistics 134, 135. Introductory course on quality control, quality assurance, random processes, acceptance sampling. Probability models and calculations for inference, prediction, and data analysis. Emphasis on decision-making aspects of prediction and control of quality. Forecasting levels and trends in data, linear regression; seasonal models. Inferences and indices for future models with exponential lives. Runs and control charts; CUSUMs; decision trees and influence diagrams. (F) Bartow

170. Human Performance Mechanisms and Manned System Design. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 140 or consent of instructor: An engineering-oriented introduction to human performance. Qualitative and quantitative models, information and techniques used in design of manned systems. System environment and safety. Laboratory exercises and design project undertaken. (F) Wilson

171. Introduction to Design of Human Work Systems and Organizations. (3) Three hours of lecture per week. Prerequisites: 140 or consent of instructor. Qualitative and quantitative models and techniques used to maximize labor productivity, employee satisfaction, and organizational effectiveness in production and service systems. Labor requirements and task performance factors; extrinsic and intrinsic motivation; job design; formal and informal authority, communication, leadership and supervision; sociotechnical systems. Computational and field projects undertaken. (SP) Staff

172. Industrial Safety and Health. (3) Two hours of lecture and two hours of laboratory work per week. Prerequisites: 170 or consent of instructor. An engineering-oriented introduction to safety and health problems encountered in industry and commerce. Coverage includes OSHA legislation, safety organization, programs and equipment, and industrial hygiene. Injuries and fatality models, human reliability; and cost-benefit analysis. Field study undertaken. (F, SP) Staff

180. Synthesis and Design of Industrial Systems. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: 150; 151; 130, 132 or ME 102A. Application of systems analysis and industrial engineering to the analysis, planning, and/or design of industrial or governmental systems. Consideration technical and economic aspects of equipment and process design. Students work in teams under faculty supervision. Topics vary yearly. (SP) Oliver

198. Directed Group Studies for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: Senior standing in engineering. Group studies of selected topics. Semester course unit value and contact hours will have a one-to-one ratio. (F, SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a pass/fail basis. Individual conferences. Prerequisites: Consent of instructor and advisor. Supervised independent study. Please see pages 81 and 82 of this catalog for description and prerequisites. (F, SP) Staff

Graduate Courses

215. Analysis and Design of Databases. (3) Two hours of lecture and one 2-hour project meeting per week. Prerequisites: 115 or consent of instructor. Data requirements determination and analysis. Conceptual design of database structures using semantic and logical data models. Implementation using database management system software on mainframe and/or personal computers. Interaction between databases and concepts in artificial intelligence. Design projects undertaken. (F) Adiga

220. Economics and Dynamics of Production. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 263A; Statistics 134. Modeling and analysis of production-systems engineering and projects. Engineering economics, including project evaluation and risk analysis. Econometric and programming models of production, dynamic systems and production networks for analyses of resource utilization and output possibilities. (F) Leachman

231. Forecasting and Time Series Analysis. (3) Two 1-hour lectures and one 1-hour laboratory-recreation per week. Prerequisites: 163A. Basic forecasting models for decision-making; emphasis on model-building through the use of conditional independence and influence diagrams; sensitivity analyses and the effect of different model assumptions upon the structure of the forecasts and decisions. The course includes a review of minimum mean-squared error forecasts, linear predictors and discrete time series formulations of autoregressive and moving average models. Kalman filters; updating algorithms for adaptive on-line estimation, prediction and control. Recitation and lab assignments emphasize practical computer applications. (F) Adiga

*240. Policy-Level Problems in Industrial Engineering. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: Graduate standing. Past and current factors which influence policy-level problems and decisions in industrial engineering practice. Case studies arising from, and currently affecting, industrial engineering practice. (SP) Staff

251. Production Systems and Facilities. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: 162. Advanced study of topics related to production system analysis and design. Emphasis placed with emphasis on model construction and the use of computers.

254. Process Planning and Scheduling. (3) Three hours of lecture per week. Prerequisites: 262A and 220. Mathematical and computer-aided methods for process planning, scheduling, and control. Topics treated include: aggregate capacity planning, manufacturing requirements planning, lot size models, job shop scheduling; hierarchical linkage of production planning and control. (SP) Staff

262A. Mathematical Programming I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 111. Basic graduate course in linear programming and introduction to network flows and nonlinear programming. Formulation and solution of linear programming problems. The simplex method and duality theory. Sensitivity analysis, parametric programming, convergence (theoretical and practical). Special struc-
262B. Mathematical Programming II. (3) Three hours of lecture per week. Prerequisites: Math 111 or Math 112. Basic first year graduate course in optimization of nonlinear programs. Formulate and model building—Theory of optimization for constrained and unconstrained problems. Study of algorithms for non-linear optimization with emphasis on design considerations and performance evaluation. (SP) Glassy

263A. Applied Stochastic Process I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Statistics 134 or Statistics 200A. Stochastic process—Conditioned expectation, Markov chains, Brownian Motion, Stochastic dynamic programming with applications to inventory and equipment replacement. Stopping Rule Problems. (SP) Ross

263B. Applied Stochastic Process II. (3) Three hours of lecture per week. Prerequisites: 263A. Key Renewal Theorem. Semi-Markov processes with emphasis on applications. The reversed chain concept in continuous time Markov chains with applications to queueing theory—Brownian Motion. Stochastic dynamic programming with applications to inventory and equipment replacement. (SP) Glassy

265. Reliability Theory. (3) Three hours of lecture per week. Prerequisites: 262A (may be taken concurrently). A systematic treatment of the mathematical aspects of systems reliability analysis; coherent structures; fault tree analysis; efficient computational methods for calculating system reliability; properties and applications of life distributions with monotone failure rate; extreme value distributions; maintenance models; allocation of redundancy. (F) Barlow

266. Network Flows and Graphs. (3) Three hours of lecture per week. Prerequisites: 262A (may be taken concurrently). Survey of solution techniques and problems for network flows in integer and Max-flow min-cut theorem. Minimum cost flows. Multiterminal and multimmodity flows. Relationship with linear programming, transportation problems, electrical networks and critical path scheduling. (SP) Glassy


269. Integer Programming and Combinatorial Optimization. (3) Formerly 290F. Three hours of lecture per week. Prerequisites: 262A and 266. Formulation of combinatorial problems as integer programming problems and consideration of special problems. Matching and weighted matching. Convergent dual and primal cutting plane algorithms; group-theoretic methods; asymptotic integer programming. Branch and bound methods; heuristic methods. (SP) Hochbaum

271. Work Systems and Organization Design. (3) Three hours of lecture per week. Prerequisites: 171. Selected topics in design of systems for ensuring effective application of volunteer or professional labor to manufacturing and service processes. Extrinsic motivation, task-level planning, performance evaluation, Intrinsic motivation, job design, quality of work life. Authority and communication structures, participative decision-making, work graph and hierarchy. (SP) Staff

280. Systems Analysis and Design Project. (3) Three hours of lecture per week. Prerequisites: 263A-263B and 283A. A project course for students interested in applications of operations research and engineering methods. One or more systems, which may be public or in the private sector, will be selected for detailed analysis and recommendation of policies. (SP) Staff

280A. Dynamic Production Theory and Planning Models. (3) Three hours of lecture per week. Prerequisites: 220 and 254. Development of dynamic activity analysis models for production planning and scheduling. Relationship to theory of production, inventory theory, and hierarchical organization of production management. (SP) Staff

280B. Dynamic Programming and Calculus of Variations. (3) Three hours of lecture per week. Prerequisites: 268 or equivalent. The necessary conditions of optimal control theory will be derived and interpreted, using dynamic programming. (SP) Staff

280C. Statistical Aspects of Discrete Event Simulation. (2) Two hours of lecture per week. Prerequisites: 267. Statistics 200B and knowledge of Fortran or an appropriate simulation language. Statistical design and analysis of discrete event simulation of queues and other stochastic models. The statistical transient and optimal conditions. Variance estimation techniques including the regenerative method, time series methods, and bandwidth estimation. (SP) Staff

290D. Bayesian Decision Analysis. (3) Two 1/2-hour lectures per week. Prerequisites: 263C or equivalent. A Bayesian decision oriented course at the graduate level concerned with solving engineering problems of a statistical nature. Emphasis will be on utilizing influence diagrams to model and solve problems in the design of experiments, multivariate decision making, calibration of measuring instruments, quality assurance, etc. (SP) Staff

290E. Large-Scale Programming. (3) Three hours of lecture per week. Prerequisites: 262A for elaborating the structure of large mathematical optimization problems to economize on computer time and/or memory. Representations of the inverse that preserve sparseness. The simplex methods with upper bounded variables. Generalized upper bounding and dual methods. Decomposition, Wolfe's generalized linear program and column generation methods for linear and convex problems. Partitioning, relaxation and resource allocation schemes. Applications. (SP) Staff

290F. Advanced Mathematical Programming. (3) Three hours of lecture per week. Prerequisites: 262A. Selected topics in mathematical programming. The actual subjects covered may include: convex analysis, duality theory, complementary pivot theory, fixed point theory, optimization by vector space methods, related topics in nonlinear algebraic complexity of mathematical programming algorithms (including linear programming). (SP) Adler

290G. Advanced Theory of Reliability with Applications. (3) Three hours of lecture per week. Prerequisites: 265. Recent research topics in reliability theory and quality assurance. Foundations of system reliability computation and analysis. Stochastic process models and inference procedures for quality assurance. Computer system reliability models and applications. (SP) Staff

290L. Logistics Modeling. (3) New course. One 2-hour lecture and one hour of laboratory per week. Prerequisites: 250 and 260C. Logistics encompasses the issues of: When and where resources (materials, equipment, energy and labor) should be produced, stored, and transported. The objectives of the course is to examine the models and economics of logistics systems operate; how to develop and verify logistics models; and how to use models to improve system operations. A number of systems will be covered, including carriers (trucks, railroads, airlines, and ships), distributors and manufacturers. Types of models covered include network, analytical approximations, graphs, and physical models. (SP) Hall

290N. Neural-Net Modeling-Connectionism. (3) New course. Three hours of lecture per week. Prerequisites: Math 112, Statistics 134. Certain algorithms allow neuron-like devices to learn to recognize patterns based on examples, to complete patterns given partial information, and to categorize input patterns. Discussion of how and why such algorithms work and examples of the behavior of such models. (SP) Dreyfus

290P. Pricing Policies. (2) One 2-hour lecture per week. Prerequisites: 262A; Economics 201A or consent of instructor. Examination of pricing related issues from economic systems and marketing perspectives. Analysis and optimal design of pricing policies for different industries. Discussion of market conditions compatible with various pricing policies and their implications for consumers and producers. Emphasis on mathematical analysis. Students will participate in presentations and prepare a term paper. (F) Oren

290Q. Advanced Topics in the Theory of Queues. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 263A or consent of instructor. Recent research topics such as queuing networks, bounds and comparison methods, heavy and light traffic approximations, priorities, and models with special structure such as communication networks. Topics vary with each offering. (SP) Staff

290R. Risk Theory. (3) Three hours of lecture per week. Prerequisites: 263A. Introduction to mathematical risk theory, emphasis on various models of insurance operations: utility theory; insurance and gambling; life and casualty models of claims; fair premiums; credibility theory; risk reserve; risk-sharing; objectives of the firm. (SP) Staff

298. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. Sections 1-4: Must be taken on a satisfactory/unsatisfactory basis. Sections 5-8: letter grading. Seminars Advanced seminars in industrial engineering and operations research. (F,SP) Staff

299. Individual Study or Research. (1-12) Course may be repeated for credit. Sections 1-16: Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual investigation of advanced industrial engineering problems. (F,SP) Staff

301. Individual Study for Master's Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study for the comprehensive examination. Units may not be used toward either unit or residence requirements for a master's degree. (F,SP) Staff

302. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study in consultation with the major field advisor. Units may not be used toward either unit or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

301. Graduate Student Instructor Training. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One meeting per week with faculty member. One meeting weekly with faculty member discussing teaching methods including: text selection, clarity of oral delivery; use of visual aids, media resources; discussion hours. (F,SP) Staff

On leave, spring

Recipient of Distinguished Teaching Award
Interdepartmental Studies (Special Studies)

The following courses, sponsored by two or more departments because the boundaries of individual departments are considered interdepartmental studies, are considered interdepartmental studies. Each class is taught by one or more instructors who represent the departments sponsoring the class. There is no central information point for these courses; for further information, please contact the departments sponsoring the classes. This information appears at the end of each course description.

Lower Division Courses

1. Technology and Society. (3) Three 1-hour lectures per week. Role of technology in the solution of social problems. Historical development of modern technology. Examples of technological systems: communications, data processing, materials, energy generation. Sponsoring departments: Political Science and EECS. (F)

2. Evolutionary Biology—An Introduction for Non-Biology Majors. (2) Formerly Zoology 16. Two 1-hour lecture periods per week. This course assumes no background in science. It will cover the history of evolutionary ideas, Darwin's theory, and more modern genetic theories of evolution and the major features of the fossil record. Registration for the course will be determined by the student's major. Sponsoring departments: Zoology and Paleontology. (F) Hickman, Sistien


Upper Division Courses

100. History of American Technology. (4) Four hours of lecture per week. Survey of American technology from colonial times to the present. Analysis of technical innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technology of war, intuition of science in technology, industrialization, and the use of corporations. Sponsoring departments: History and EECS. (SP)

103. Introduction to Mathematical Economics. (3) Students who have completed Econometrics 104 will receive no credit for IDS 103. Three hours of lecture per week. Prerequisites: Math 50A-50B. Selected topics illustrating the application of mathematics to economic theory. Course is intended for upper division students in mathematics, statistics, the physical sciences, and engineering, and for economics majors with adequate mathematical preparation. No economic background is required. Sponsoring departments: Mathematics and Economics. (SP)

110. Introduction to Computers. (3) Students who have completed Computer Science 7, 8, or 50 will receive no credit for IDS 110. Three hours of lecture per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110L, with the same grading option as in IDS 110L. An introduction to the professional schools other than Engineering. Elements of programming. Applications programs. Laboratory exercises are drawn mainly from word processing, databases, spreadsheets, graphics and simulation, and telecommunication. Sponsoring departments: Education, Engineering, and Computer Science. (F,SP)

111. Introduction to Neurobiology. (3) For course description see the Neurobiology section of this catalog.

112. Mammalian Neurophysiology. (3) For course description see the Neurobiology section of this catalog.

113. Developmental Neurobiology. (3) For course description see the Neurobiology section of this catalog.

114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) One 2-hour lecture per week in the evening. Prerequisites: high school biology and chemistry. This interdisciplinary course will single out specific topics in aging of great current interest (Alzheimer's disease; spring, strategies for intervention) and present lectures on all aspects of each topic (biomedical, health, socioeconomic, legal, and ethical). Students without expertise in these areas will participate. Credit for the course will be based on a term paper. Sponsoring departments: Optometry, Physiology-Anatomy, Public Health, Social Welfare. (F) Dreslinski, Miller

115. Microcomputer Data Acquisition and Control in the Biological Laboratory. (2) New Course. One hour lecture and one 3-hour laboratory per week. Prerequisites: Consent of Instructor. Introduction to the use of microcomputers for the acquisition, analysis, and control of data in biological research. Operation and engineering of digital systems not programmed. Programming will be minimal. Transduction, A/D conversion, statistical analyses, Fourier transforms, digital filtering. Laboratory projects will include real-time data acquisition, on-line control of biological processes, data analysis, report generation. Sponsoring departments: EECS and Zoology. (S) Miller, Werbin

116L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Two hours of lecture per week. Prerequisites: Must be taken in conjunction with IDS 116L. The theory of pollen analysis. Taxonomy of pollen types commonly encountered in the fossil record, with special reference to the Quaternary. The relationship between the "pollen rain" and modern vegetation. The taxonomy of pollen. Use of pollen analysis in archaeological and palaeocological contexts. Discussion of selected case studies. Sponsoring departments: Geography and Paleontology. (F) Byrne

116L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Three hours of lab per week plus two weekend field trips in September and October. Prerequisites: Must be taken in conjunction with IDS 116L. An introduction to the techniques of Quaternary pollen analysis: recovery of sediment cores from lakes, and peat bogs, extraction of fossil pollen from sediment cores, collection of surface samples, graphical presentation of results. Sponsoring departments: Geography and Paleontology. (F) Byrne

121. Neurobiology. (3) Formerly Zoology 121. Three hours of lecture per week. Prerequisites: Biology 1. An introductory course designed to provide the general understanding of current knowledge of the nervous system. Critical properties of nerve cells, cell-to-cell junctions, and simple circuits are analyzed. Operation of these components in more complicated nervous systems, and the state of understanding of complex nervous phenomena are then considered. Sponsoring departments: Zoology and Physiology-Anatomy. (F) Bentley, Miller

*121A-121B. Environmental Education. (3,3) Must be taken on a pass/no pass basis. Five and one half hours of lecture/discussion and six hours of field work per week. Prerequisites: 121A is prerequisite to 121B; consent of instructor. Theory and practice of translating ecological knowledge, environmental issues and values into educational programs for all facets of society, including schools. Conceived experience in participatory education. Sponsoring departments: Education and Conservation Research Studies.

122. Animal Behavior. (3) Three hours of lecture, one hour of demonstration, plus one hour per discussion week. Prerequisites: Biology 1 or, 11, or Zoology 11, or Ecology 120. Students 102 strongly recommended. An introduction to some of the major animal behavior and behavioral physiology to evolutionary perspective, including analysis of behavior genetics and development, learning aggregation, reproduction, adaptiveness, physiology of the substrate, regulation of behavior. Sponsoring departments: Entomological Sciences, Psychology, and Zoology.

124. Applied Chemical Thermodynamics. (3) Three hours of lecture per week. Prerequisites: Chemistry 10B or equivalent. Properties of real fluids and fluid mixtures including chemical equilibria. Additional topics to be chosen by the instructor. Sponsoring departments: Chemistry and Chemical Engineering.

126. Seminar on Social, Political and Ethical Issues in Health and Medicine. (2) Must be taken on a pass/no pass basis. One hour of lecture and one hour of discussion per week. An interdisciplinary approach to health and medicine. Guest lecturers will speak on the social, political, and ethical aspects of health and medicine. Students will then discuss and present analyses of the reading materials as well as issues raised by the speakers. An optional Social and Administrative Health Sciences 1975 field study will place some students with health professionals in local health care settings. Sponsoring departments: Social and Administrative Health Sciences, Education, and Zoology. (F,SP)

130. History of Technology. (4) Three hours of lecture plus extensive listening assignments. Prerequisites: Major in French or Music, or consent of instructor. Emphasis on the development of European society on the eve of the French Revolution, and their musical settings by Mozart and other composers. Also included will be Mozart's Don Giovanni and Carl Ivan Tutt, both composed in response to the successes of Le Nozze di Figaro. Don Giovanni will be studied in conjunction with Molier's Don Juan. Sponsoring departments: Music and French. (SP)

140. Technical Communication for Non-native Speakers of English. (3) Two 1-hour lectures and one 1-hour laboratory per week. Prerequisites: English 1A, or equivalent course; upper-division or graduate standing. Emphasis on improving language skills and use of the rhetorical conventions of technical writing (see course description for Engineering 190). Also, some work with oral presentations. This course is designed to prepare non-native speakers for the more advanced work in Engineering 190. Sponsoring departments: Subject A and the College of Engineering. (F,SP)

145. Chemical Methods in Nuclear Technology. (3) One 11/2-hour lecture and one 4-hour laboratory per week. Prerequisites: Nuclear Engineering 101 or Chemistry 145. Experimental illustrations of the interrelationship between chemical, engineering, and technology; fission process, chemistry of fission fragments, chemical effects of nuclear transformations; application of radioactivity to study of chemical problems; neutron activation analysis. Sponsoring departments: Chemistry and Nuclear Engineering. (SP)

151. Toxic and Hazardous Waste Management. May be taken on a pass/no pass basis. Prerequisites: Math 1A-1B; Chemistry 1A. Three 1-hour lectures. Quantitative analysis, control and disposal alternatives, and environmental transport on the land as well as in the water and the atmosphere. Also included will be properties that make a waste hazardous, a brief discussion of toxicology, and some background on current federal and state regulations. (SP) Hunt, Trzezek

167. Introduction to Chinese Philosophy. (4) New course. Two 11/2-hour lectures and one 1-hour discussion section per week. A survey of the history of Chinese philosophy from Confucianism and Taoism to modern Chinese philosophers. Special emphasis placed on the classical Chinese tradition and the role of language in moral education. Other subjects covered are Chinese aesthetics, political
thought, and metaphysics. Sponsoring departments: Philosophy and Oriental Languages. Riegel, Shun

170. Economics of Organization. (3) Two 1-hour lectures per week. Prerequisites: Econ 100 or 101; or BA 110 or equivalent; or consent of instructor. This course uses economic analysis to explain why and how firms vertically integrate, as well as how to fit professional norms; professional governance structures. Motivating professionals. Professional control and responsibility. Codes of ethics. (F) Benveniste

220. Management Professionals in Organizations. (3) One 3-hour lecture per week. The history and concept of professional roles. Professionalization as an alternative to bureaucracy. Adapting skills and roles to fit professional norms. Professional governance structures. Motivating professionals. Professional control and responsibility. Codes of ethics. (F) Benveniste

228. Human Evolution, Prehistory and Paleoenvi- ronments. (2) Course may be repeated for credit. Must be taken in progress the first semester. Two hours of seminar per week. Prerequisites: Consent of instructor. Required of students working that they are carrying on as research assistants and research that they are carrying on as research assistants. (F,SP)

*238. Environmental Design: Stress and Health. (2-4) One 1-hour lecture per week. Prerequisites: Consent of instructor. This course will focus on the relation between theory and method in understanding family structure and functioning. In terms of both the nuclear and extended family. Two 1-hour seminar per week. Prerequisites: Consent of instructor. Emphasis on regulations and integration of development and integration of development. Two hours of seminar per week. Prerequisites: Consent of instructor. The seminar course devoted to consideration of the theory and method of studying couples, parent-child relations, and family systems as they change over time. May be repeated for credit. One 1-hour laboratory per week. Prerequisites: Biology 1A-1B or equivalent, upper division standing. For students working that they are carrying on as research assistants. (F,SP)

191. Public Health and Nuclear War. (2) Formerly P.H. 291. One lecture of 1-hour and one hour of discussion per week. Prerequisites: Consent of instructor. To the interactions between the health of the current arms race and the threat of nuclear war. Topics to be considered include: the physical and mental health effects of nuclear detonation, as well as the economic, psychological, and health dimensions of destruction from preparation for detonation. Conflict resolution and other preventative measures will be explored and discussed. Sponsoring departments: Public Health and Policy, Conflict Studies. (SP) Winkelestein, Hurst, Leonard

*191A. Introduction to Laboratory Animal Science and Resources. (2) Must be taken on a passed/not passed basis. One 1-hour lecture and one 2-hour laboratory per week. Prerequisites: Biology 1A-1B or equivalent, upper division standing. For students working with laboratory animals. Lectures on basic animal science, including animal research models; principles of anesthesia, surgery, and sanitation; animal welfare regulations. Laboratory sessions will cover care and breeding of animal genetics and diseases. Laboratory applications of lecture material. Sponsoring departments: Entomological and Environmental Sciences.

H195A-H195B. Senior Honors Thesis. (3,3) Credit and grade to be awarded upon completion of the sequence under the direction of the advisor. Open only to honors students with an individual group major in the College of Letters and Science. The senior thesis will be written while a student is enrolled in IDS

NOTE: IDS 205–212, 214, and 217-219 comprise the Program in Public and Nonprofit Management, a cooperative campus effort pooling the resources of various academic units to further the study and understanding of managers and management in this specialized area. Courses are listed in the Public and Nonprofit Management section of this catalog.

213A-213B. Mathematical Economics. (3,3) Two hours of lecture per week. Prerequisites: Math 51 or equivalent. Feedback systems, sequence responses to exogenous changes, estimation, simulation and prediction. Examples in government, economics, business and biology. Growth dynamics, phase-plane methods, state variables, statistical signals, sampled data, stability, root locus, gradient methods, and computer simulation. Laboratory sessions are part of the course. Sponsoring departments: Economics and EECS. (SP) Smith

180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisites: Math 51 or equivalent. Feedback sequences, systems response to exogenous changes, estimation, simulation and prediction. Examples in government, economics, business and biology. Growth dynamics, phase-plane methods, state variables, statistical signals, sampled data, stability, root locus, gradient methods, and computer simulation. Laboratory sessions are part of the course. Sponsoring departments: Economics and EECS. (SP) Smith

183. Modernity: Nietzsche, Weber, Heidegger and Foucault. (4) Three hours of lecture per week. Thinking about modernity as crisis has produced some of the most important works of our age. In this course we will examine the problematization of modernity in four thinkers: Nietzsche (nihilism and history), Weber (rationalization and the social sciences), Heidegger (technology and thought) and Foucault (writings and thought). We will also examine how these thinkers addressed the dangers and opportunities of our modern condition. (F. 1988 only) Dreyfus, Rabinow

191. Public Health and Nuclear War. (2) Formerly P.H. 291. One lecture of 1-hour and one hour of discussion per week. Prerequisites: Consent of instructor. To the interactions between the health of the current arms race and the threat of nuclear war. Topics to be considered include: the physical and mental health effects of nuclear detonation, as well as the economic, psychological, and health dimensions of destruction from preparation for detonation. Conflict resolution and other preventative measures will be explored and discussed. Sponsoring departments: Public Health and Policy, Conflict Studies. (SP) Winkelestein, Hurst, Leonard

*191A. Introduction to Laboratory Animal Science and Resources. (2) Must be taken on a passed/not passed basis. One 1-hour lecture and one 2-hour laboratory per week. Prerequisites: Biology 1A-1B or equivalent, upper division standing. For students working with laboratory animals. Lectures on basic animal science, including animal research models; principles of anesthesia, surgery, and sanitation; animal welfare regulations. Laboratory sessions will cover care and breeding of animal genetics and diseases. Laboratory applications of lecture material. Sponsoring departments: Entomological and Environmental Sciences.

H195A-H195B. Senior Honors Thesis. (3,3) Credit and grade to be awarded upon completion of the sequence under the direction of the advisor. Open only to honors students with an individual group major in the College of Letters and Science. The senior thesis will be written while a student is enrolled in IDS

NOTE: IDS 205–212, 214, and 217-219 comprise the Program in Public and Nonprofit Management, a cooperative campus effort pooling the resources of various academic units to further the study and understanding of managers and management in this specialized area. Courses are listed in the Public and Nonprofit Management section of this catalog.

213A-213B. Mathematical Economics. (3,3) Two hours of lecture per week. Prerequisites: Math 51 and 112. Basic mathematical analysis of economic theory. The problems treated involve as wide a range of mathematical techniques and of economic topics as possible, including theories of preferences, utility, demand, supply, market equilibrium, and general equilibrium. This course requires at least 12 hours of work per week including outside work and preparation. Sponsoring departments: Economics and Mathematics. (F,SP)

214. Organizational Skill for Managers. (3) (For course description see the Public and Nonprofit Management section of this catalog.)

215. Faunal Analysis in Archaeology. (4) One hour of lecture, one hour of discussion, and two 3-hour laboratories per week. Prerequisites: Paleobotany 126 or equivalent. An introduction to the problems of faunal analysis of archaeological contexts, principles and procedures in faunal analysis of archaeological sites, practical training in osteology and research methods, and preparation of a faunal analysis of an archaeological site. Sponsoring departments: Anthropology and Paleontology. (SP)

217. Technology, Tasks, and Politics. (3) (For course description see the Public and Nonprofit Management section of this catalog.)

218. Information Resource Management. (3) (For course description see the Public and Nonprofit Management section of this catalog.)

219. Financing Tools for Public Managers. (3) (For course description see the Public and Nonprofit Management section of this catalog.)

*Not offered 1988-89

‡On leave, spring

§On leave, fall, spring

On leave, spring

†Recipient of Distinguished Teaching Award

‡On leave, spring
Biomedical and Environmental Health Sciences and Architecture.

241. The Urban Environment. (3) Two 1-hour seminars and one 3-hour laboratory per week. The components, structure, and meaning of the urban environment. Environmental problems, attitudes, and criteria. Environmental survey, analysis, and interview techniques. Methods of addressing environmental quality. Environmental simulation. Sponsoring departments: City and Regional Planning and Landscape Architecture. (F,SP)

249. Urban Design Planning. (3) Three hours of seminar and discussion per week. Requires: Consent of instructor. This seminar will focus on urban design issues in the context of environmental planning surveys, methods of community involvement, problem identification, goal formulation and alternative generation, environmental media and presentation, design generation, and environmental evaluation and impact assessment. Case studies. Sponsoring departments: City and Regional Planning and Landscape Architecture. (SP)

251. Plant-arthropod Seminar. (1) New course. Must be taken on a satisfactory/unsatisfactory basis. One hour lecture per week. Prerequisites: Consent of instructor: Seminar on plant-arthropod interactions held interdepartmentally with Entomology and Botany. Will include topics of current or controversial nature as well as review of general topics, crop protection, stress and insects, weed control, etc. (F,SP) Baker, Bernays, Ornuff

252. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisites: Physics 110A-110B, 111 or consent of instructor. Stellar structure, radiative transfer and convection, thermodynamic relations and stellar energy generation; stellar models, degenerate configurations, evolutionary sequences; supernovae; neutron stars; black holes; nucleosynthesis. Sponsoring departments: Physics and Astronomy. (F)

254. High Energy Astrophysics. (3) Three hours of lecture per week. Prerequisites: 201 or consent of instructor. Basic physics of high energy radiation processes in an astrophysical environment. Cosmic ray production and propagation. Applications selected from pulsars, X-ray sources, supernovae, interstellar medium, intergalactic medium, extragalactic radio sources, quasars, and X-ray cosmology. Sponsoring departments: Physics and Astronomy. (SP)

255A-255B. Eastern Frontiers of the Classical World. (4,4) New course. Course may be repeated for credit. One 3-hour seminar per week. The course is intended to provide an archaeological perspective on the eastern frontiers of the classical world, frontiers which came to extend from Afghanistan and beyond. 255A will cover the prehistoric developments in this easternly area which eventually became a part of the classical world. 255B will explore the interactions of the classical world with the indigenous cultures of Central Asia. Sponsoring departments: Near Eastern Studies and South and Southeast Asian Studies. (F,SP)

270. Doctoral Seminar on the Functions of the Executive. (2) New course. Course may be repeated for credit on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Doctoral standing or consent of instructor: This special interdisciplinary seminar will be organized to celebrate the 50th anniversary of the publication of Chester N. Nye's "The Functions of the Executive" (1938). Classic organizational issues, such as the nature of the employment relationship, communication processes within organizations, and cooperation, will come under close scrutiny in the seminar. An attempt will be made to assess what has been learned and what issues require refocused efforts, with respect to the economics of organization. The course will also feature guest lectures by a variety of eminent scholars of economics and organization. (SP) Williamson

271. Seminar in Neuropsychology. (3) Course may be repeated for credit. One 3-hour lecture and one 2-hour laboratory per week. Prerequisites: consent of instructor. Course will cover the topics of cognitive and information processing manifested in cases of aphasia, dementia, stroke, traumatic injury, and other forms of neurological damage. Case presentations of patients alternate with discussions of research strategies for evaluation of cognitive functioning. Presentation of neuropsychological populations as opportunities for the study of cognitive functioning. Sponsoring departments: Education and Psychology. (SP)

282. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and discussion per week. Prerequisites: Consent of instructor. Reviews and reports of current research in tumor biology. Sponsoring departments: Biomedical and Environmental Health Sciences, Zoology, Physiology-Anatomy, and Microbiology. (F,SP)

287. Theoretical Astrophysics Seminar. (2) Course may be repeated for credit on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. The study of theoretical astrophysics. Sponsoring departments: Astronomy and Physics. (F)

290. International Food and Nutrition Policies. (3) New course. Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. Interdisciplinary course surveying the world food situation emphasizing the links between food production, food consumption and nutrition: the effect of income and education; methods of food on demand, and socioeconomic factors affecting food consumption within and among households. The various nutritional problems plaguing developing countries (including famine); intervention measures, such as food aid, feeding programs, price policies and nutrition education, and methods of program evaluation are reviewed. Sponsoring departments: Agriculture and Resource Economics, Nutritional Sciences, Social and Administrative Health Sciences (School of Public Health). (SP) Lane, Robinson, Viteri, Sabry

295. Systems and Integrative Biology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour laboratory per week. Prerequisites: Graduate standing in Biology, Environmental Sciences, or Physiology. Presentation and discussion of current research in integrative, developmental, and regulatory biology. Emphasis on interdisciplinary communication and approaches. Sponsoring departments: Biophysics and Medical Physics, Physiology-Anatomy, and Nutritional Sciences. (SP) Forte, Hayes, USkin, Willumsn

296. Management of Innovation and Policy. (3) Formerly BA 286. Two 1/2-hour lectures per week. Prerequisites: Graduate standing in business administration or engineering. This course is designed to introduce students to the innovation process and its management. It draws on a variety of disciplines and aims to integrate them in a fashion which will generate key insights into how technology can be developed and managed. Sponsoring departments: Engineering and Business Administration. (SP) Eeece

Professional Courses

407. Introduction to Scientific Diving. (4) Two 1-hour lectures, one 3/4-hour pool lab plus one 7-hour ocean laboratory per week. Prerequisites: Swimming test, free diving test, and medical exam. CPR and basic first aid as prescribed by the Diving Control Board, and consent of the instructor: Diving physiology, physics, medicine, rescue, first aid, recompression, air tables, weights, currents, navigation, physical illness, psychology, management, and underwater life support equipment, and University regulations. Leading area of study for research. Independent study. Sponsoring departments: Botany and Geography. (SP) Williamson

497A. Internship in India. (4-5) Field work and research done by student. Prerequisites: Graduate status and acceptance into program. This course comprises the field work and research aspect of the Professional Studies Program. (F,SP)
Italian
(College of Letters and Science)

Department Office: 6125 Dwinelle Hall, 642-2704
Chair: Professor Paolo Biasin, Ph.D.

Professors:
Gian-Paolo Biasin, Ph.D, 20th-century criticism
Louise George eiubb, Ph.D. Renaissance
Nicolas J. Perella, Ph.D. Romance Literature

Associate Professor:
Gervetl Moses, Ph.D. 17th-century, cinema

Assistant Professor:
Steven Botterill, Ph.D. Middle Ages, Dante

Senior Lecturer:
Catherine Feucht, B.A.

Major Adviser: Mr. Botterill.
Graduate Adviser: Mr. Perella.

The department gives undergraduates the opportunity to acquire proficiency in the Italian language and a broad background in Italian literature from its beginnings to the present. It also offers courses in English translation on Italian civilization, literature, and film. The graduate program offers in-depth training in the history and critical analysis of Italian literature along with courses in philology and stylistics.

The Major

Lower Division.
Courses 1, 2, 3, 4, or their equivalent in linguistic proficiency.

Upper Division. 27 units of upper division courses (of which at least 15 units must be taken in residence) including Italian 101A-101B, 103A-103B. No more than one Italian film course in English may count toward the major unit requirement.

Honors Program. To enter the honors program, in addition to having a minimum overall grade-point average of 3.3, the student must have completed at least 18 upper division units in the major with a minimum grade-point average of 3.5. Candidates must enroll in Italian H195 for one semester during which they will carry out research and write an honors thesis under the guidance of a faculty member.

The Minor

Lower Division. Required: Italian 1, 2, 3, 4 or their equivalent in linguistic proficiency. Recommended: Italian 40B.


Graduate Program

Master of Arts in Italian. Requirements: a minimum of 27 units of combined upper division and graduate courses of which at least 12 units must be at the graduate level and must include Italian 200; a comprehensive written examination based on a departmental reading list. Students desiring to continue for the Ph.D. in Italian will take an oral permission-to-proceed examination. Further information is available from the Italian Department.

Doctor of Philosophy in Italian. The Ph.D. program is open to students with an M.A. degree in Italian or in a program in which Italian was the major field of study. Requirements: Demonstration of a reading knowledge of Latin and a modern language other than Italian and English; a basic knowledge of Italian philology; a written and oral qualifying examination in a major field of Italian literature and in a minor of an approved related field; a dissertation. Detailed information is available from the Italian Department.

Ph.D. in Romance Languages and Literatures (emphasis in Italian). This program requires for admission an A.B. degree with a major in Italian approximately equivalent to the undergraduate major at Berkeley. No specific courses are required, but students, in consultation with a graduate adviser, will lay out a program designed to prepare them for the qualifying examination preceding advancement to candidacy. As early as possible, they must demonstrate a reading knowledge of Latin, Spanish, and French in a written examination or appropriate coursework in the department. Students must complete at least 54 units beyond those for which they originally filed. Split grading is optional. (F,SP)

40A. Italian Civilization (in English). (3) Three 1-hour lectures per week. Birth, rise and triumph of Italian civilization in the Middle Ages and the Renaissance; socio-political history, literature, and the fine arts. (F) Feucht

40B. Italian Civilization (in English). (3) Three 1-hour lectures per week. Glory, decline and revival of Italian Civilization from the Baroque Age to the present; socio-political history, literature, music, the arts and the cinema. (SP) Moses

50. Epic Transformations: Virgil, Ovid, Dante (in English). (3) Three 1-hour semesters per week. Prerequisite: Consent of instructor. An undergraduate seminar that will analyze a set of literary texts with an interdisciplinary approach, with a view to European political theories in their historical evolution from feudalism to parliamentary democracy.

85. Vision of After Life: Homer, Vergil, Dante (in English). (3) Three 1-hour seminars per week. Prerequisite: Consent of instructor. A reading of the narrative poems which stand as pillars of Western literature: the Iliad, Odyssey, Aeneid, and Divine Comedy. The poems will be interpreted from an inter-cultural literary standpoint and as repositories of our cultural identities.

90. Time and Consciousness in the Contemporary Novel (in English). (3) Two 1-1/2-hour seminars per week. Prerequisite: Consent of instructor. An undergraduate seminar that analyzes the struggle against time and the search for knowledge which are the very foundation of many contemporary novels. The readings and discussions will focus on how such a struggle and such a search ultimately define the very nature of literature. (SP) Feucht

101A-101B. Advanced Grammar Composition and Conversation. (3,3) Three 1-hour classes per week. Prerequisites: 1 or 14B. Reading and grammatical analysis of representative texts; advanced written and oral composition. (F,SP) Feucht

103A-103B. Introduction to Italian Literature. (3,3) Three 1-hour lectures per week. An introduction to the chief currents and authors of Italian literature. Lectures, selected readings and analysis of texts. (F,SP) Botterill

109A-109B. Dante's Divine Comedy. (3,3) Three 1-hour lectures and discussions per week. A close reading of Dante's masterpiece. (F,SP) Stefanini

110A-110B. Literature of the 13th and 14th Centuries. (3,3) Three 1-hour lectures per week.

110A. Emphasis on the "Stil Novo" and Dante's minor works. (SP) Botterill

110B. Emphasis on Boccaccio's Decameron and Petrarch's Rime. (SP)

111. Fifteenth Century Literature. (3) Three 1-hour lectures per week. Humanism and the Early Renaissance.

112A-112B. Sixteenth Century Literature. (3,3) Three 1-hour lectures per week.

112A. The High Renaissance. (F) Costa

112B. The Late Renaissance. (SP)

113. Seventeenth Century Literature. (3) Three 1-hour lectures per week. Major trends in the prose and poetry of the age of the Baroque. (SP) Möszer

114. Eighteenth Century Literature. (3) Three 1-hour lectures per week. Emphasis on the works of Vico, Goldoni, Parini, Alfieri.

*Not offered 1988-89
1On leave, spring, fall
2On leave, fall
115. Nineteenth Century Literature. Three 1-hour lectures per week.

115A. From Neoclassicism to Romanticism. (3) Mori, Roscolio, and early Leopardi. (F) Perrella

115B. Romanticism. (3) The mature Leopardi and Manzoni. (SP) Perrella


117. Twentieth-Century Literature. Three 1-hour lectures per week.

117A. Fiction. (3) (F) Blissin

117B. Poetry. (3)

117C. Theatre. (3)

130. Dante's Divine Comedy (In English). (3) Three 1-hour lectures per week. An introduction to Dante's thoughts and works. Emphasis on a critical reading of the Divine Comedy. (SP) Perrella

140. Petrarch and Boccaccio (In English). (3) Three 1-hour lectures per week. Lectures, readings, and discussions of Petrarch's Rime and Boccaccio's Decameron.


155. Machiavelli (In English). (3) Three 1-hour lectures per week. The political and literary works of Machiavelli in the context of the thought and culture of his age.

160. Italian Culture During the Fascist Period (In English). (3) Three 1-hour lectures per week. An examination of the political-cultural climate of the fascist regime.

165. The Anti-Hero in the Contemporary Italian Novel. (3) Three 1-hour lectures per week. An analysis of the novelistic portrait of the anti-hero figure that pervades contemporary culture.

170. The Italian Cinema: History, Genres, Authors (In English). (3) Course may be repeated for credit when topic changes. Three 1-hour lectures and 2-3 hour film viewing, analysis, and discussion per week. An analysis of Italian cinema as seen in the development of specific film genres such as neorealism, comedy, self-reflexive cinema. Occasionally, the course will concentrate on a specific director and study his individuality through style, theme and personal development. This course fulfills major requirement in one of history, genre, and/or author.

175. Film and Literature (In English). (3) Course may be repeated for credit when topic changes. Three 1-hour lectures, two hours film viewing, and 2-hour video-production workshop per week. The interaction of film style with literary and poetic structure studies through films dealing with the essence of cinematic form will be studied. This course may fulfill the film major requirement in theory. (F) Moshe

H195. Special Studies for Honors Candidates. (3-4) Individual conferences. Prerequisites: Limited to senior honors candidates. Directed study relating to the writing of an honors thesis. (F,SP)

197. Field Studies. (1-4) New course. Course may be repeated for credit. Two hours of field work per week. Prerequisites: Consent of instructor. Supervised field programs involving experiences in schools and school-related settings. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Feucht

199. Supervised Independent Study and Research for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Restricted to senior students with overall GPA of 3.0 or better. Enrollment restricted according to regulations listed on pages 81 and 82 of this catalog. (F,SP)

200. Italian Syntax, Lexicon, and Composition. (3) One 3-hour seminar per week. An analysis of Italian syntax and lexicon, with exercises in critical language and explication. Required for the M.A. in Italian. (F) Blissin

201. Historical Grammar. (3) One 3-hour seminar per week. History of Italian phonology and morphology. The course fulfills the philology requirement for the Ph.D. in Italian.

202. Bibliography and Methods of Research. (3) One 3-hour seminar per week. A pragmatic inquiry into bibliography and the methodology of research.

203. Literary Criticism. (3) One 3-hour seminar per week. Studies in literary criticism from Santacroce to Grassi.

204. Contemporary Trends in Critical Theory. (3) One 3-hour seminar per week. Studies in the main currents of contemporary criticism and their application in the interpretation of literary texts.

205. Studies in Literary Genres and Poetics. (3) Course may be repeated for credit when topic changes. One 3-hour seminar per week. An analysis of significant questions related to poetics and literary genres.

208. Minor Medieval Authors. (3) One 3-hour seminar per week. Lyric and religio-didactic poetry, chronicles, novelle, and treatises.

209. Seminar on Dante. (3) One 3-hour seminar per week. Studies in the Divine Comedy and Dante's minor works.

211. Seminar on Petrarch. (3) One 3-hour seminar per week. Studies in Petrarch's poetry.

213. Seminar on Boccaccio. (3) One 3-hour seminar per week. Studies in the Decameron and the minor works. (F) Bottirff

217. Studies in the Renaissance. One 3-hour seminar per week.

217A. Humanism. (3)

217B. Theatre. (3)

217C. Ariosto. (3) (SP) Clubb

217D. Tasso. (3)

217E. Machiavelli. (3)

218. The Age of the Baroque. (3) One 3-hour seminar per week. Studies in the thought and writings of the 17th century.

219. The Age of the Enlightenment. (3) One 3-hour seminar per week. Studies in the thought and writings of the 18th Century. (SP) Costa

221. Studies in the Nineteenth Century. One 3-hour seminar per week.

221A. Literary Theory and Polemics. (3)

221B. Leopardi. (3)

221C. Manzoni. (3)

221D. Verga. (3) (F) Perrella

223A-223B. Studies in the Twentieth Century. (3-3) One 3-hour seminar per week.

A. Poetry and Theatre. (SP) Blissin

B. Prose.

228. Special Study. (2-4) Course may be repeated for credit. Individual conferences. Prerequisite: Students in Italian Ph.D. program. Designed to allow students to do research in areas not covered by other courses. Requires regular discussions with the instructor and a final written report. (F,SP)

229. Directed Research. (6-12) Course may be repeated for credit. Must be taken on a satisfied/unsatisfactory basis. Individual conferences. Limited to students engaged in research for the doctoral dissertation. (F,SP)

601. Individual Studies for M.A. Candidates. (1-6) Course may be repeated for credit with consent of graduate adviser. May not be used for unit or residence requirement for the master's degree. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study in consultation with faculty member with a view to the M.A. comprehensive examination. May be taken only in the semester of the comprehensive examination. (F,SP)

602. Individual Studies for Doctoral Students. (1-6) May not be used for unit or residence requirements toward the doctoral degree. Course may be repeated for credit with consent of graduate adviser. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study in consultation with a faculty adviser. Intended to provide an opportunity for qualified students to prepare for the Ph.D. qualifying examination. May be taken only in the semester of the qualifying examination. (F,SP)

**Journalism**

(Graduate School of Journalism)

Office: 121 North Gate Hall, 642-3383
Dean: Ben H. Bagdikian, A.B.

Professors:
Ben H. Bagdikian, A.B. Clark University. Media criticism, social issues, reporting
David Littjohn, (Associate Dean), Ph.D. Harvard University. Criticism, cultural reporting
Bernard B. Taper, M.A. Stanford University. Magazine writing, biographical reporting
Edwin R. Bayley (Emeritus), B.A. Lawrence College. Political reporting, general reporting
Timothy Ferris, B.S. Northwestern. Science writing, newspaper reporting
Tom Goldstein, J.D. Columbia Law School. M.S. Columbia University Graduate School of Journalism. Media criticism, journalism ethics
Thomas C. Leonard, Ph.D. University of California. Journalism history and literature
Joseph P. Lyford (Emeritus) B.A. Harvard University. Urban affairs, community studies
Albert G. Pickerton (Emeritus), Ph.D. Stanford University. Law of journalism
A. Kent MacDougall, M.S. Columbia University. Business reporting, newspaper reporting

Assistant Professor:
Susan Cohen, M.I. University of California. Newspaper reporting

Acting Professor:
William Drummond, M.S. Columbia University Graduate School of Journalism. Broadcast journalism, foreign policy

Senior Lecturers:
Andrew A. Sarn, B.A. Dartmouth University. Broadcast Journalism, television and humanitics
James C. Spaulding (Emeritus), B.A. University of Michigan. Science writing, newspaper reporting

Lecturers:
Judith Colburn
Bruce Cohn, B.A.
Barbara Erickson, M.J.
Cynthia Gomey, B.A.
James Giacomini, M.A.
Ken Light, B.A.
Richard Reinhardt, M.S.
Morton Riggs, M.J.
Rosalie Sliter, M.A.
Christine Watcher, M.I.
David Weir, B.A.

Graduate Advisers: Ms. Cohen, Mr. Littlejohn, Mr. Taper.

**Graduate Program**

For a description of the graduate program in journalism, see page 70.

**Upper Division Courses**

100. Introduction to News Writing. (4) Three hours lecture and discussion plus eight hours of field work per week. Survey of journalistic principles and practices, and study and practice of methods of gathering, writing, and editing news. Pre-enrollment required. (F,SP) Staff

101. Advanced Writing for Journalists. (4) Course may be repeated for credit under certain circumstances. Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: 100 and consent
of Instructor: An extension of Journalism 100 for students who seek additional instruction and practice in gathering, writing, and editing news, editorials and features. (F), Staff

110. Colloquium (Undergraduate). (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hours of lecture and discussion per week. Introduction to various branches of the journalistic profession by means of weekly meetings and discussions with the faculty of the School of Journalism and visitors. (F,SP) Taper

140. History of the American Press. (3) Three hours of lecture and discussion per week. How "news" has been defined, discovered and communicated from colonial times to the present. This survey places journalism in the context of American political institutions and foreign affairs. The course studies changing attitudes about free speech, privacy and equality in America. Students will do research on the role of the press in a campaign for political or social reform. (F) Leonard

141. The Mass Media and Society. (3) Three hours of lecture and discussion per week. Critical analysis of the structure and dynamics of contemporary mass media and their impact on society. (F,SP) Goldstein

151. Reporting as Literature. (3) Three hours of lecture and discussion per week. Study of selected works of outstanding writers for the American and European press from the eighteenth century to the present. (SP) Littlejohn

163. Propaganda and the Mass Media. (3) Three hours of lecture and discussion per week. A survey, beginning in the 19th century, of the origins and effects of attempts at mass persuasion. Shifting concepts of public opinion, propaganda and public relations will be analyzed. There will be substantial reading and writing assignments on the flow of information to Americans during wartime. (SP) Littlejohn

165. Legal Aspects of the News Media. (3) Three hours of lecture and discussion per week. Analysis of legal rights and restrictions on the news media, including prior restraint, fair trial/free press, libel, invasion of privacy, subpoena of reporters, access to meetings and judicial proceedings, copyright and broadcast law. (F) Taper

175. The Critical Review. (4) Three hours of lecture, discussion and field work per week. Prerequisites: Consent of instructor. Weekly written assignments, readings and discussion in the field of critical reviewing (books, films, drama, criticism). (F) Taper

180. Issues in Television Journalism. (3) Three hours of lecture and discussion and field work per week. An evaluation of television news and documentaries from 1950 to the present. Course will analyze local and national news programs, examine problems of journalism and the role of the FCC and the future of public television. (SP) Stern

184. Reporting of Public Affairs. (4) Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: 100 or equivalent and consent of instructor. Study of the practice in reporting news of city, county and state government. (SP) Staff

197. Field Study in Journalism. (1-2) Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised experience in the practice of journalism in off-campus organizations. Individual meetings with faculty staff and written reports required. See Additional Information, Field Study and Internships. (F,SP)

198. Directed Group Study in Journalism. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Seminar with three hours of lecture and discussion per week. Prerequisites: Total grade point average of not less than 3.0 and consent of instructor. (F,SP) Stern

199. Supervised Individual Study and Research. (1-12) Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised individual study and research. Prerequisites: Total grade point average of not less than 3.0 and consent of instructor. See Additional Information, Independent Study Courses. (F,SP)

Graduate Courses

200. Reporting the News. (5) Five hours of seminar and 12 hours of field work in news reporting per week; periodic tutorials. Required as prerequisite to advanced reporting and broadcasting courses. (F) Cohen, Farris, MacDougall, Taper

201. Advanced News Writing. (4) Three hours of seminar; eight hours of field work in news reporting per week; periodic tutorials. Prerequisites: 200 or consent of instructor. Advanced study of reporting in more complex subject areas and more sophisticated writing skills. (F,SP) Staff

205. News Editing. (2) Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture and laboratory per week, plus outside assignments and reading. Study of the principles and practice of news editing, copyediting, headline writing, and makeup, with later emphasis on creative editing and criticism of manuscripts. (F,SP) Colvin, Stemer

210. News Photography. (2) Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture and discussion plus four hours of laboratory per week. Prerequisites: Priority to journalism graduate students. Fundamentals of photography and taking news photographs. Field assignments. (F,SP) Light

224. Reporting on Social Issues. (4) New course. Three hours of lecture and six hours of field work per week. Prerequisites: For Journalism students, 200 or equivalent; for others, consent of instructor. Work on a selection of major social problems in contemporary society, acquaintance with current developments in the social sciences relative to the problems, exposure to contrasting views, and writing of articles that will aid public understanding. (SP) MacDougall

226. Science Writing. (4) Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: For journalism students, 200 or equivalent; for others, consent of instructor. Advanced study of reporting and critical writing in fields such as science, education, health, or the environment. (SP) Farris

227. Reporting of Cultural Events. (4) Three hours lecture and discussion plus six hours of field work per week. Prerequisites: For Journalism students, 200 or equivalent; for others, consent of instructor. Advanced study of reporting and critical writing in fields such as drama, film, music, fine arts, literature, and architecture. (F) Taper

228. Political Reporting. (4) Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: For Journalism students, 200 or equivalent; for others, consent of instructor. Study and discussion of politics and practice in reporting political events and campaigns. (SP) Stern

229. Science and Society. (3) New course. Three hours of lecture and discussion per week. Case studies in the interaction between scientific research and the wider community from the Greek atomists to twentieth-century cosmology and physics, with an emphasis on the development of ideas of importance to science writers today. Background in science welcome, but not required. (F) Taper

238. Business Reporting. (4) Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: For Journalism students, 200 or equivalent; for others, consent of instructor. Study of practices and operations in business, financial and consumer affairs. (SP) MacDougall

239. Reporting International Affairs. (3) Three hours of lecture and discussion per week. Study and analysis of techniques, practices, and production of news stories and news reports. Enrollment limited to 15. (SP) Drummond

240. History of American Journalism. (3) Three hours lecture and discussion per week. The social and political conditions that have shaped the American press from colonial era to present. (F) Leonard

242. Writing of Profiles, Personality Sketches, Short Biographies. (4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisites: 200 or consent of instructor. Study of biographical writing from Plutarch forward, and writing profiles under varying conditions. (F) Taper

245. Social Aspects of the Mass Media. (3) Three hours of lecture and discussion per week. Critical analysis of the mass media, discussion of problems of ethics and responsibility, and the production of several research papers. (SP) Goldstein

246. Ethical Issues in Journalism. (3) Three hours of lecture and discussion per week. Study and research in ethical problems of the working journalist, including conflicts of interest, questions of privacy, confidentiality of sources, withholding of news, relationships with the community and with authorities. (F,SP) Bagdikian, Geller

250. Investigative Reporting. (4) Three hours of lecture plus eight hours of field work per week. Prerequisites: 200 or consent of instructor. Study of investigative reporting, analysis of its technique with outside reporting assignments. (F) Weir

251. Reporting as Literature. (3) Three hours of lecture and discussion per week. A study of outstanding examples of journalistic literature. (SP) Littlejohn

252. Magazine Article Writing. (4) Three hours of lecture/discussion and eight hours of field work per week. Prerequisites: For journalism students, 200 or equivalent; for others, consent of instructor. Study and analysis of the techniques of writing and editing of articles for publication. (F,SP) Taper

253. Public Opinion, Propaganda and the Mass Media. (3) Three hours of discussion per week. Prerequisites: Consent of instructor. Study of techniques important to journalists from World War I to the present. Each student will do major research. (SP) Goldstein

257. Law for Journalists. (3) Three hours of lecture and discussion per week. Study of courts and procedure, libel, slander, copyright law, fair trial/free press, libel, privacy, subpoena of reporters, access, copyright, broadcast law, relationship of reporter to publisher. (F,SP)

258. Law for Legal Affairs Reporting. (3) Three hours of lecture and discussion per week. Prerequisites: Law for journalists. Seminar on the legal system and the practice of journalism. (F) Taper

275. Radio News Reporting. (4) Four hours of lecture and discussion and four hours of field and laboratory work per week. Study of techniques and methods of gathering and writing radio news. Students will produce weekly live radio news programs. Enrollment limited to 15. (SP) Drummond

282. Introduction to Television News. (4) Four hours of lecture and discussion; 15 hours laboratory per week and some field work. Study of the history and institutions of broadcast journalism (nine weeks), practice, techniques of reporting news for radio and television. (F) Stern

283. Reporting for Television. (5) Six hours of lecture and discussion; 24 hours of field work and laboratory work per week. Prerequisites: 282 and consent of instructor. Producing, directing, writing, and videotaping of live weekly television news program. (SP) Stern

284. Documentary News Films. (3) Three hours of lecture and 12 hours of laboratory and field work per week. Prerequisites: 200 or consent of instructor. Production of television documentary news programs. (F) Stern

297. Field Study in Journalism. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Students, working on theses and thesis projects. (RSP) Stern

299. Professional Project (Thesis) Seminar. (3) Must be taken on a satisfactory/unsatisfactory basis. Group meetings, plus individual project and final paper. Prerequisite: Consent of instructor. Seminar in methods of research, organization, and preparation of master's theses and professional thesis projects. Required of M.J. candidates working on theses and thesis projects. (SP) Stern

297. Field Study in Journalism. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Field study. Supervised experience in the practice of journalism in off-campus organizations.

*On leave, spring
+Racially active service
#Recipient of Distinguished Teaching Award
Landscape Architecture
(College of Environmental Design)

Department Office: 202 Wurster Hall, 642-4022
Chair: Randolph T. Hester, Jr., M.L.A.

Professors:
- E. Eckbo, M.L.A. (Emeritus) Landscape design, design
- Michael J. Carroll, M.C.P. Landscape design, design
- Alan B. Jacobs, M.C.P. Urban design and planning
- Louis C. I. Hiss, M.L.A. Landscape architecture, design
- John Cooper Marcus, M.A. (Emeritus) Social behavior
- Joe R. McBride, Ph.D. vegetation and ecological analysis
- Richard L. Meier, Ph.D. Third World environments, resource conservation
- Robert H. Trees, Ph.D. Regional planning assessment, theory
- Garrett Eckbo, M.L.A. (Emeritus) Landscape design, design
- William Garnett (Emeritus) Landscape photography
- Luanne M. Hest, Ph.D. (Emeritus) Landscape design, design
- Burton Lilton, Jr., M.L.A. (Emeritus) Visual analysis and aesthetics
- Willard Rosequist, M.A. (Emeritus) Videographics
- Robert J. Tewell, M.L.A. (Emeritus) Site planning, construction, graphics
- Francis Vocelich, B.S. (Emeritus) City planning and design

Associate Professor:
- Michael Southworth, Ph.D., M.C.P. Urban design

Assistant Professors:
- Paul E. Groth, Ph.D. American cultural landscapes, landscape theory and ideology
- Patrick J. Atten, M.L.A. Landscape design, historical design precedents
- Chet Kostlan, M.L.A. Landscape design and art, graphics

Lecturers:
- Russell A. Beaty, M.L.A. Urban forestry, horticulture and planting design

The Profession

The profession of Landscape Architecture plays an important role in solving environmental problems through design and planning. Professional practice includes design of public spaces for parks and recreation areas, schools, housing, and urban redevelopment projects; planning for conservation of open space and natural amenities; land management and development; and assessment of the impact of projects and programs on environmental quality and design of such projects to be environmentally compatible. Landscape design typically involves project programming and planning; site planning of buildings and building complexes; and the analysis, planning, and detailed design of public and private exterior spaces and landscapes. It requires an understanding of visual and social factors, plant materials, construction technology, and ecology.

Environmental planning is concerned with the larger context of natural and urban environments including the study of ecology, conservation planning, environmental law, resource development, computer applications, recreation planning, and urban open space and transportation systems.

Undergraduate Program

The four-year curriculum leading to the A.B. degree in Environmental Design with a major in Landscape Architecture can provide general education in environmental design or select professional preparation for subsequent graduate education or entry-level work in the field. The A.B. degree is approved by the California licensing board; students who earn the degree will become eligible to take the state examination after fulfilling a two-year apprenticeship under a licensed landscape architect. The Department's only professional degree, accredited by the American Society of Landscape Architects, is the Master of Landscape Architecture. Undergraduate professional accredited landscape architecture degrees are available at other educational institutions.

Required core courses represent a minimum basic coverage in theory, design, and technology, but the program provides an opportunity to study more intensely all aspects of landscape architecture, including landscape analysis and planning, urban design, recreation, site design and development, graphics, construction, and planting design. For more complete information, see the Announcement of the College of Environmental Design. For courses offered in summer session, see the Summer Session Catalog.

Graduate Program

The Master of Landscape Architecture Degree

The Master of Landscape Architecture degree is a professional degree accredited by the American Society of Landscape Architects. The program offers advanced work in landscape architecture from the scale of detailed form to that of the regional landscape. A common core of courses in the department is required of all students, emphasizing the relationship between the environmental planning aspects of the field. This core group forms the foundation for extended course work in landscape design, urban and community design, and environmental planning.

Current faculty research and professional involvement include: impact and planning analysis, climatic factors and design, environmental simulation, landscape visual and scenic assessment, ecology and plant selection, hydrology and planning, coastal zone planning and design, urban and community design, urban forestry, and community participation in design and planning.

Concurrent Program in Urban Design and Environmental Planning

The departments of Landscape Architecture and City and Regional Planning jointly offer a program of studies in urban design or in environmental planning, leading to both the Master of Landscape Architecture and Master of City Planning degrees. Applicants must be admitted separately by both the Department of Landscape Architecture and the Department of City and Regional Planning.

The usual procedure is for applicants to apply to either department, and then submit an application to the other department by January 15 of the first academic year in residence. Acceptance into a joint program is not automatic and is limited to outstanding applicants.

The Ph.D. Degree in Environmental Planning

The Doctor of Philosophy program in Environmental Planning has a core field of environmental planning and design with "natural" and "social" minor fields. It is aimed toward the education of teachers, researchers, and advanced professionals in the fields of landscape architecture, urbanism and regional planning. Applicants come from a variety of fields other than landscape architecture, including geography, forestry, earth science, environmental studies, city planning and architecture. They must present outstanding academic records that most applicants will have completed a professional degree or other master's degree before entering.

Students with only a bachelor's degree should apply to the M.L.A. program first, or otherwise complete an appropriate master's degree before application. For information about this program please consult the Graduate Secretary, Department of Landscape Architecture, 202 Wurster Hall.

For more detailed information about the graduate program, consult the Announcement of the College of Environmental Design and the graduate advisers in the Department of Landscape Architecture.

Upper Division Courses

100. Landscape Architecture Studio I. (4) Two hours of lecture and six hours of studio per week. Prerequisites: ED 110 and upper division studio problems in landscape architecture; the design process and sources of form. (SP)

101. Landscape Architecture Studio II. (4) Two hours of lecture and six hours of studio per week. Prerequisites: LA 100 and ED 110B. Intermediate studio problems: ecological, functional, and social systems in site design. (F)

102. Landscape Architecture Studio III. (3) Two 1-hour lectures and two 2-hour studios per week. Prerequisites: 101 and two 2-hour studios in landscape architecture. (SP)

103. Landscape Design for the Neighborhood. (3) Course may be repeated once for credit. Two 1-hour lectures and four 2-hour studios per week. Prerequisites: 101. The relationship of phytophysiology, cultural factors, function, and landscape quality to land use planning and community form. Offered every other year; alternates with 106. (F)

110. Ecological Analysis. (4) Formerly 11 and 11L. Students who have taken 11 and 11L may not receive credit for 110. Three 1-hour lectures and four 2-hour studios per week. Prerequisites: Botany 10 or equivalent. Fundamentals of plant growth, nomenclature and definition of ecological concepts. Interaction of climate and soils; historic and contemporary uses of plants in design; plant design principles. (F)

111. Field Identification of Landscape Plants. (2) Two 3-hour field laboratory per week. Prerequisites: 111 (concurrent or prior) or consent of instructor. Field identification and identification of plants most suitable for use in central California. Individual graphic exercises in field observation of plants; plant composition and growth. (SP)

112. Landscape Horticulture (Special Schedule Course). (2) Two 3-hour workshops per week for 10 weeks. Prerequisites: 111 and 111L; Botany 10 or equivalent. Horticultural techniques for landscape installation and maintenance including planting and early care of shrubs, annuals, perennials, and turf grasses, disease and pest management. Personalized System of Instruction course. (SP)

113. Regional Landscape Plants (Special Schedule Course). (2) Two 3-hour field laboratories per week for seven weeks. Prerequisites: 111 and 111L. Field observation and identification of native and introduced plants for landscape design; emphasis on water conservation, ecological adaptation and landscape management. Individual graphic exercises on selected species. (SP)

120. Topographic Form and Design. (4) Two 1-hour lectures and six hours of studio per week. Recommended: Civil Engineering 86, Theory, methodology,
121. Design of Landscape Structures. (F) Formerly LA 121 and LA 121L. Students who have taken LA 121 or LA 121L may not receive credit for LA 121. Two hours of lecture and two hours field work per week. An exploration of wildlands as a landscape resource, stressing visual composition as a base to which forestry and resource management decisions may be given form and relationships through design. (F) Staff

130. Introduction to Landscape Architecture. (3) Three 1-hour lectures per week. Survey of landscape architecture as it has evolved as an expression of people, time, scale, and function. Includes: rural and public open spaces. Land use planning and environmental protection. Discussion of design process and planning methods, materials, and techniques of professional practice. (F) Staff

131. Design Implications in Forestry and Resource Management. (2) Two hours of lecture and two hours field work per week. An exploration of wildlands as a landscape resource, stressing visual composition as a base to which forestry and resource management decisions may be given form and relationships through design. (F) Staff

134. Advanced Graphics for Landscape Architecture. (3) Two 3-hour studios per week. Prerequisites: 201, 220, 230, or consent of instructor. Freerhand and formal perspective approaches to graphic representation of design concepts. Pencil, ink, and color media. (SP) Staff

140. Social and Psychological Factors in Open Space Design. (3) Three hours of lecture and one hour of discussion per week. User-oriented approach to design, post-occupancy evaluation as a tool for understanding use of designed open spaces. Design as a communication process. Environmental needs of vulnerable populations—children, elderly, disabled, low-income families. Personal and societal environmental values. (F) Marcus

150. History and Literature of Landscape Architecture. (3) Two 1½-hour lectures per week. Developmental history of landscape design practice; relationships to society, climate and topography. (SP) Staff

160. Field Study in Landscape Architecture. (2-3) Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Field study of landscape architecture in regular individual meetings with faculty and outside mentor. Reports required. (F,SP)

180. Directed Group Study. (1-4) No more than four units in any one semester. Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Enrollment restricted by rules listed on pages 81 and 82 of this catalog. (F,SP)

190. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Enrollment restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

See Environmental Design course listings for description of required environmental design courses for landscape architecture majors.

Graduate Courses

200A. Introduction to Landscape Design. (4) Two 4-hour studios per week. Prerequisites: 201, 220, 230, or consent of instructor. Investigation of the design process and sources of form in Landscape Architecture. Investigation of spatial composition and use of landscape media in the solution of design problems. (F) Staff

200B. Urban Landscape Design. (4) Two 4-hour studios per week. Principles and determinants of social factors as inspiration for three-dimensional form in the design of landscape spaces. Investigation of spatial composition and arrangement of topography, construction materials, and plant materials in a variety of spaces as users relate to them. Introduction to community design, design by hypothesis, and use performance criteria. (SP) Hester

201. Problems in Site and Environmental Planning. (4) Two 4-hour studios per week. Prerequisites: 220, 230. Problems in planning and design at the site and regional scale emphasizing the influence of natural, physical, and social factors. (SP) Staff

202. Advanced Landscape Design. (4) Two 4-hour studios per week. Prerequisites: 208 or consent of instructor. Landscape design for a complex project through comprehensive analysis of program, user characteristics, region, and site. Technical and compositional refinement of project design, construction, and planting. (F) Southworth

203. Environmental Planning Studio. (3) Two 3-hour studios per week. Prerequisites: 201 or consent of instructor. Application of environmental planning principles to a complex problem; one 4-hour laboratory per week. Techniques and criteria and desired land uses in a complex in situ solution and political setting. Student teams will identify needed data, assess environmental and developmental problems, weigh competing uses, and prepare an environmental management plan. (SP) Staff

213. Landscape Planting Design. (4) Two 4-hour studios per week. Prerequisites: 211, Advanced problems in design investigated in terms of plant selection, planting design, and implementation on specific sites. (SP) Staff

220. Natural Factors in Planning and Design. (3) Two 1-hour lectures and two 2-hour laboratories per week. General interpretation of physical and natural processes in land planning; use of inventories in geology, soils, vegetation, wildlife, and water; links with visual aspects; synthesis for planning. (F) Staff

221. Quantitative Methods in Environmental Planning. (3) One 1½-hour lecture and one 3-hour laboratory per week. Discussion and critique of the application of quantitative methods to environmental assessment, analysis, and application in environmental planning. Topics to include geographical information systems and other bases, remote sensing, and multivariate analysis. This course emphasizes computer applications and data analysis. (F) Staff

222. Hydrology for Planners. (3) Two 1-hour lectures and one 2-hour laboratory per week. Relation of rainfall to runoff, development of the storm hydrograph; effects of urbanization on flood potential; flood frequency; effect of man's activities on runoff. (SP) Staff

223. Introduction to California Landscapes. (1) Must be taken on a pass/no pass basis. One hour of lecture/discussion per week plus two field trips (total of four days). Introduction to the ecology, visual characteristics, land use, and design history of the major landscape regions in California. (SP) McBride, Laurie

224. Vegetation Analysis and Management. (3) Two 1½-hour lectures per week. The analysis and assessment of vegetation for landscape design and environmental planning. Management of vegetation in parks, nature reserves, and open space areas. (F) McBride, Beatty

225. Urban Forest Planning and Management. (3) New course. Must be taken on a satisfactory/unsatisfactory basis only. Two hours of lecture and 4 hours of laboratory per week. Introduction to the field of urban forestry, its history and role in contemporary towns and cities. Emphasis on planning and management of the urban forest, restoration of old parks, street trees, and community participation. (F) McBride, Beatty

226. Landscape Design Construction. (3) Two 3-hour studios per week. Prerequisites: 120 and 120L. Advanced problems in landscape design investigated in terms of construction details, land alteration, and implementation on specific sites. (SP) Staff

230. Communications in Landscape Architecture. (3) Two 3-hour studios per week. Discussion of the theory and practice of communication in landscape architecture with primary emphasis on graphic presentation, but also including photography, videography, workshop, the spoken and written word, reports, and models. (F) Staff

232. The Landscape As A Visual Resource. (3) Two 1½-hour lectures per week and two field trips (total of three days). Visual analysis of wildlands landscapes, procedures, problems in landscape design, and design policy development, especially related to public wildlands. (SP) Staff

233. Environmental Law and Resource Management. (3) Two 1½-hour seminars per week. Prerequisites: Consent of instructor. An introduction to the legal and institutional requirements, environmental impact assessment, permit systems for development control, pollution control, natural resources planning law. (SP) Staff

234. Computer Graphics in Landscape Architecture. (SP) Two 1½-hour lectures and one 2-hour laboratory per week. Introduction to the use of computers in landscape design; covers applications in computer mapping and graphics; landscape construction; planting design, and data base management; data problems using computer hardware and software in central campus and departmental computing facilities. (SP) Staff

235. Environmental Simulation and Public Communication. (2-4) Two hours of lecture and six hours of laboratory per week. Introduction to the theory of experimental simulation; criteria for a good presentation; case studies in the use of models and media in citizen participation and environmental design; instruction in modeling, slide photography, video-taping, use of the environmental simulation in film-making, script writing, and presentation design. Exercises and projects. (SP) Bossenmann

236. Advanced Seminar in Landscape and Environmental Planning. (3) Course may be repeated for credit. Two 1½-hour seminars per week. An intensive seminar investigating issues and topics in landscape and environmental planning; with emphasis on critical examination of policy and design issues and the development of policies and design principles for more effective technical planning and public participation. (SP) Staff

237. The Process of Environmental Planning. (3) Two 1½-hour lectures per week. Prerequisites: 233 or consent of instructor. A review of the techniques used in environmental planning. Emphasis on models of implementation in varying environmental and political circumstances. The class will examine and critique a number of well-known environmental planning programs and plans. Lectures and discussion will deal with recurrent planning problems, such as the limitations of available data, legal and political constraints on plans, conflicts among specialists. (F) Staff

238. Environmental Policy Planning. (3) Two 1½-hour lectures per week. Collective intervention into the living environment. How is action taken? Effects upon quality of life measures. Advanced planning methods, including risk management and principles of preservation. Discussed approaches to stable state and resource-conservation policies. Employment and ecology policy compatible with conservation policies. (F) Staff

239. Public Land and Resource Planning and Administration. (3) Three hours of lecture/discussion per week with occasional seminars. Prerequisites: CRS 130 or graduate standing. History and institutions, legislation, case law, and federal/state relations vis-a-vis planning for major public resources: wilderness, wildlife, recreation, timber, water, and minerals. Analysis of U.S. Forest Service planning will be critical in interpreting legal mandates, planning practice, and developments in resource management and planning. Occasional laboratories will provide opportunity for formal and informal discussion with planning professionals. (SP) Staff

250. Faculty Research Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis only. One 1½-hour seminar per week. Examination of current status and future scope of professional practice and research in...

*On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award

Landscape Architecture / 231
landscape architecture and environmental planning. 

251. History and Theories of Landscape Architecture and Environmental Planning. (2) One 2-hour seminar every other week. Investigation of the major ideas in landscape architecture and environmental planning. Review of history and theory from the classical and contemporary literature. Topics may include: ecological determinism, rationalism, ethics, social and economic values, limits, aesthetics, preservation/conservation, and the role of the professional. 

252. Thesis and Professional Project Research Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar every other week. Consideration of alternative methods and strategies for the development of research and research proposal for the thesis or professional project. 

255. Supervised Research in Landscape Architecture and Environmental Planning. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Graduate standing and appointment as a research assistant. Supervised teaching experience in undergraduate courses. Regular meetings with faculty sponsor. 

256. Directed Dissertation Research. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Graduation and appointment as a research assistant. Supervised teaching experience in undergraduate courses. Regular meetings with faculty sponsor. See departmental sheet for other limitations. 

260. Professional Practice Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week for eight weeks. Professional methods and approaches in the practice of Landscape Architecture. Contracts, specifications, agreements, management and organization. Contrast between practices in the private and public sectors. Visits to professional offices. 

270. The Urban Park. (2) Formerly 291A. Students who have taken 291 may not receive credit for 270. Two hours of seminar and discussion per week. Review of the origins and development of the public park as a component of cities. Particular emphasis will be given to contemporary inquiry into the role of changing uses and expectations, and future directions. 

295. Supervised Research in Landscape Architecture and Environmental Planning. (2) Course may be repeated for credit. Any combination of 295 or 297 may be taken for a total of six units maximum toward the M.L.A. degree. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Graduate standing and appointment as a research assistant. Supervised experience on a research project in landscape architecture and environmental planning. Regular meetings with faculty sponsor required. See departmental sheet for other limitations. 

296. Directed Dissertation Research. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Advancement to Ph.D. candidacy. Course open to qualified students who have been advanced to candidacy for the Ph.D. degree and are directly engaged upon the doctoral dissertation. 

297. Supervised Field Study. (2-3) Any combination of 295 or 297 may be taken for a total of six units maximum toward the M.L.A. degree. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Graduate standing and consent of instructor. Supervised experience relative to specific aspects of practice in landscape architecture and/or environmental planning. Regular meetings with faculty and outside sponsor as well as final report required. See departmental information sheet for other limitations. 

298. Group Study. (1-4) Course may be repeated for credit. Hours to be arranged. Special group studies. Topics to be announced at the beginning of each semester. 

299. Individual Research. (1-6) Course may be repeated for credit. Hours to be arranged. Prerequisites: Graduate standing and consent of instructor. Research work conducted preparatory to completion of the thesis or professional project as well as other approved research. A maximum of six units will be counted towards the M.L.A. degree. The six units allows for four units maximum for thesis or professional project research, and two units maximum for other approved research. See departmental information sheet for other limitations. 

601. Individual Study for Master's Students. (1-6) Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Last semester of residence in M.L.A. program. Individual study for final degree requirements in consultation with advisor. 

602. Individual Study for Doctoral Students. (1-6) May not be used for unit or residence requirements for the doctor's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: For candidates for the doctor's degree. Individual faculty in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. 

Professional Courses 

300. Supervised Teaching in Landscape Architecture and Environmental Planning. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Graduate standing and appointment as a graduate student instructor. Supervised teaching experience in undergraduate courses. Regular meetings with faculty sponsor. See departmental sheet for other limitations. 

Interdepartmental Studies Courses 

Graduate Courses 

IDS 235. Community Scale Energy Systems. (3) Two 1½-hour lectures/discussions per week. Prerequisites: Consent of instructor. Energy supply at the community scale. Introduction to energy resources (solar, wind, biomass). Architecture, site planning and urban development; review of conservation and supply technologies. For students in design, planning, energy, public policy, and related fields. Term project. Sponsoring department: Architecture, Landscape Architecture and Energy Resources Group. 


IDS 249. Urban Design in Planning. (3) Three hours of seminar and discussion per week. Prerequisites: Consent of instructor. This seminar will focus on urban design in the planning process, the role of environmental surveys, methods of community involvement, problem identification, goal formulation and alternatives generation, environmental media and presentation, design guidelines and review, environmental evaluation and impact assessment. Case studies. Sponsoring departments: City and Regional Planning and Landscape Architecture. 

Related Courses in Other Departments 


Latin American Studies (College of Letters and Science) 

Undergraduate Group Major in Latin American Studies 

Group Major Office: Department of Spanish and Portuguese, 4319 Dwelling Hall, 642-0741 

Adviser: Arthur L. Ashkins (Spanish and Portuguese). 

The group major in Latin American studies is designed to present a balanced curriculum of the history, culture, and environment of Latin America for students wishing a broader perspective of the area than is usually available through a departmental major. This program may be of particular interest to (1) students desiring a general education focused on the Latin American cultural regions; (2) students planning to enter business, government, or international agency service; and (3) students preparing to teach social science or language. 

Lower Division. Spanish 1, 2, 3, 4 (or equivalent) or Portuguese 1, 2, 3, 4 (or equivalent); History 8A-8B. 

Upper Division. A minimum of 30 upper division units, but not more than 36, distributed as follows: Spanish 104A-104B or Portuguese 104 and 128; two appropriate upper division courses in the department of History; and five upper division courses, at least two of which must be in a single field other than History, Portuguese or Spanish, as approved by the advisor. 

List of approved courses: Anthropology 123, 124, 125, 175, 176, 177, 179; Geography 131, 154, 155, 156, 157, 158; History 101A, 101B, 101C, 101D, 141A, 141B, 142, 143, 144; Music 137; Political Science 148A, 148B; Portuguese 102, 104, 114, and 128 (if not included in core courses), 134 (when topic is appropriate), 150; Spanish 100, 102A-102B, 104A-104B (if not included in core courses), 113, 114, 125, 130, 131, 135 (when topic is appropriate), 138, 144, 185 (when topic is appropriate). 

Note: Beyond the basic list given above, any special topical class or special course other than 199 may be approved by the adviser as an elective if the subject matter is appropriate. 

Honors Program. With consent of the group major adviser, a student with an overall grade-point average of 3.0 or higher and a grade-point average of 3.3 or higher in courses completed in the major may apply for admission to the honors program. Students accepted in the honors program will enroll in Latin American Studies H195 for the preparation of a senior thesis. 

Graduate Programs 

Graduate Group Office: Center for Latin American Studies, 2334 Bowditch Street, 642-0381 

Advisers: David Hayes-Bautista (Public Health), Canciole Slater (Spanish and Portuguese/Comparative Literature), Michel Laguerre (Afro-American Studies), Alex Saragoza (Chicano Studies). 

Master's Degree. The M.A. program in Latin American Studies provides an opportunity for interdisciplinary work on Latin America at the immediate post-baccalaureate level. Candidates must have a bachelor's degree, a reading knowledge of either Spanish or Portuguese, and adequate grade standing. Applicants from the United States must take the Graduate Record Examination (GRE) aptitude tests. Foreign students must achieve a minimum score of 550 on the Test of English as a Foreign Language (TOEFL). A high score on the TOEFL is desirable. Samples of written work must also be submitted. Admission is limited by the number of places allotted to the program.
must be taken. The language requirement for Latin American Studies is intended for more advanced students with unusually strong academic records and a high degree of intellectual maturity and independence. Students in this program have well-defined interdisciplinary interests that do not fit within the boundaries of the departments, and in most cases they do not plan to pursue traditional academic careers. Due to the limited number of places allotted to the program, only very few students can be admitted in any given year. Candidates must have a master's degree or have completed equivalent graduate study. This previous graduate work need not be in Latin American studies but should be clearly related to the proposed program of study. GRE scores, TOEFL scores when appropriate, and samples of written work must be submitted by candidates for the Ph.D. degree.

Students in the Ph.D. program concentrate their work primarily in three or four departments. Courses in these departments should be selected in consultation with a faculty adviser within each department. The language requirement for the degree is a high level of proficiency in reading, speaking, and writing Spanish or Portuguese, a strong reading and speaking knowledge of the other of the two languages, and a reading knowledge of a third language chosen in consultation with an adviser. Upon successful completion of the examinations, students will be admitted to candidacy and will prepare a doctoral dissertation under the guidance of a three-member faculty committee.

Upper Division Courses
H195. Honors in Latin American Studies. (3) Individual courses. Prerequisites: Senior standing with a minimum of 3.3 in the major, and 3.0 in all work completed in the University. Consent of group major adviser. Honors thesis. (F,S) Staff

Graduate Courses
200. Latin American Studies Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 11-hour lecture per week. Prerequisites: Consent of instructor. Mandatory for Latin American studies graduate students. Seminars by faculty and advanced graduate students on their current research on Latin America. (F,S)

209. Field Methods for Research in Latin America. (4) Three hours of seminar and one hour of individual consultation per week. Prerequisites: Consent of instructor. Field methods and techniques, emphasizing Latin American research. Propositional research design, ethical considerations, interviewing, participant observation, quantitative methods, analysis and write-up of field data. Supervised field exercises. (F,S) Staff

Law
(School of Law)
Office: 225 Boalt Hall, 642-1741
Dean: Jesse H. Choper, B.S., LL.B., D.N.U.H.

Professors:
- Thomas G. Barnes, A.B., Ph.D. European Legal History
- Stephen R. Barnett, A.B., LL.B. California Supreme Court, Criminal law
- Babette B. Barton, B.S., LL.B. Taxation
- Robert C. Berring, B.A., J.D., M.L.S. (Law Librarian and Dean, School of Library Information Studies)
- Richard M. Barabam, A.B., LLM. Corporations, International business transactions
- Robert H. Cole, A.B., LL.B. Constitutional law, torts
- John E. Coons, B.A., J.D. Law and Education, contracts
- Robert Coolen, B.A., Ph.D. Law and economics, financial institutions
- James E. Crawford, A.B., LL.B., A.M. Bankruptcy, contracts
- Marjorie M. Shultz, B.A., M.A.T., J.D. Biomedical ethics, legal process
- Martin M. Shapiro, A.B., Ph.D. Administrative law, procedures
- Malcolm E. Feisley, B.A., Ph.D. Court reform, criminal justice
- David E. Feiler, B.A., LL.B. (John H. Boalt Professor)
- William A. Fletcher, B.A., J.D., Federal courts, administrative law
- Caleb Foote, M.A., LL.B. (Elizabeth Josselyin Boalt Professor)
- James R. Gornaley, B.A., M.A., B.J.D. Civil Law, comparative law
- Edward C. Halbach, Jr., B.A., LLM., LL.D. (Walter Perry Johnson Professor) Estate and gift taxation, trusts and estates
- John R. Hiltland, B.S.L., J.D. Real estate law
- Ira Michael Heyman, B.A., J.D. (Chancellor) Environmental law, land use
- Philip E. Johnson, B.A., J.D. Criminal law and criminal procedure
- Thomas M. Jordan, B.A., J.D. Antitrust
- Sanford H. Kadish, B.A., B.S., LLB. (Alfred F. and May T. Morrison Professor) Criminal law, jurisprudence
- Herman Hyll Kay, B.A., J.D. Conflict of laws, family law, sex discrimination
- Kristin Luna, A.B., Ph.D. Federal Income tax, Federal Taxation
- Sheldon L. Meselinger, B.A., M.A., Ph.D. (Chair, Jurisprudence and Social Policy Program) Criminal sentencing, prisons
- Paul MathiHEN, A.B., B.L. (Emeritus) S. Helper Professor) Constitutional law, courts, judicial process
- Michael S. Moore, B.A., J.D. Jurisprudence, law and society
- John T. Noonan, Jr., Ph.D., LL.B. Jurisprudence, legal theory
- Kenneth P. Phillips, B.A., LL.B. (Adjunct Professor) International economic development
- Daniel Rubinfield, B.A., M.S., Ph.D. Law and economics, public finance
- Joseph Saw, A.B., B.J.D. Indian law
- Harry N. Schaefer, B.A., Ph.D., B.J.D., M.P.H., B.S. American legal history, law and technology
- Philip Silver, B.A., M.A., Ph.D. Property
- Martin J. Shapiro, A.B., Ph.D. Administrative law, constitutional law
- Marjorie W. Shulman, B.A., M.A., TAT. B.J.D. Biomedical ethics, contracts
- Jerome H. Skolnick, B.A., M.A., Ph.D. Police practices, criminal justice
- Michael E. Smith, B.A., M.A., J.D. Church and state, constitutional law
- Priscle Stroz, A.B., Ph.D. Administrative law, judicial administration, legal education
- Stephen D. Sugarman, B.A., B.J.D. Education law, social welfare legislation, torts
- Lawrence A. Sullivan, A.B., B.J.D., Antitrust, European Economic Community
- Justin Sweet, B.A., LL.B. Constitutional law, contracts
- Jan Vetter, B.A., LL.B. (Associate Dean) Labor law, civil procedure
- Jeremy Waidron, D.Phil. Political theory
- Franklin Zimmer, A.B., J.D. (Director, Earl Warren Legal Institute) Criminal justice, family law
- Bernard L. Diamond, A.B., M.S. Psychiatry and law
- Caleb Foote, M.A., LL.B. (Elizabeth Josselyin Boalt Professor) (Emeritus/Richard W. Jennings, M.A., J.D. (James W. and Isabel Coffman Professor) Emeritus)
- Frederick Kessler, Dr. Jur., M.A. (Hon.) (Emeritus) Contracts
- Adrian A. Krag, A.B., J.D. (Shannon Cofin Turner Professor) (Emeritus) Taxation
- Stefanie Waidron, A.B., B.S. (Emeritus) (Emeritus) Taxation
- Stephanie Georg, P.C. Diplom in Law, J.V.D. (Emeritus) Jurisprudence
- William T. Latham, B.A., J.D. (Emeritus) Contracts, bankruptcy
- Vadim Mostovsky, M.A., M.S., Dr.Jur. (Law Librarian) Emeritus
- Stefan A. Riesenfeld, Dr.Jur., B.S., Dott in gur., S.J.D. Dr. Jur. (Emeritus) Emeritus
- Bankruptcy, international law, jurisprudence
- Philip Senzon, M.A., B.A., Ph.D. (Emeritus) Emeritus
- Law and sociology, jurisprudence

*Not offered 1988-89
*On leave, spring
*On leave, fall

Programs
For a description of the graduate programs in law, see page 71.

Explanation of Course Numbering System
The following list indicates the courses usually offered each academic year, although changes in instructors and course offerings are often necessary. After the title of each course is the credit value in semester units in parentheses, and a brief description of the subject matter.

1. Courses are listed alphabetically, with two exceptions: courses numbered 200 to 205, and special programs are numbered 295 to 299.

2. Courses that substantially are the same (although the emphasis or the number of units may differ) are given the same number, but a different identifying number following a hyphen.

3. Where no integer number is available at the place in the list at which a course belongs, the preceding number is assigned followed by a decimal point and another number.

4. Two-semester course is indicated by letters (e.g., 1994, 2035). Unless otherwise indicated, completion of the A part of the course is a prerequisite to taking the B part.

For further information and admission requirements of the School of Law, see the Announcement of the School of Law, available without charge from the Law School Admissions Office, 220 Boalt Hall, Berkeley, CA 94720.

Graduate Courses
First Year
The first semester program is composed of four prescribed courses. Three of the classes are in large sections with approximately 110 students in each. The fourth is a small section of 25 to 30 students. In the second semester, four courses are prescribed and there are large sections and small sections in each of the first-year courses except Law 205 which is all small sections.

200A-200B. Civil Procedure. (3,3) Credit and grade to be awarded upon completion of the sequence. The principles of pleading under the code system and the federal rules; modern trial practice, including venue, process, the jury, sufficiency of evidence, instructions, verdicts, new trials, judgments; appellate procedure. (F-S)

201. Constitutional Law. (3) An introduction to the subject covering judicial review and the judiciary, federalism, separation of powers and substantive due process. (SP)

202A-202B. Contracts. (3,3) The law of contracts, dealing with the problem of formation, operation, and termination. (F-S)

203. Criminal Law. (4) (F)

205. Property. (4) (SP)

204. Torts. (5) The law of civil injuries, including both intended and unintended interference with personal and property interests as well as liability without fault. (F)

205A. An Introduction to the Legal System and Legal Analysis. (2) Credit and grade to be awarded upon
237. EEC Competition Law. (2) A basic introduction to the competition law of the European Community. Some stress will be placed on aspects which differentiate the EEC competition law, such as community law emphasis on vertical restraints (as opposed to horizontal mergers). This course will provide a broad basis for understanding the fundamental tools of economic analysis. Students will be expected to understandable the principles of microeconomics as they help one to evaluate the effect of legal institutions on the allocation of resources in contemporary, Rubinfeld

238. Criminal Law and Procedure. (3) A study of criminal Law and Procedure with an emphasis on arrest, search and seizure, electronic eavesdropping, interrogation, identification, entrapment, pretrial motions and hearings, plea bargaining, jury trial and double jeopardy. (F)

239. Economics and Public Policy Analysis. (3) This course will provide a broad basis for understanding the fundamental tools of economic analysis. The focal point of discussion will be the principles of microeconomics as they help one to evaluate the effect of legal institutions on the allocation of resources in contemporary, Rubinfeld.

240. Immigration Law and Practice. (2) This course considers the combination of special administrative pro-

241. Criminal Procedure. (3) A survey of criminal trial and pretrial procedure. Topics include: an introduction to arrest, search and seizure, electronic eavesdropping, interrogation, identification, entrapment, pretrial motions and hearings, plea bargaining, jury trial and double jeopardy. (F)

242. Economics and Public Policy Analysis. (3) This course will provide a broad basis for understanding the fundamental tools of economic analysis. The focal point of discussion will be the principles of microeconomics as they help one to evaluate the effect of legal institutions on the allocation of resources in contemporary, Rubinfeld.

243. Immigration Law and Practice. (2) This course considers the combination of special administrative pro-

244. Business, Law and Ethics. (3) A modestly introductory course, reflecting the view that conventional analysis of professional duties and rules does not provide an adequate basis for personal responsibility for one's conduct in a professional role. Its purposes are to introduce students to the Graduate School of Business. (SP)

245. Criminal Procedure. (3) A survey of criminal trial and pretrial procedure. Topics include: an introduction to arrest, search and seizure, electronic eavesdropping, interrogation, identification, entrapment, pretrial motions and hearings, plea bargaining, jury trial and double jeopardy. (F)

246. Economics and Public Policy Analysis. (3) This course will provide a broad basis for understanding the fundamental tools of economic analysis. The focal point of discussion will be the principles of microeconomics as they help one to evaluate the effect of legal institutions on the allocation of resources in contemporary, Rubinfeld.

247. Immigration Law and Practice. (2) This course considers the combination of special administrative pro-
and constitutional law that is called immigration law. (F) Blum

2501A. Income Taxation I. (4) A study of statutory, judicial, and administrative material constituting the federal income tax as applicable to the individual. (F) Dewey, Peterson

250B. Income Taxation II. (3) Prerequisites: 250A. Continuation of the study of federal income tax, with emphasis on the taxation of business enterprises, including partnerships and corporations, and other financial intermediaries. (SP) Barton

255. Insurance Law. (2) Attention will be focused upon materials which expose the arcane and almost unintelligible language of the insurance policy. Also, it will be important to explore the function of insurance in the carrying out of specialties of risk, and the development of standardized policies. The approach will be from the perspective of the practitioner asked to review policies, present claims or defend claims. Visitors will be used as time permits to outline recent practice and industry developments. (SP) Sweet

2514. International Human Rights: Problems of Law and Policy. (2) The problems studied will be based on those set out in the Litch-Newman coursebook, published in 1976. Account will be taken of significant developments since 1976 that include (1) markedly increasing use of international human rights laws in state and federal courts, and (2) markedly more militant concern on the part of the United Nations and other transnational forums. (F,SP)

2515. International Law. (3) The basic rules governing the international community, including the rules of customary law as well as the Law of Treaties. Special attention is given to modern developments such as the role of the sea, protection of the environment, and the abatement from the force of war. The emerging role of the UN as a principal factor in the lawmaking process. (F) Baron

254. Jurisprudence. (3) A critique of the main trends of contemporary jurisprudence. The use of analogs, models and understanding for law. The place of persons in an account of law. The relationship of law to love. (F,SP) Nonet

2542A-2542B. Jurisprudence and Social Policy Seminar. (3-3) A two-semester seminar required for all students in the Graduate Program in Jurisprudence and Social Policy. Through intensive reading and discussion this seminar will establish the scope of the field of jurisprudence and social policy for degree candidates. The course will provide students with an understanding of theoretical and empirical materials and will acquaint them with options for specialization. There will be one 2-hour meeting each week. Enrollment will be limited to students in the Jurisprudence Program. (F,SP)

254A. Jap: Readings in the Literature Seminar. (3)

254B. Jap: Readings in the Literature Seminar. (3)

255.1. Labor Law. (3) The law governing relations between employer and employee and the impact of state and federal legislation in the area of collective agreement, the strike, the boycott, and picketing. (F,SP) Feller

2572. Land Use Planning and Control. (3) This course will provide understanding in planning and controlling the use of land, with particular emphasis on local and regional efforts. Topics will include comprehensive land-use plans, zoning, subdivision controls, aesthetic regulation, the regional obligations of municipalities, and constitutional issues raised by land-use regulation. (SP) Peterson

2675. Professional Responsibility. (2) A study of the legal profession and of many of the ethical decision-making problems which the lawyer is likely to encounter in a large variety of areas. Emphasis is given to the origin and organization of the practice, to the right of the citizen to competent counsel, duty to counsel, the limits of the adversary system and to the differing roles of the function of counsel, negotiation advocate, judge and teacher. (F) Bundy, Noonan

268. Property. (4) This is a required course. An introduction to the law of real property, including estates and other interests in land, real property marketing and conveyancing, land-use control, and landlord-tenant problems. (SP) Soro

2701. Remedies. (3) The function of awarding remedies, the various types of remedies that can be awarded and their usefulness, and the extent to which legal rules established by legislatures are increasingly regulatory remedies. The types of remedies which will be discussed include money damage awards, including expectation and restitution, and the efficiency of equitable remedies such as injunctions and specific performances. (SP) Peterson

272A. Securities Regulation. (2) Prerequisites: Law 218A, 218B (Corporations) or their equivalent. Law 272B is not a prerequisite. This course concentrates on the regulation of the distribution of securities under the Securities Act of 1933 and its state Blue Sky laws, including the registration under the 1933 Act, practice before the Securities and Exchange Commission, and the underwriting process of certain distributions of securities. (F) Soro

272B. Securities Regulation. (2) Prerequisites: Law 218A, 218B (Corporations), or their equivalent. This course concentrates on the regulation of trading of securities on stock exchanges and in the over-the-counter market; disclosure obligations in securities transactions; broker-dealer regulation; insider trading under state and federal laws; civil liabilities under state, and federal securities acts, including responsibilities and liabilities of attorneys, accountants, and other professionals. (F,SP) Soro

2715. Secured Land Transactions. (3) Real property secured transactions, including the procedural, remedial, and economic attributes of various security devices; deficiency and subordination problems; limitations; priority; redemption; transfer; and allocation of ultimate loss. (F) Hetland

2733. Sex-Based Discrimination. (3) Prerequisites: Constitutional Law. This course deals with the legal issues raised by legal and social discrimination between men and women and explores a range of potential legal remedies including federal and federal constitutional law, statutory enactments, and common law developments. Subject matter areas include sex-based discrimination in family law, employment law (including Title VII, the Equal Pay Act, and Executive orders), educational opportunity, and criminal law. (SP) Key

275. State and Local Government. (3) Power allocation among governmental units: between state and local units, and among local units. Objectives and methods of governmental restructuring in the metropolitan areas. Limitations to governmental responsive to the people. Operational problems: personnel, financing, contracting, torts, and resource allocation. (F)

276. State and Local Taxation. (3) A study of substantive provisions and procedure relating to property tax, bank and corporation income tax, excise tax, use tax, and other local taxes. Attention given to interstate tax problems, such as allocation of income among the states, jurisdiction to tax, and commerce clause restrictions. (F)

2873. Unfair Competition. (3) This course deals with a wide range of legal materials that influence competitive behavior. Subject to time constraints, the subjects covered will include statutory restrictions on entry; misleading practices (false advertising; disparagement); predatory practices (interference with business relations; appropriation of rival's good will); trademarks; patents; regulation of franchise relationships. (F) Sullivan

288. Water Resources Law. (3) The legal aspects of water resources management. The course examines the legal concepts and institutions that have developed to resolve the multiple demands imposed upon this resource, and explores the problems of these doctrines as well as the roles and conflicts of various governmental units in meeting this responsibility. (SP) Sato

295. Student Initiated Course. (1-10) Must be taken on a satisfactory/unsatisfactory basis. Open to students who have completed the first-year curriculum. Clinical work, field work, legal assistance, individual research and writing, writing or editing for professional journals, student-taught courses, or other legal projects of a se-
IDS 218. Information Resource Management. (3)
IDS 219. Financing Tools for Public Managers. (3)

For information about these and other courses related to this program, consult the Public and Nonprofit Management section of this catalog.

Legal Studies
(College of Letters and Science)

Program Office: 2240 Piedmont Avenue, 642-4038

The legal studies major is under the academic supervision of the School of Law faculty.

Program Coordinator: Charles McClain, Jr., Ph.D., J.D.

The Major

The legal studies major provides undergraduate students with an opportunity to become familiar with legal ideas, legal institutions, and the legal process. It is designed to provide tools for reasoned appraisal of legal problems and of the policies that underlie them. The major is based firmly on the view that the study of law and justice has a rich humanistic tradition and that its pursuit can encourage sustained reflection on fundamental values.

Legal studies courses are taught by members of the Law faculty, by scholars, and by social scientists who teach in the graduate program in Jurisprudence and Social Policy. The courses build on the contributions of philosophy, history, sociology, political science, economics, psychology, anthropology—as well as legal scholarship. It should be noted that legal studies is a liberal arts major in the College of Letters and Science. The major was established to provide the basis for preparing students for law school. It is designed for undergraduate students who are interested in law as a field of critical inquiry, irrespective of their ultimate career objectives.

Lower Division Requirements. One term of course work is required in each of the following areas before a student can declare legal studies as their major: introductory statistics, introductory economics, introductory philosophy, and European history. These courses may be from any division of the College.

Upper Division Requirements. A minimum of 32 upper division units is required for completion of the major. Students must complete one course from each of the following four groups of courses: A. Legal and Social Theory; B. Historical/Comparative; C. Principles and Problems of Substantive Law; D. Administration of Justice. The remainder of the units may be either legal studies courses or courses from an approved list of law-related courses offered outside the program.

The rationale for the structure of the legal studies curriculum becomes apparent if a few words are said about each of the course groupings referred to above. The Group A requirement insures that all students will be exposed to conceptual analysis and broad intellectual perspectives. Group B courses are meant to limit parochialism and to insure that students have the capacity to draw on the insights of legal traditions other than their own. The courses from Group C are meant to acquaint students with selected forms of legal order—e.g., the substantive law of crimes, property, negligence—and to assure that students can relate legal doctrines to social and historical contexts. The Group D requirement assures that students in the major have familiarity with some of the important aspects of legal procedure or, more broadly, legal process. These courses use relevant insights from the social sciences, e.g., organizational theory, to illuminate the dynamics of law-making, adjudication, and implementation.

Honors Program. With consent of the major adviser, a student majoring in legal studies with an overall GPA of 3.3 and a GPA of 3.5 in legal studies courses may be admitted to the Honors Program. The Honors student is required to enroll in H195, the legal studies honors course for one or two semesters (at the instructor's option) and to prepare an honors thesis. Further information on the group major in legal studies may be obtained from the program office.

Only some of the following listed courses are offered in any given year. The Schedule of Classes should be consulted for up-to-date information on course offerings.

Upper Division Courses

100A-100B. Foundations of Law: The Quest for Justice. (4, 2A): Three hours of lecture and one hour of discussion per week. Prerequisites: 100A is prerequisite to 100B. Introduction to law for the liberal arts student. The purpose is to familiarize students with major legal ideas, legal reasoning, and legal processes; to provide a comparative and historical perspective on law; and to highlight basic philosophical problems in the quest for justice.

103. Theories of Law and Society. (4) Three hours of lecture and one hour of discussion per week. An historical examination of major interpretations of law, morals, and social development, with special emphasis on the social thought of the 18th and 19th centuries and including the writings of Marx, Maine, Durkheim, Weber and other contemporary figures.

*105. Ethics and Justice. (3) Two 1/2-hour seminars per week. Readings in ethical philosophy are combined with judicial opinions. Topics include: moral and secular sources of morality, the nature of human life, criminal responsibility, sexual morality and economic justice.

107. Theories of Justice. (4) Three hours of lecture and one hour of discussion per week. Major perspectives in social and economic thought, e.g., natural law, natural right, laissez faire, possessive individualism, contractualism, pluralism, and social equality as they affect contemporary discussions of higher law, free market, civil competence, and distributive justice.

108. Topics in Philosophy and Law. (3) Two hours of lecture and one hour of discussion per week. This course is designed to deal with contemporary legal issues on which philosophical techniques and arguments bear. Possible topics include: insanity, responsibility, abortion; the validity of statistical modes of proof; income redistribution; taxation of the individual versus the household.

109. Aims and Limits of the Criminal Law. (4) Three hours of lecture and one hour of discussion per week. Analysis of the capacity of criminal law to fulfill its aims. What are the aims of criminal law? How are they assigned relative priority? What principles can be identified for evaluating the effort to control disapproved activities through criminal law?

111. The Making of Modern Constitutionalism. (4) Two 1/2-hour lectures and one hour of discussion per week. Historical examination of the emergence of constitutionalism as an authoritative approach to the study of law and politics, covering the 15th to 19th centuries, concluding in discussion of the debate over ratification of the U.S. Constitution.

140. Property and Liberty. (3) Two hours of lecture and one hour of discussion per week. Topics include ways in which property may be defined; manner in which law regulates and protects property interests; arguments for and against redistribution of wealth and greater public control of private property. Readings include legal cases and essays by philosophers, economists, etc.

*142. Law and Bureaucratic Organizations. (3) Three hours of lecture and one hour of discussion per week. Legal theory usually presupposes only individual actors and does not recognize organizational giants like, e.g., General Motors. This course explores the implications of taking organizations seriously as agents of action, issues that include the legal rights of organizations, legal control of organizational behavior, ethical questions.

145. Law and Economics I. (4) Two 1/2-hour lectures and one hour of discussion per week. Prerequisites: Together, Law and Econ I and II provide a comprehensive introduction to economic analysis of law. Courses need not be taken in numerical order or be prerequisites to the other. The course will apply microeconomic theory analysis to legal rules and procedures. Emphasis will be given to the economic consequences of various sorts of liability rules, remedies to contract and the allocation of property rights. The jurisprudential significance of the analysis will be discussed.

147. Law and Economics II. (4) Two 1/2-hour lectures and one hour of discussion per week. Law and Economics I is not a prerequisite for Law and Economics II. Students may take either course without taking the other. The course uses many mechanisms to influence the provision of goods and services. Economists and lawyers have developed a critique of these mechanisms which has policy issues as well.

148. Laws of the American Legal System. (3) Two 1/2-hour lectures and one hour of discussion per week. Prerequisites: Law and Economics I. A study of the American legal system, from both the legal and normative perspectives. Topics covered include: the nature of judicial decision making, the nature of judicial review, the role of the courts in control of Federal and other political institutions, law as a symbol.

149. Lawmaking. (3) New course. Two hours of lecture and one hour of discussion. This course traces the lawmaking process from the generation of ideas for new laws and the entry of individuals and groups into the lawmaking process through the drafting of bills, the deliberation and voting on them by legislatures, the implementation of them by administrative agencies and courts and then to the next round of changes in the laws that their implementation suggests. Special attention will be paid to supplementary lawmaking by administrators and judges. The focus will be on American experience but some comparisons with Western European nations will be made.

150. Legal and Moral Responsibility. (3) Course may be repeated for credit. Two hours of lecture and one hour of discussion per week. Analysis of the conditions of moral and legal responsibility. Discussion of the concepts of cause, blame, guilt, punishment, fault, liability. Topics to be examined: role of excuses in a theory of responsibility; justification for holding one person responsible for the actions of others.

153. Seminar on Social Science in Law. (4) One 3-hour seminar per week and one conference hour per week. Prerequisites: Permission of the instructor. In this seminar we shall examine actual cases used as examples of social science research in the American legal process. Topics will include: origins of social science in law; the application of social science methods to such legal and policy issues as race and sex discrimination in education and employment; obscenity; parole and sentencing prediction; eyewitness testimony; insanity and diminished capacity; lie detection; the exclusionary rule; criminal sanction; court reform; jury size and decision rules.

155. Government of the Family. (3) Three hours of lecture and one hour of discussion per week. This course examines the historical evolution of conventional family formation and dissolution, and focuses on selected topics in child welfare laws. Topics include: the state role in reproductive decisions, marriage, divorce, economic consequences of divorce and child custody decisions.

160. Punishment, Culture, and Society. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Criminal Justice I and II. Discussion of the role of punishment in society. Emphasis will be given to the crime and punishment systems of various societies and to the changing nature of crime, punishment, and the meaning of punishment across cultures.

162. Law and Economics I. (4) Two 1/2-hour lectures and one hour of discussion per week. Prerequisites: Together, Law and Econ I and II provide a comprehensive introduction to economic analysis of law. Courses need not be taken in numerical order or be prerequisites to the other. The course will apply microeconomic theory analysis to legal rules and procedures. Emphasis will be given to the economic consequences of various sorts of liability rules, remedies to contract and the allocation of property rights. The jurisprudential significance of the analysis will be discussed.

167. Law and Economics II. (4) Two 1/2-hour lectures and one hour of discussion per week. Law and Economics I is not a prerequisite for Law and Economics II. Students may take either course without taking the other. The course uses many mechanisms to influence the provision of goods and services. Economists and lawyers have developed a critique of these mechanisms which has policy issues as well.

168. Criminal Justice I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Law and Economics I. A study of the American legal system, from both the legal and normative perspectives. Topics covered include: the nature of judicial decision making, the nature of judicial review, the role of the courts in control of Federal and other political institutions, law as a symbol.

170. Legal and Moral Responsibility. (3) Course may be repeated for credit. Two hours of lecture and one hour of discussion per week. Analysis of the conditions of moral and legal responsibility. Discussion of the concepts of cause, blame, guilt, punishment, fault, liability. Topics to be examined: role of excuses in a theory of responsibility; justification for holding one person responsible for the actions of others.

Noonan
182. Law, Politics and Society. (4) Two 1/2-hour lectures and one hour of discussion per week. This course examines the theory and practice of legal institutions in performing several major functions of law: allocating authority, defining relationships, resolving conflict, adapting to social change, and fostering social solidarity. In doing so, it will assess the nature and limits of law as well as contrasting perspectives on social control and social change.

185. Church, State and the Law. (3) Two 1-hour lectures and one hour of discussion per week. An examination of Church-State relationships. One-third of the course will be historical, based on texts taken from critical cases of Church-State interactions. Two-thirds will be devoted to problems in the United States from 1946 to the present.

190. Seminar on Topics in Law and Society. (4) Course may be repeated for credit. Three hours of seminar plus individual conferences. Prerequisites: Consent of instructor. Advanced study in law and society with specific topics to be announced.

H195A-H195B. Honors in Legal Studies. (4-4) To be arranged. Prerequisites: Senior standing, acceptance into honors program in legal studies. Study of an advanced topic under the supervision of a faculty member leading to the preparation of a senior honors thesis. One or two semesters at the instructor's option. If two semesters, credit and grade to be awarded on completion of the sequence.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail credit basis. To be arranged. Prerequisites: Upper division standing. Consent of instructor and approval of program chair. Enrollment is restricted by regulations listed on pages B1 through 81 of this catalog. Consult the legal studies office for more information.

Library and Information Studies (School of Library and Information Studies)

Office: 102 South Hall, 642-1464
Dean: Robert C. Berring, M.L.S., J.D.

Professors:
Robert C. Berring, M.L.S., J.D. Legal research, onlinesearch thebiy ^
Mary K. Duggan, Ph.D. History of printing and publishing Michael Cooper, Ph.D. Economics of information, design/
Fredric John Mosher, Ph.D. (Emeritus) Raynard C. Swank, Ph.D., LL.D. (hon.) (Emeritus)

Associate Professors:
Yale M. Braunstein, Ph.D. Economics of information and

Senior Lecturers:
Ray R. Larson, Ph.D. Bibliographic information retrieval
systems
John Ober, M.S., M.L.I.S. (Acting) Computer-based

Yates Professor of the Humanities:
Dr. Harlan, Ph.D. Independent Libraries, library planning

Graduate Courses

200. Introduction to Information Service. (3) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 210 must be taken concurrently; instructor approval required. Search strategy for newspapers, magazines, and 210 is required of all beginning MLS students in the library. Information retrieval, and statistical indexing techniques; retrieval evaluation; relevance, authority, utility; indexing, vocabulary control. (F,SP) - Maron

205. Principles of Information Retrieval. (3) Three hours of lecture per week. Prerequisites: 200, 210 or consent of instructor. The design and evaluation of information retrieval systems with emphasis on techniques that can be implemented on a computer. Types of retrieval systems; automatic indexing; clustering techniques; measures of retrieval effectiveness; retrieval experimentation methodology; introduction to question-answering systems. (SP) - Cooper, Maron

206. Advanced Topics in Information Retrieval. (3) Three hours of lecture per week. Prerequisites: 205 or consent of instructor. Topics include: analysis of relevance, utility, and other fundamental concepts; probabilistic approaches to indexing, query formulation, and logical, linguistic, and cognitive science issues in the design of information systems. (W) - Cooper, Maron

212. Computer and Information Systems. (4) Three hours of lecture per week. Prerequisites: 205 or consent of instructor. Survey and analysis of computer information systems which supply information responses to user queries. Aspects of logical, linguistics and cognitive science which bear on the design of knowledge-based library search. (F,SP) - Cooper, Maron

On leave, spring
Recalled as active service
Recipient of Distinguished Teaching Award

Diamond

Lower Division Courses

1. Methods of Library Use. (2) Formerly Bib 1. Two 1-hour lectures per week. Students will learn how to use the LC Library's resources in a systematic way to meet their needs, via lectures, assignments, examinations, and a term project. They will learn to extend these techniques to future independent research. (F,SP)

10. Computers and Information Systems. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. A nonmathematical introduction to computer concepts, programming, information retrieval, and databases (e.g., MELVYL). Reading, writing, and running of BASIC programs on a microcomputer and introduction to computer programming systems: word processing, electronic mail, databases. Intended for those with no programming experience. (F,SP) - M. Cooper

Upper Division Courses

180. Mental Health Issues and the Law. (3) Formerly Bib 182. Two 1 1/2-hour lectures per week. A survey of the evolution of mental health. Prerequisites: Consent of instructor. The design and evaluation of information retrieval systems; automatic indexing; clustering techniques; measures of retrieval effectiveness; retrieval experimentation methodology; introduction to question-answering systems. (SP) - Cooper, Maron

181. Mental Health Issues and the Law. (3) Formerly Bib 182. Two 1 1/2-hour lectures per week. A survey of the evolution of mental health. Prerequisites: Consent of instructor. The design and evaluation of information retrieval systems; automatic indexing; clustering techniques; measures of retrieval effectiveness; retrieval experimentation methodology; introduction to question-answering systems. (SP) - Cooper, Maron

184. Church, State and the Law. (3) Two 1-hour lectures and one hour of discussion per week. An examination of Church-State relationships. One-third of the course will be historical, based on texts taken from critical cases of Church-State interactions. Two-thirds will be devoted to problems in the United States from 1946 to the present.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail credit basis. To be arranged. Prerequisites: Upper division standing. Consent of instructor and approval of program chair. Enrollment is restricted by regulations listed on pages B1 through 81 of this catalog. Consult the legal studies office for more information.

200. Introduction to Information Service. (3) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 210 must be taken concurrently; instructor approval required. Search strategy for newspapers, magazines, and cataloging. (F,SP) - Maron

205. Principles of Information Retrieval. (3) Three hours of lecture per week. Prerequisites: 200, 210 or consent of instructor. The design and evaluation of information retrieval systems with emphasis on techniques that can be implemented on a computer. Types of retrieval systems; automatic indexing; clustering techniques; measures of retrieval effectiveness; retrieval experimentation methodology; introduction to question-answering systems. (SP) - Cooper, Maron

206. Advanced Topics in Information Retrieval. (3) Three hours of lecture per week. Prerequisites: 205 or consent of instructor. Topics include: analysis of relevance, utility, and other fundamental concepts; probabilistic approaches to indexing, query formulation, and logical, linguistic, and cognitive science issues in the design of information systems. (W) - Cooper, Maron

212. Computer and Information Systems. (4) Three hours of lecture per week. Prerequisites: 205 or consent of instructor. Survey and analysis of computer information systems which supply information responses to user queries. Aspects of logical, linguistics and cognitive science which bear on the design of knowledge-based library search. (F,SP) - Cooper, Maron

Graduate Courses

On leave, spring
Recalled as active service
Recipient of Distinguished Teaching Award
201. Cataloging and Classification. (3) Three hours of lecture per week. Prerequisites: 220 must be taken concurrently. Instructor approval required. Determination of data elements, cataloging points in the organization of bibliographic records; use of thesauri, codes, and classification schemes according to standard library practice; format, structure, and internal arrangement of catalogs; machine-readable communication formats. 200 and 210 are required of all beginning MLIS students in their first semester and must be taken on a letter-graded basis; satisfactory/unsatisfactory option not allowed. (F,SP)

210. Organization of Nonbook Materials. (3) Formerly 224. Three hours of lecture per week and 60 hours of supervised on-site activity. Prerequisites: 210. Methods and principles of organization, access, and retrieval; use of 200 and 210 and other standards; evaluation of practices. (SP)

217. Analytical and Descriptive Bibliography. (2) Two 1-hour lectures per week. Prerequisites: 200 or consent of instructor. Analytical bibliography as a method of investigation of the book as a physical object. The method of descriptive bibliography based upon libraries. A critical survey of the state of analytical and descriptive bibliography. (SP) Harlan

220. Systems Analysis in Information Services. (3) Formerly 230. Two 1½-hour lectures per week. The systems analysis of design and planning process and policy analysis in libraries and information centers. The systems analyst in library and information center management. (SP) M. Cooper, Van House

225. Catalog Design. (3) Formerly part of 223. Three hours of lecture per week. Prerequisites: 200, 210, or consent of instructor. Focus on subject access options for bibliographic retrieval systems; comparative classification, indexing, thesaurus construction, design of special-purpose retrieval systems through stage of systems implementation. (SP) Larson

227. Information and Records Management Practices. (2) Two hours of lecture per week. The various components of professionally managed records and information systems, including records inventory and disposition, records processing, vital records control, form management, correspondence systems, micrographics and storage, reports management, personal privacy protection, and rights of public access to information. (SP)

228. Office Information Systems. (3) Two 1½-hour lectures per week. Prerequisites: 271. Business Administration 248 or equivalent or consent of instructor. Information systems frameworks. Technological and organizational issues related to office automation, documentation of systems and end-user computing, implementation strategies. (SP) Ober

230. Introduction to Computing for Information Studies. (2) New Course. Two hours of lecture per week. Prerequisites: Consent of instructor. Fundamental computer concepts and programming techniques illustrated by applications involving information retrieval, data bases, and management of libraries and information centers. Practice in writing and running BASIC programs on microcomputers. For students without previous programming experience. (F,SP)

235. Data Processing for Librarians and Information Management. (3) Two 1½-hour lectures and two hours laboratory per week. An introduction to computer programming with emphasis on algorithm development and structured programming of bibliographic systems for solving library and information center data processing problems, using the PASCAL programming language. (F)

236. Computer Manipulation of Bibliographic Data. (3) Two 1½-hour lectures per week. Prerequisites: 235, 225, and 227. Business Administration 248, or consent of instructor. Development of computer programs for manipulation of bibliographic records using the MARC monograph format. Computer file organization techniques for bibliographic data. (SP) M. Cooper

227. Design and Implementation of Computer-Based Information Systems. (4) Six hours of lecture per week. Prerequisites: 235, 228. Class jointly develops functional specifications and design for an automated library sub-system such as acquisition, circulation, or cataloging.

Class then writes and tests computer programs to implement system they design. (F) M. Cooper

238. Use of Database Management Systems. (3) Two 1½-hour lectures per week. Prerequisites: 230, 235, or equivalent, or consent of instructor. Analysis of computer database technology, maintenance, support, and applications. (SP) M. Cooper, Ober

239. Implementation of Bibliographic Database Systems. (3) New course. Two 1½-hour lectures per week. Prerequisites: 230, 235 or equivalent; or 238. Advanced group design and implementation of a bibliographic application using a database management system. (SP) M. Cooper

244. Information in Society. (3) Two 1½-hour classes per week. Information in its social context. The place of library and information centers in information-gathering behavior and use. Societal and clientele needs and demands. Application of behavioral and social sciences to study and evaluation of information services. (SP) Braunstein

250. Bibliography and Information Service. (3) Two 1½-hour classes per week. Prerequisites: 200, 210 or equivalent. Exploration of the bibliographical organization in specialized subject fields. Printed and online sources of bibliographic and nonbibliographic data. Information analysis, evaluation, and synthesis. Studies of literature. Information service problems and policies. (F,SP) Wilson

250P. Practicum in Information Services. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour every other week plus sixty hours of on-site activity. Prerequisites: Consent of instructor; 200; 250P may be taken concurrently. Practicum 60 hours per semester of approved on-site activity in an agency providing reference service, plus bi-weekly meetings to be arranged. (F,SP)

251. Bibliography and Information Service: Health Sciences. (2) Formerly 251D. Four hours of lecture per week for 3½ weeks or two hours of lecture per week for 15 weeks. Prerequisites: 200. Search strategies, selection, and evaluation of information sources in health sciences. (F,SP)

253. Bibliography and Information Studies: Law. (2) Formerly 251F. Four hours of lecture per week for 3½ weeks or two hours of lecture per week for 15 weeks. Prerequisites: 200. Search strategies, selection, and evaluation of information sources in law. (SP) Bening

257. Evaluation of Reference Services. (2) Ten 1½-hour classes per week. Two 60 hours on-site activity in an agency providing reference service. Prerequisites: 200 or 251D (may be taken concurrently). Examination of the design, organization, operation, and evaluation of reference service: economic, ethical, political, technical, and interpersonal considerations. Extensive analytical paper required. (F,SP) Nolan

261. Information Services in Organizations. (2,3) Students who have taken 281, 284, or 282 will receive only 2 units of credit for 261. Two 1½-hour lectures per week. General introduction to the provision of specialized library services and other information management activities in business and public sector governmental agencies, non-profit organizations, and private corporations. Mission, problems, opportunities. Management functions as applicable: planning, organizing, staffing, budgeting, controlling. (F,SP) Weedman

262. Public Libraries. (2,3) Students who have taken 261, 263 will receive only 2 units of credit for 262. Two 1½-hour lectures per week. General introduction to public libraries: Functions, services, and relationship to the community. Management of public libraries: Planning, organizing, staffing, budgeting, controlling. (SP) Van House

264. Work with Children and Young Adults in School and Public Libraries. (2,3) Two 1½-hour lectures per week. Systematic planning, implementation, management, and evaluation of multi-media library programs in school and public libraries: reading interests, types of materials, levels of reading ability, library skills, instructional design. (SP) Weedman

265. Children's Literature. (3) Formerly 265A. Two 1½-hour lectures per week. Historical backgrounds and developments, twentieth century and present trends. Extensive analytical paper required; evaluation; trends in use of illustration. (F) Weedman

266. Oral Interpretation of Imaginative Literature. (1) Formerly 265B. One 2-hour lecture per week. Prerequisites: 265A or consent of instructor. Historical development and critical analysis of folklore, legends, myths, and modern imaginative literature: Their role in library progress. (SP) Weidman

277. Non-Print Media in Libraries. (3) Three hours of lecture per week. Problems relating to the handling and use of non-print media. The role of the librarian in a multimedia environment. The use of mass media in education, design of media centers, and some aspects of media technology. (F,SP)

277. Management of Information Technology. (2) Two 1-hour lecture per week. Prerequisites: 230 or 235 (may be taken concurrently) or consent of instructor. Implementation and management of computerized systems in libraries and information centers: planning, selection, procurement, staffing, supervision, costing, evaluation. Concepts of hardware, operating systems, programming languages, database management systems, telecommunications, distributed processing, and networks. Technological trends. (F)

272. Measurement and Evaluation of Library and Information Services. (3) Three hours of lecture per week. Prerequisites: Any of 220, 261, 262, 263, 264, or consent of instructor. An introduction to the measurement and evaluation of libraries and other information services and systems. Topics include introduction to evaluation research; measurement of organizational performance; evaluation of the performance of libraries, library systems (e.g., reference, book selection), and other information services; and cost, cost-effectiveness, and cost-benefit analysis. (F)

274. Economics of Information. (3) Three hours of lecture per week. Prerequisites: Course in economics or consent of instructor. The measurement and analysis of the informational and media resources devoted to the production and distribution of information. Topics include the functioning of information markets and the reasons for market failures. (F,SP) Braunstein

276. Collection Development. (2) One 2-hour class meeting per week. General principles and procedures relative to selection of materials: assessment of user needs; resource allocation, selection responsibility, budgetary control, acquisitions and review bibliography, ethical issues, special applications to different kinds of libraries.

280. Development of the Book. (3) Two 1-hour lectures and one 1½-hour laboratory per week. A survey of the development of the book from the beginning of writing to today's computerized production methods. Emphasis placed on all aspects of the book's life cycle. Laboratory work and field work required. (SP)

282A. History of Printing and Publishing: Origins to 1700. (3) Two 1½-hour lectures per week. Prerequisites: 280. Historical, social, and technological study of the invention and spread of printing in the West and development of the book and book trade through the eighteenth century. (SP)

282B. History of Printing and Publishing: 1700 to Present. (3) Three 1½-hour lectures per week. Prerequisites: 280. The history of printing, publishing, and the book
trade during the transitional and modern periods. (SP) Haaran

293. Contemporary Publishing. (2) One 2-hour lecture per week. Survey of the publishing industry and the processes of the field; current trends and problems. (F,SP) Haaran

290. Special Topics in Library and Information Studies. (1-3) Formerly 219, 259, and 279. Course may be repeated for credit with change in content. Two to six hours of lecture per week for 7.5 weeks or one to three hours of lecture per week for 15 weeks. Prerequisites: Consent of instructor. Specific topics, hours, and credit make-up from section to section, year to year. (SP) Berring

295. Quantitative Social Science Research Methods in Library and Information Science. (3) One 3-hour lecture per week. The application of quantitative social science research methods in library and information studies. Includes: research design; conceptualization, operationalization, and measurement; sampling; experimental design; data collection, including survey research; and data analysis. Intended primarily for doctoral students. (SP) Van House

296A. Seminar. (2-4) Course may be repeated for credit, with change in content. Two to four hours of seminar per week. Topics in bibliography, information sciences, administration of libraries and information systems, history of the library, comparative librarianship, library education, and related fields. Specific topics vary from year to year. (SP) Berring

297. Field Study. (1-4) Course may be repeated for credit, with change in content. Two to four hours of field study per week. Topics in special problems in library and information service in the field. Individual and group meetings with faculty sponsor and reports required. Regular supervision as needed. Unit value depends on student workload. (F,SP) Noton

298. Directed Group Study. (1-3) Course may be repeated for credit. One to three hours of meeting per week. Group study of special problems in library and information studies under faculty direction. Group meetings with instructor. Reports required. (F,SP) Berring

299. Individual Study. (1-12) Course may be repeated for credit. Varies. Individual study of topics in library and information studies under faculty supervision. (F,SP) Berring

Professional Courses

310. Teaching Assistance Practicum. (1-6) Course may be repeated with change in content. Must be taken on a satisfactory/unsatisfactory basis. Four hours of work per week per unit including class time. Discussion, reading, preparation, and practical experience for individual supervision. In the problems and opportunities of teaching special topics in library and information studies. (F,SP) Cooke

384. Special Practicum in School Libraries. (2) Six hours of practicum per week. Prerequisites: 200, 210, 254, 265, of which 265 may be taken concurrently. Open only to those who hold a standard teaching credential. Organization, operation, and evaluation of library and information services for children and young adults in a school, including collection, communication, evaluation, management, technical, and political considerations. Extensive analytical paper required. May satisfy the practicum requirement for the School Library Services Credential. (F,SP) Cooke

410. Research Skills Practicum. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Four hours of work per week per unit including class time. Individual research work under supervision of a faculty member. (F,SP) Cooke

602. Individual Study for Doctoral Students. (1-5) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for doctoral degree. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. and D.L.I.S. degrees. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Haaran

Related Courses in the Program in Public and Nonprofit Management

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)
IDS 207. Managers and Management. (3)
IDS 208. Techniques of Management Control. (3)
IDS 209. Applied Microeconomics. (3)
IDS 210. Organizational Understanding for Managers. (3)
IDS 211. Public Sector Accounting. (3)
IDS 212. Financial Management. (3)
IDS 214. Organizational Skill for Managers. (3)
IDS 217. Technology, Tasks, and Politics. (3)
IDS 218. Information Resource Management. (3)
IDS 219. Financing Tools for Public Managers. (3)

For information about these and other courses related to this program, see the Public and Nonprofit Management section of this catalog.

Linguistics

College of Letters and Science

Department Office: 2327 Dwinelle Hall, 642-2757 Chair: Paul Kay, Ph.D.

Professors:

Charles J. Fillmore, Ph.D. University of Michigan. Syntax, lexical semantics, philosophical linguistics. Paul Kay, Ph.D. Harvard University. Syntax, semantics, pragmatics, variation

George Lakoff, Ph.D. Indiana University. Syntax, semantics, cognitive linguistics

Robin Lakoff, Ph.D. Harvard University. Semantics, syntax, pragmatics, sociolinguistics

James A. McCawley, Ph.D. University of California at Berkeley. Syntax, lexical semantics, psycholinguistics.

William S-Y. Wang, Ph.D. University of California at Los Angeles. Experimental phonology, phonetics.

E. G. Herz, Ph.D. University of Hawaii. Phonology, phonetics, language change, language acquisition, Turkish.

Madison S. Beeler, Ph.D. (Emeritus) Harvard University. Semantics, syntax, pragmatics, sociolinguistics

C. B. Bird, Ph.D. (Emeritus) Harvard University. Semantics, syntax, pragmatics, sociolinguistics

Trainee peoples: (Doctoral Degree in Linguistics. The program follows Plan A or B, as described in the doctoral degree section (see Index) with some augmentations. Information on further requirements is obtainable from the departmental adviser.

Graduate Programs

Preparation for Graduate Study in Linguistics. Graduate students in linguistics should have had an undergraduate major in linguistics, a foreign language, or some equivalent acceptable to the department. They should be prepared to pass the required foreign language reading examinations early in their graduate career.

Master's Degree in Linguistics. Students may follow either Plan I or Plan II for the Master's Degree. Plan I requires 25 units plus a thesis. (No course units are granted for the thesis itself.) Plan II requires 30 units. Both plans include at their core, completion of a three-course core in historical, comparative, or typological linguistics. Students are encouraged to supplement their courses with a coherent battery of courses in a particular language or language family. In general, linguistics, or in some allied field such as cognitive science, anthropology, or literature. These supplemental courses are to be chosen in consultation with the student's adviser.

Doctoral Degree in Linguistics. The program follows Plan B, as described in the doctoral degree section (see Index) with some augmentations. Information on further requirements is obtainable from the departmental adviser.

Summer Linguistic Institute. The principal scholarly organization representing the field of linguistics in this country, the Linguistic Society of America, annually sponsors a six-week or eight-week summer program in linguistics, in collaboration with some sponsoring University. Students in linguistics, at both the graduate and the undergraduate level, are strongly encouraged to attend this six-week or eight-week program in linguistics, in collaboration with some sponsoring University. Students in linguistics, at both the graduate and the undergraduate level, are strongly encouraged to attend such linguistic institutes. These programs offer a wide range of seminars, conferences, workshops, and lecture series, covering developments in the field and areas of interest which no single university can offer.

*Not offered 1988-89

On leave, spring, fall

On leave, fall
112. Phonological Theories. (3) New course. Three 1-hour lectures per week. Prerequisites: 110. A survey of the most significant theories and issues in phonology in the twentieth century. (F) Rhodes

115. Morphology. (3) Three 1-hour lectures and one 1-hour section per week. Prerequisites: 110. Analysis of word structure, including inflection, derivation, and compounding, in various languages. (SP) Zimmer

120A. Introduction to Syntax and Semantics I. (4) Three 1-hour lectures and one hour of section meeting per week. Prerequisites: 100. An introduction to the study of meaning and sentence structure, beginning with transformational grammar and extending to current approaches. (F) Fillmore

120B. Introduction to Syntax and Semantics II. (4) Three 1-hour lectures and one hour of section meeting per week. Prerequisites: 120A. Intermediate syntax. Covers some topics covered in 120A in greater depth and introduces new topics. Emphasizes the differences between the traditional transformational approach and the new approach of the Government and Binding theory, in which transformations play a much-reduced role while constraints exterior to the transformational system become the central focus of the theory. (SP) Sweerter

121. Logical Semantics. (3) Three 1-hour lectures per week. Prerequisite: 120A. Basic speech act theory and pragmatics. Issues in compositional semantics.

122. Language Typology and Linguistic Universals. (3) Three 1-hour lectures per week. Prerequisites: 120A. Issues in language typology and linguistic universals. An examination of various linguistic systems in different languages. Topics will include interrogatives, pronominal systems, relative clause formation, case systems, etc. (F) Zimmer

123. Pragmatics. (3) Three 1-hour lectures per week. Prerequisite: 120A. The role of language use and human actions. Some topics to be emphasized are: conversational logic, speech act theory, politeness, social role, psychological perception of oneself and language, variation in language use.

124. Discourse. (3) Three 1-hour meetings per week. Prerequisite: 120A. The relationship between language use and human actions. Some topics to be emphasized are: conversational logic, speech act theory, politeness, social role, psychological perception of oneself and language, variation in language use.

130. Comparative and Historical Linguistics. (4) Three 1-hour lectures and one hour of discussion per semester. Prerequisites: 110. Methods of reconstruction. Types and explanations of language change. Dialectology. The establishment of language relationships and subgrouping. (SP) Rhodes

131. Indo-European Comparative Linguistics. (3) Three 1-hour lectures per week. Prerequisite: 130. The affinities of the Indo-European languages and the reconstruction of their common ancestor. (F) Staff

140. Introduction to Field Methods. (3) Three 1-hour lectures per week. Prerequisites: 110 and 115. Training in the discrimination and transcription of the sounds of a particular language. Methods and practice in collecting and processing data from a particular language. (F) Hinton

150. Sociolinguistics. (3) Two 1-hour lectures per week. Prerequisites: 100. The principles and methods of sociolinguistics. Topics to be covered include linguistic pragmatics, variation theory, social and regional dialectology, and oral styles.

155. Language and Interaction. (3) New course. Course may be repeated for credit. This is a two-semester course. A grade of IP will be given after the first semester. Two 1-hour lectures per week. Prerequisites: 5. The relationship between the form of communication and its pragmatic and sociolinguistic effects. Topics include: conversation; misunderstanding; politeness; speech acts; dialect and bilingualism; attitudes towards linguistic variation; political and advertising language in the courtroom, the classroom, and psychotherapy. (F,SP)

180. Introduction to Cognitive Linguistics. (3) Three 1-hour lectures per week. Prerequisites: Consent of instructor. An introduction to the use of concepts contained in cognitive linguistics. Topics include: schema theory, frame semantics, and the general theory of cognitive models, including metaphor, metonymy and image-schemas; prototypical theory; some aspects of conceptual systems; the theory of mental spaces. (SP) G. Lakoff

181. Lexical Semantics. (3) Three 1-hour lectures per week. Prerequisites: 120A. Lectures and exercises in the description of word meanings, the organization of lexical systems, the lexicalization of particular semantic domains (kinship, color, etc.), and aspectative lexicology: lexicalization pattern differences across languages. (F) Sweerter

185. Metaphor. (3) Two 1-hour meetings per week. Prerequisites: Lower division students must have permission of instructor. The role of metaphor in structuring our everyday language, conceptual system, and world view. Topics include cross-cultural differences, literary metaphor, sound symbolism, and related theoretical issues in philosophy, linguistics, psychology and anthropology. (F) G. Lakoff

190. Upper Division Seminar. (2-3) Course may be repeated for credit. To be arranged. Prerequisites: Core courses (100, 110, 115, 120, 130). Seminar-style class for juniors and seniors. (F) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. To be arranged. (F,SP)

200. Graduate Proseminar in Linguistics I. (3) Two 1-hour meetings per week. Prerequisites: Graduate standing. Required of all graduate students during their first year in program. A close reading of selected works in the field. (SP) Otaha

201. Graduate Proseminar in Linguistics II. (3) Two 1-hour meetings per week. Prerequisites: 200. Required of graduate students during their first year in program. A more in-depth treatment of syntactic, semantic, and phonological analysis in the generative tradition. (SP) R. Lakoff

210. Methods in Phonological Analysis. (3) Two 1-hour meetings per week. Prerequisites: 110. Field laboratory, and "pencil and paper" methods of analyzing phonological data from many languages. (SP) Otaha

211. Problems Course in Phonology. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour meetings per week. Prerequisites: 210. Issues in phonological theory as
is administered by an interdepartmental group which cooperates closely with both the Department of Mathematics and the Department of Philosophy.

Preparation. For admission to the graduate program, students must have completed an undergraduate major in philosophy, or in mathematics, or a joint major in both, including at least one full-year upper division course in logic. In addition, they must have completed (a) at least one upper division course in some science, and (b) at least one full-year upper division course in mathematics (other than logic) if the undergraduate major was philosophy, or in philosophy (other than logic) if the undergraduate major was mathematics. Exceptions to these requirements are made only at the discretion of the graduate adviser. Written examinations must be passed in two foreign languages, to be chosen from the following: French, German, Russian. One examination must be passed before advancement to candidacy. Students should prepare themselves for the foreign language requirement before or during their undergraduate years.

Further information about the program, including a full statement of the requirements for advancement to candidacy, is given in the Announcement of the Group in Logic and the Methodology of Science, which is available upon request from the Group Office, Group in Logic and the Methodology of Science, University of California at Berkeley; Berkeley, CA 94720.

Courses. Courses are chosen with the advice of the graduate adviser from among the offerings of the various departments of the University. In addition to the departments of Mathematics and Philosophy, attention is especially directed to courses in the various science departments, in statistics, and in linguistics.

Logic Colloquium (no credit). Reports on current research and scholarly work by members of the staff, visitors, and graduate students. Harrington (F,SP).

Other Departments with Related Programs
Mathematics and Philosophy.

Manufacturing Engineering
(College of Engineering)

Manufacturing Engineering is an interdisciplinary undergraduate program offered jointly by the Department of Industrial Engineering and Operations Research and the Department of Mechanical Engineering. The emphasis of the program is on how to manufacture products and includes machinery design, plant layout, employee supervision, and economic analysis. The program demands creativity and the ability to solve problems and communicate effectively.

Course topics include computer-aided manufactur- ing, robotics, production systems analysis, properties of materials, systems design and synthesis, reliability, optimization, and manufacturing processes. These fundamentals are applied to a variety of manufacturing industries, including integrated circuit, automobile, steel, and electronics.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

All students must complete a total of 18 units of humanities and social studies of which at least 3 units must be in English composition (cannot be passed/not passed) and 6 units must be taken in the following two courses, at least one of which is upper division, must be taken from a single department.

Lower Division, Mathematics 1A-1B, 50A-50B; Chemistry 1A; Physics 7A-7B; Engineering 7, 25, 36, 45; Electrical Engineering and Computer Sciences 100. Electives must include 4 units of lower division physical science, engineering, mathematics, or statistics courses approved by the adviser.

Upper Division, Engineering 102, 120; Civil Engineering 130; Mechanical Engineering 101, 102A, 104, 105; Industrial Engineering and Operations Research 110, 130, 150, 153, 165, 180; Mechanical Engineering 102B; Industrial Engineering and Operations Research 180; Statistics 134. Electives must include 2 courses from each of the following two groups: Group I: ME 110, 122, 128, 130, 131, 133, 134, 135; Group II: Industrial Engineering 115, 131, 140, 160, 164, 170 or 171. If 162 is elected, Industrial Engineering 160 should be substituted for Engineering 102.

Mass Communications
(College of Letters and Science)

Group Major Office: Division of Special Programs, 301 Campbell Hall.

Faculty Advisory Committee: Todd Gitlin, Head Advisor (Sociology), Bertrand August (Comparative Literature), Jack Citrin (Political Science), W. Russell Ellis (Architecture), Donald Hansen (Education), Karl Jackson (Political Science), Thomas Leon (Journalism), Leo Lowenthal (Sociology), John G. Myers (Business Administration), Percy Tannenbaum (Public Policy), Harold Wintersky (Political Science), Raymond Wolfinberg (Political Science).

Group Major in Mass Communication

The group major in mass communications is administered by the Division of Special Programs. It applies a range of disciplines in the social sciences and humanities to the understanding of contemporary mass media, their structure, history, content, consequences, and policy implications. Entry to the major is by competitive application early in the fall semester (only). Students interested in majoring in mass communications should contact the undergraduate assistant in 301 Campbell Hall or the major adviser in 339 Campbell Hall for information regarding application to the major. Admission to the major is an entirely different process from admission to the University; admission to the University does not guarantee admission to the major.

Major Program

Prerequisites. One course from each of the following four groups. All prerequisites must be taken for a letter grade.

1. History 17B, History 124A, History 124B or History 131B;
2. Political Science 1 or Political Science 100;
3. Anthropology 3, Economics 1, Psychology 1, Sociology 1 or Sociology 3;

These courses must be completed (or enrolled in) when applying for admission to the major.

Requirements for Graduation (in addition to the prerequisites for admission to the major).

A. The following three core courses in mass communication: Mass Communications 101; Mass Communications 140; Public Relations 102B.

B. One of the following methods courses: Anthropology 190A; Political Science 3; Political Science 132A; Political Science 132B; Psychology 101; Sociology 5; Sociology 105.

C. Five courses (totaling at least 18 units) from the following list: Anthropology 144, Anthropology 149, Anthropology 156B, Anthropology 165, Anthropology 166, Business Administration 160, Business Administration 165, English 173, English 178, Journalism 140, Journalism 141, Journalism 162, Journalism 165, Journalism 180, Linguistics 150, Mass Communications 197A or 197B, Political Science 161, Political Science 162, Political Science 164A (Political Science 164B, Political Science 166A-166B, Psychology 123, Psychology 124, Psychology 180, Psychology 182, Psychology 185, Public Policy 163, Public Policy 186, Public Policy 187, Sociology 110, Sociology 110A, Sociology 150, Sociology 160, Sociology 170.

All requirements for graduation in the major must be taken for a letter grade.

No student may count toward the major more than three courses offered outside the College of Letters and Science.

Any exceptions or substitutions must be approved by the major adviser.

Honors Program. To be admitted to the honors program, students must have completed at least 3.3 grade-point average in the University and a 3.3 grade-point average in the major. In order to be granted honors, a student must write a thesis which in the judgment of the thesis director and the major adviser is characterized by superior distinction. An honors student must also complete Mass Communications H195, a one-semester honors colloquium.

Lower Division Courses

10. Mass Communications in America: An Introduction. (4) Two 1 1/2-hour lectures plus two 1-hour sections per week. Prerequisites: Sophomore standing or permission of the instructor. An introduction to the history, functions, and control of mass communication institutions in the United States, and to media content and effects. (F) Tannenbaum

Upper Division Courses

101. The Structure of Mass Media. (4) Two 1 1/2-hour lectures plus two 1-hour sections per week. Prerequisites: 10 and sophomore standing, or permission of the instructor. Analysis of contemporary structures of mass communications, primarily in capitalist societies, with historical background on the popular press, radio, and television. The organization of news and entertainment. Comparison with other societies. (F) Gitlin

102. The Effects of the Mass Media. (4) Two 1 1/2-hour lectures plus two 1-hour sections per week. Prerequisites: 10 and instructor's permission. A study of communication effects. Alternative analytic models, the effects of television, and the effects of mass media exposure on attitude change. (SP) Staff

103. The Communications Media in Public Policy. (4) Two 1 1/2-hour lectures plus two 1-hour sections per week. Prerequisites: 10 or permission of the instructor. The context for policy affecting the communications media, including legal constraints, governmental institutions, media interests and public interest groups. Effects of the media (e.g., the violence issue and portrayal of special population groups) will be assessed. Other current policy issues (e.g., special privileges for journalists and interactive cable TV) will be examined. (SP) Tannenbaum

H195. Honors Colloquium. (3) One 3-hour seminar per week. Prerequisites: Open only to honors seniors in the group major in mass communications. Under the supervision of the instructor, students will work toward preparing scholarly theses on the field, basing their work on theoretical considerations and, where applicable, analyzing empirical data. (F) Staff

197A. Media and Society. (4) One 3-hour seminar plus 10 to 12 hours of field laboratory per week. Prerequisites: Consent of Instructor. Analysis of contemporary media in terms of access, social organization and impact. Seminar topics: audience, objectivity, ownership and control; content and content analysis; alternative media; ethics and law; professionalization; advertising. Field placements: national and local news magazines; television and radio stations; newspapers. (F) Staff

197B. Social Issues in Publishing. (4) One 3-hour seminar and 10 to 12 hours of field laboratory per week.
Materials Science and Engineering

Prerequisites: Consent of instructor. Discussion of communication and language; tastes, values and standards; local culture; the economics of production and consumption; development and socialization of culture. Seminar topics include: literacy; acquisition of manufacture; publishing profession versus the book industry; first amendment/publishers' rights and responsibilities. Field placements include: literary agencies; bookstores; critical reviews; publishers. (F)

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/credit basis. Prerequisites: Regulations set by College of Letters and Science. Seminars for the group study of selected topics not covered by regularly scheduled courses. Topics will vary from year to year. (F,SP) Staff

199. Supervised Independent Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/credit basis. Prerequisites: Regulations set by College of Letters and Science. Independent study and research by arrangement with faculty. (F,SP) Staff

Materials Science and Mineral Engineering

(College of Engineering)

Department Office: 210 Hearst Mining Building, 642-3801
Chair: James W. Evans, Ph.D.
Professors:
- Alex Becker, Ph.D. McGill University. Exploration geophysics
- Neville S. Cook, Ph.D. University of Witwatersrand. Mineral science and mining
- Didier de Fontaine, Ph.D. Northwestern University. Thermodynamics, phase transformation theory
- James W. Evans, Ph.D. State University of New York. Engineering geosciences
- Didier de Fontaine, Ph.D. Northwestern University. Thermodynamics, phase transformation theory
- Joseph A. Pask, Ph.D. (Emeritus)
- Jack Washburn, Ph.D. (Emeritus)
- Paul A. Witherspoon, Ph.D. University of Illinois. Fluid flow in porous media
- Robert H. Brass, Ph.D. (Emeritus)
- Ralph R. Hultgren, Ph.D. (Emeritus)
- H. Frank Morrison, Ph.D. University of California. Exploration geophysics
- John R. Rile, Ph.D. University of Cambridge. Tectonics and failure of metals
- K.V.S. Sastry, Ph.D. University of California at Berkeley. Elasticity and plasticity of polycrystalline materials
- Allen W. Searcy, Ph.D. University of California at Berkeley. High-temperature superconductors
- Gareth Thomas, Ph.D., D.Sc. Cambridge University. Electronic materials
- Paul A. Witherspoon, Ph.D. University of Illinois. Fluid flow in porous media
- Michael Hoed, Ph.D. University of Witwatersrand. Mine engineering
- Michael Hoed, Ph.D. University of Witwatersrand. Mine engineering
- Ronald Merriam, Ph.D. Carnegie Institute of Technology. Materials science and Engineering
- Elicke W. Weber, Ph.D. University of Cologne. Electronic materials

Assistant Professors:
- Florian Kstock, Imperial College, London. Hydrodynamics
- Alan S. Baudendistel, Sc.D. Massachusetts Institute of Technology. Microstructure development
- Professor: Lutgard De Jonghe, Ph.D. (In residence)
- T.N. Narasimhan, Ph.D. (In residence)
- Associate Professor: Ronald Goodwin, Ph.D. (In residence)
- Assistant Professor: Ronald Goodwin, Ph.D. (In residence)

The Department of Materials Science and Mineral Engineering administers undergraduate-programs in materials science and mineral engineering and graduate programs in materials science, mineral engineering and engineering geoscience. (The undergraduate program in engineering geoscience is part of Engineering Science.)

Materials science deals with natural and man-made materials—their extraction, development, and characterization for use particularly in advanced applications such as solid-state electronics, atomic energy, and aerospace industries. A student in the materials science and engineering curriculum is provided a basic background in chemistry, physics, and engineering and applies this background to a field of specialization: ceramic engineering, extractive metallurgy, or physical metallurgy.

Engineering geoscience applies the discoveries and knowledge of mathematics, statistics, physics, chemistry, and the geosciences to our total environment: the earth, the oceans, the atmosphere, and space. The program provides education in the fundamental subject matter necessary for engineering occupations in mining exploration and exploitation, petroleum exploration, planetary exploration, marine geophysics and geosciences and engineering geophysics.

Ceramic Engineering. The ceramic engineer studies the physical and chemical properties of the raw materials and their application in ceramic industry and fundamentals of ceramic processing. Ceramics are inorganic nonmetals which are subject, either in their production or use, to high-temperature environments. Such materials include rocket nozzles, electrical insulators, precision molds for metallurgical industry, and glass of all types. Ceramic engineers work not only in the industries producing ceramic products but also in industries which make extensive use of ceramic materials such as aerospace, nuclear, and electrical.

Metallurgy. Metallurgy is the science and art of processing and utilizing metals and alloys. The field has two main areas of specialization:

Extractive Metallurgy. Studies of the scientific and engineering principles involved in the development of metals and alloys from their ores and in refining them to the desired purity. The subject includes mineral processing as well as smelting, leaching, and electrochemical methods of extracting and refining metals and requires using most recent advances in chemistry and physics.

Physical Metallurgy. Primarily studies the relationships between the chemical and physical structure of materials and their properties. The improvement and control of these properties in advanced applications is a broad field which within primary emphasis can be directed toward fundamental physics, chemistry, or engineering. Because of the ever-increasing demand for improved or better characterized materials, fundamental and applied research in the field is extremely active, providing a wide choice of rewarding career opportunities.

Mineral Engineering. The materials from which all fuels and manufactured goods are produced originate either from living organisms or from the crust of the earth. Mineral engineering is concerned with the latter and provides a basic science of raw materials upon which the whole of civilized society depends. This most fundamental of all branches of engineering encompasses processes for geological zones of mineral enrichment, the evaluation and economic assessment of those minerals, and the processing required to convert them into salable commodities. The four-year undergraduate program leading to the B.S. degree provides a foundation of knowledge and intellectual development that will prepare the student either for professional involvement in industry or graduate studies. The first two years include the basic sciences and engineering subjects. The junior and senior years include the topics common to all mineral engineers with the exception of those students in the petroleum, mining engineering, or mineral processing option.

Graduate Study in Materials Science and Engineering

Qualifiers of the bachelor's degree in fields such as ceramic engineering, metallurgy, physics, materials science, chemistry, and various fields of engineering can all successfully undertake graduate study in materials science.

The graduate program emphasizes research. Techniques such as transmission electron microscopy, field-ion microscopy, X-ray diffraction tomography, mass spectrometry, precision calorimetry, micro-probe X-ray emission spectroscopy, differential thermal analysis, precision calorimetry and cryogenic and high temperature mechanical testing are used for fundamental characterization of materials. Research topics include study of the mechanical, chemical, surface, thermodynamic, electrical, and magnetic properties of materials, and study of the kinetics, thermodynamics, and simulation of the processes by which materials are produced.

Graduate Study in Extractive Metallurgy/Mineral Processing

Holders of bachelor's degrees in metallurgy, mineral engineering, materials science, chemical engineering or chemistry would find this program of interest. A number of introductory and advanced level courses on the program are useful in preparing ones into useful materials and processing of metallic fuels are taught. Research concerns the thermodynamic and kinetic phenomena which are fundamental to these processes as well as the computer simulation, control and scale-up of these operations. A combination of

1The program includes 43 units of elective courses, including the College requirement of 18 units in humanities and social studies and 21 units in technical and professional studies. A minimum of 50 units of upper division technical elective courses. Courses selected to satisfy the technical elective requirement must be chosen to meet the requirements of the major.
2The program includes 54 units of elective courses, including the College requirement of 18 units in humanities and social studies and 21 units in technical and professional studies. A minimum of 50 units of upper division technical elective courses. Courses selected to satisfy the technical elective requirement must be chosen to meet the requirements of the major.
3The program includes 43 units of elective courses, including the College requirement of 18 units in humanities and social studies and 21 units in technical and professional studies. A minimum of 50 units of upper division technical elective courses. Courses selected to satisfy the technical elective requirement must be chosen to meet the requirements of the major.
104. Materials Characterization. (4) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 102. Physical and chemical characterization of materials: Diffraction, imaging, and spectroscopy using optical, electronic, and magnetic techniques. Measurement of physical properties. Project laboratory focusing on mechanical, chemical, electrical, and magnetic properties of materials, and materials characterization. (F) Staff

111. Electrical and Magnetic Properties of Materials. (3) Two 1-hour lectures per week. Prerequisites: Physics 7A-7B-7C or Physics 7A-7B and consent of instructor. Understanding of electrical and magnetic properties of materials, semiconductors, and their applications on the basis of physical principles. Control of the properties by processing. Materials for lasers and optical fibers, superconductivity. Examples of electronic, magnetic and optical device applications. (SP) Haller


113. Mechanical Behavior of Materials. (3) Three 1-hour lectures per week. Prerequisites: E 45. Study of microscopic aspects of deformation including ideal strength, elementary dislocation theory, dislocation glide and high strain experiments. Macroscopic and microscopic aspects of fracture, fatigue, and environmentally-affected failure using fracture mechanics. Analysis of engineering failures. (F) Ritchie

120. Materials Production. (3) Two 1½-hour lectures per week. Significance of Materials. Occurrence of raw materials. Scientific and engineering principles relevant to materials production and processing. Methods for production of major materials. (F) Evans

121. Metals Processing. (3) Three 1-hour lectures per week. The principles of metals processing with emphasis on the use of processing microstructures which impart desirable engineering properties. The techniques discussed include solidification, thermal and mechanical processing, powder processing, welding and joining and surface treatments. (F) Staff

122. Ceramic Processing. (3) Three 1-hour lectures per week. Prerequisites: 101 and E 45. Powder fabrication by grinding and chemical methods, rheological behavior of powder-fluid suspensions, forming methods, drying, sintering and grain growth. Relation of processing steps to microstructure. (F) Glaeser

123. Semiconductor Processing. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 111 or Physics 7A-7B-7C and consent of instructor. Semiconductor purification and crystal growth techniques; impurity doping by diffusion, ion implantation and alloy growth; contact formation, mechanical and chemical processing; semiconductor analysis. (SP) Weber

124. Glass and Crystaline Ceramic Materials. (3) Three hours of lecture per week. Prerequisites: 101 and E 45. Introduction to noncrystalline ceramics, crystalline glasses, and glassy materials. Theoretical and practical aspects of glass, strengthening mechanisms. Controlled crystallization of glasses and powder fabrication of crystalline ceramics. Mechanics of crystalline ceramics relevant to structural applications. Ceramics for optical, magnetic, and electronic applications with emphasis on microstructure-property relationships. (F) Glaeser

130. Materials Engineering. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 111, 112, 113 and E 45. Studies course concerned with materials development and application, including ferrous, non-ferrous, and non-metallic materials. Emphasis on heat treatment, deformation, fracture, and failure analysis; examples relate to mechanical properties, electrical properties, and corrosion. (SP) Staff

198. Directed Group Studies for Advanced Undergraduate Students. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Upper division standing in Engineering. Group studies of selected topics. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor. Staff

201A-201B. Thermodynamics and Phase Transformations. Two 1½-hour lectures per week. Prerequisites: 101, 102, 103 or equivalent. 201A is a prerequisite for 201B. The laws of thermodynamics, fundamental equation for multicomponent elastic solids and electromagnetic media, equilibrium criteria. Application to solution thermodynamics, point defects in solids, phase diagrams. Phase transition, Landau rule, symmetry rule. Interfaces, nucleation theory, elastic effects. Kinetics: diffusion of heat, mass and charge; coupled flows. (F,SP) Morris

202. Crystal Structure and Bonding. (3) Three hours of lecture per week. Regular, irregular arrays of points, spheres; lattices, direct, reciprocal; crystallographic point and space groups; atomic structure; bonding in molecules and solids, ionic (Pauling rules), covalent, metallic bonding; structure of elements, compounds, minerals, polymers. (SP,F) de Fontaine


204. Theory of Electron Microscopy and X-Ray Diffraction. (3) Two 1½-hour lectures per week. Prerequisites: 102, 103 or equivalent. Basic principles of techniques used in the characterization of engineering materials by electron microscopy and X-Ray diffraction; emphasis on detailed analysis of defects responsible for material properties. Modern electrical, optical and particle beam techniques for characterization of bulk single crystals and their crystalline and amorphous layers. Examples: Hall effect, Deep Level Transient Spectroscopy, IR-Spectroscopy. (SP) Haller, Thomas

205. Defects in Solids. (3) Three 1-hour lectures per week. Prerequisites: Physics 7C or consent of instructor. Microstructures of solid state materials are determined by lattice defects. This course treats in detail the structure of crystal defects, defect formation and annihilation processes, and the influence of lattice defects on the physical and optical properties of crystalline materials. (F) Weber


213. Environmental Effects on Materials Properties and Behavior. (3) Two 1½-hour lectures per week. Prerequisites: MSE 112 or equivalent: Electrochemical aspects of corrosion; pitting and crevice corrosion; active/passive transition; fracture mechanics approach to corrosion; stress corrosion cracking; hydrogen embrittlement; liquid metal embrittlement; corrosion fatigue; testing methods. (F) Weber

221. Metals Processing. (3) Three hours of lecture per week. Prerequisites: MSE 202. MSE 211. Treatment of common techniques in the processing of metals from the perspective that these involve the manipulation of phase transformations and interactions to establish desirable combinations of composition and microstructure. Control of composition, phase content, grain size and shape, and precipitate and defect type and distribution. (SP) Staff

222. Powder Processing and Sintering. (3) Three hours of lecture per week. Prerequisites: MSE 101 or MSE 103 or equivalent. Introduction to surface and
223. Semiconductor Materials. (3) Three hours of lecture per week. Prerequisites: Physics 7C or consent of instructor. Semiconductors purification and crystal growth techniques. Doping, radiation damage, and annealing. Metal-semiconductor interfaces and reactions. Interaction between defects and impurities during processing of devices, Major electronic and optical methods for the analysis of semiconductors. (F) Haller

231. Advanced Electron Microscopy. (3) Three hours of lecture per week. Prerequisites: 204 or consent of instructor. Advanced treatment of instrumentation, theory and application of electron microscopy including high voltage systems microprocessor control, contrast transfer functions, optical diffractogram methods, STEM, reflection electron microscopy, atomic resolution microscopy and computer methods for image simulation and reconstruction. (SP) Gronsky

241. Electron Microscopy Laboratory. (2) Six hours of laboratory per week. Prerequisites: 204 or equivalent. Basic techniques and operations of transmission, and scanning, electron microscopy, x-ray microscopy, energy loss spectrometry; specimen preparation, interpretation of data; individual projects in materials science. (SP) Thomas

242. Electrical, Optical, and Ion Beam Techniques. (2) Six hours of laboratory per week. Prerequisites: 204 or equivalent. Advanced electrical, magnetic, and optical characteristics including Hall effect, capacity-voltage methods, electron paramagnetic resonance, conductivity and photococonductivity, and optical absorption are used to characterize crystalline and amorphous solids. Emphasis on semiconductors and magnetic materials. (F) Haller, Weber

290A. High Temperature Oxidation and Corrosion. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Thermodynamics of metal and alloy oxidation and corrosion in different atmospheric and fused salts. Defects in oxides and sulfides; rates and theories of scale growth. Stress generation and relief in growing scales; scale breakdown. Design of oxidation resistant alloys; accelerated attack and hot corrosion in energy applications. (F) Staff

290M. Special Problems in Materials Science. (3) Three hours of lecture per week. Prerequisites: 201A-201B or consent of instructor. Selected topics in the theoretical and empirical treatment of physical phenomena resulting from solid state materials. Topics will generally be selected based on student interest in MSE 201A-201B. The course provides an opportunity to explore subjects of particular interest in depth. (SP) Staff

298. Group Studies, Seminars, or Group Research. (1-9) Nine hours per week. May be repeated for credit. Grading on a satisfactory/unsatisfactory basis. Advanced study in various subjects through special seminars on topics to be selected each year, informal group studies of special problems, group participation in comprehensive design problems or group research on complete problems for analysis and experimentation. (F,SP) Staff

299. Individual Study or Research. (1-12) Course may be repeated for credit. Grading on a satisfactory/unsatisfactory basis. Advanced study of individual interest in a subject not currently offered. May be repeated for a maximum of four units per semester. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. May not be used to meet either unit or residence requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. (and other doctoral degrees). (F,SP) Staff

Mineral Engineering

Upper Division Courses

100. Introduction to Mining Methods. (3) Two 1/2-hour lectures per week. Prerequisites: Upper division standing. Details are given of all the important techniques used for extraction of minerals from the earth's crust. Surface and underground mining methods are outlined. The decision variables for a given solution to the selection of an optimum mining method are discussed. (F) McPherson

106. Mine Planning and Systems Engineering. (3) Two 1/2-hour lectures per week. Prerequisites: 100 or consent of instructor. Concepts of engineering economics and operations. Upper techniques applicable in mine planning are introduced. The principles of mine design and the impact of the selection of mining method on the economics of the mining project are discussed. (SP) Hood

108. Mineral Economics. (3) Two 1/2-hour lectures per week. Political and economic concepts of world, regional, and national mineral resources. Geographical concentration, production, uses and consumption. Exploration economics. The evolution of mining projects, financial appraisal methods, political risk assessment. Mining finance, capital sources, taxation, management accounts. (F) Cook

110. Fundamentals of Rock Mechanics. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Mathematics 105 and 106. Stress-strain behavior of rock and application to practical problems of design of mine excavations and methods of rock breakage. (F) Cook

111. Introduction to Fluid Flow in Rocks. (2) Two 1/2-hour lectures per week. Prerequisites: Mathematics 50B and Physics 5C. Principles governing the movement and storage of fluids in soils and rocks. Methods of measuring fluid flow parameters. Applications to typical problems in hydrogeology and engineering. (F) Witherspoon

120. Subsurface Ventilation Engineering. (3) Two 1 1/2-hour lectures per week. Prerequisites: Upper division standing. Principles of large-scale underground ventilation laws of airflow in tunnels and other subsurface openings. Airflow requirements. Ventilation surveys and economics. Thermodynamics of steady-state airflow systems. Ventilation network analysis. Theory design and operation of ventilation systems. Design of mines and deep nuclear waste repositories. Students undertake some laboratory work and conduct a computer-based ventilation planning project. (F) McPherson

130. Introduction to Mineral Exploration. (3) Two 1 1/2-hour lectures per week. Prerequisites: Geology 100 or consent of instructor. Economic targets of mineral exploration, regional geological setting and examples of typical deposits, including their mineralogy and physical properties. Introduction to exploration geophysics and geochemistry including field procedures, and interpretation. Exploratory drilling, logging, and deposit evaluation. (F) Spector, D. Becker, Morrison

150. Mineral Engineering Laboratory. (3) Two hours of lecture and three hours of laboratory per week. Study of factors influencing the physical properties of rocks which include the elastic moduli, electrical resistivity, magnetic susceptibility, dielectric constant, thermal conductivity, density, chemical composition and other properties related to techniques used for processing minerals. The laboratory experiments are designed to familiarize student with methods of measurement of physical properties of core, bulk rock specimens, and laboratory simulation, and to emphasize the physical and chemical principles. (SP) Becker, Cook, Doyle

160. Introduction to Mineral Processing. (3) Two 1/2-hour lectures per week. Prerequisites: Upper division standing. Introduction to operations and processes employed to utilize ores, minerals, and solid fuels and to extract metals from low-grade ores. Methods for separating minerals in ores and processing mineral substances are discussed from unit operation and unit process point of view. (F) Sastry

162. Mineral and Metallurgical Process Engineering. (3) Two 1 1/2-hour lectures per week. Prerequisites: 160. Quantitative description of the behavior of unit operations encountered in mineral processing/extraction process engineering. Introduction to process analysis by Computer Simulation. Materials and energy balances; fluid flow and heat transfer; dynamics and control in mineral and metallurgical systems. (SP) Staff

164. Mineral and Particulate Processing. (3) Two 1 1/2-hour lectures per week. Prerequisites: 160 and 162. Principles of physical processing of mineral and other particulate systems. Particle characterization; particle and particle-fluid interactions. Unit operations of mineral and particulate processing analysis of size reduction, mineral separation by gravity magnetic and flotation methods, thickening and filtration, agglomeration. (SP) Sastry

165. Mineral and Metallurgical Process Design. (3) Two 1 1/2-hour lectures per week. Prerequisites: 160 and 162. Development of flow sheets for the processing of minerals and the extraction of metals from ores. Principles employed in the selection of unit operations. Estimation of the cost of such operations and evaluation of alternative processing systems. (SP) Staff

178A-178B. Mineral Processing/Extractive Metallurgy Laboratory. (2,2) One hour of lecture and one 3-hour laboratory per week. Prerequisites: 160. Laboratory experiments in particle characterization, mineral processing, and extractive metallurgy. (F,SP) Staff

190. Field Trips. (1) Course may be repeated for credit. Prerequisites: Registered student in mineral engineering or consent of instructor. A number of lines and mineral processing plants will be visited on this trip. The focus will alternate between mining operations and extractive metallurgical operations. (SP) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-4) Must be taken on a pass/no pass basis. Prerequisites: Upper division standing in engineering. Group studies of selected topics. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a pass/no pass basis. Independent conferences. Prerequisites: Consent of instructor and major adviser. Supervised independent study. Please see pages 81 and 82 of this catalog for description and prerequisites. (F,SP) Staff

Graduate Courses

200. Mining of Bedded Deposits. (2) Two 1-hour lectures per week. Prerequisites: 100 or consent of instructor. Methods used in mining bedded deposits, including coal, oil shales, salt. Underground techniques including longwall and room and pillar layouts. Surface mining practices including strip mining. Principles of mine design and mine ventilation systems. Environmental impacts. Offered odd-numbered years. (SP) Hood

203. Numerical Methods for Analyzing Fluid Flow in Soil and Rock Systems. (3) Two 1 1/2-hour lectures per week. Prerequisites: Mathematics 50B or equivalent. Physical processes governing two-phase flow and chemical transport in deformable soil and rock systems. Physically based numerical models (finite differences, integrated finite differences, finite elements) of such systems. Outline of essential aspects of numerical methods for analyzing practical problems using available computer programs. (F) Narashimhan

204. Analytical Methods for Fluid Flow in Soil and Rock Systems. (3) Two 1 1/2-hour lectures per week. Prerequisites: Engineering 230A or consent of instructor. Analytical methods of solving steady state and nonsteady state fluid flow, boundary value problems in Idealized and real rock systems. Applications to field problems of practical interest. (SP) Witherspoon

206. Advanced Mine Planning. (2) One 2-hour lecture per week. Prerequisites: 106 or consent of instructor.

F: Fall; Sp: Spring; W: Winter; SP: Summer, P: Summer

1On leave, fall
2Recipent of Distinguished Teaching Award

Materials Science and Mineral Engineering / 245
240. Digital Data Processing. (2) Two 1/2-hour lectures per week. Prerequisites: 110, CE 118, CE 119, or CE 120, equivalent. Rock breaking is important to many operations in mining, civil, and petroleum engineering, mineral processing, and other engineering activities. Stable theoretical determination of depth fractures and fracture of rocks is studied experimentally and theoretically; the application of these phenomena in practice is examined. Offered odd-numbered years. (SP) Cook, Hood

241. Rock Breaking—Principles and Practice. (3) Two 1/2-hour lectures per week. Prerequisites: 110, CE 118, CE 119, or equivalent. Rock breaking is important to many operations in mining, civil, and petroleum engineering, mineral processing, and other engineering activities. Stable theoretical determination of depth fractures and fracture of rocks is studied experimentally and theoretically; the application of these phenomena in practice is examined. Offered odd-numbered years. (SP) Cook, Hood


243. Potential Field Methods in Applied Geophysics. (3) Two 1/2-hour lectures per week. Prerequisites: 120, Students interested in the study of geophysics should learn to use heat and humidity in mines. Heat conduction in rocks. Psychrometry. Simulation computer underground mining. Water cycling. Gas flow through strata. Gas leak detection. Sources of gas. Gas detection and fracture of rocks is studied experimentally and theoretically; the application of these phenomena in practice is examined. Offered odd-numbered years. (SP) McPherson

244. Hazards in the Subsurface Environment. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Upper division standing. Dangers in the design and interpretation of electromagnetic surveys. In mining prospecting and geological mapping. Petroleum exploration and source fields above and within layered earth models; fields scattered from basement igneous and sedimentary half spaces. (SP) Morrison

245. Electromagnetic Methods in Applied Geophysics. (3) Two 1/2-hour lectures and one hour of discussion per week. Prerequisites: Graduate standing. Electromagnetic propagation in the earth with emphasis on the design and interpretation of electromagnetic surveys in mineral prospecting and geological mapping. Petroleum exploration and source fields above and within layered earth models; fields scattered from basement igneous and sedimentary half spaces. (SP) Morris

246. Surface Chemistry of Flotation. (2) One 2-hour lecture per week. Application of surface and crystal chemistry to the separation of minerals by flotation; selective absorption of surfactants; national flotation; flotation of fine particulates, precipitates, oil droplets. Offered odd-numbered years. (SP) Fuerstenau

247. Inverse Theory. (2) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Consent of instructor. Direct versus iterative inversion of geophysical exploration data. Geelfield-Levitan, Marchenko, and Weidelt theories and their application to geophysical data, and their application via Coen's theory to the direct inversion of geophysical exploration data. The Backus and Gilbert resolving power theory will be discussed with emphasis on the tradeoff between resolution and certainty. (F)

248. Surface Properties of Materials. (3) Two 1/2-hour lectures per week. Thermodynamics of surfaces and phase boundaries, surface tension of solids and liquids, surface area, adsorption, phase equilibria and contact angles, electrophysical double layers at interfaces, theory and applications. Offered even-numbered years. (SP) Fuerstenau

249. Applied Colloidal Phenomena. (2) One 2-hour lecture per week. The characterization of colloidal materials and the physical chemistry of colloid systems. Primary emphasis on the interaction of colloid particles, particularly in aqueous environments, flocculation, coagulation, and dispersion phenomena, selective flocculation. Offered odd-numbered years. (SP) Fuerstenau

250. Marine Environmental Engineering. (3) Two 1/2-hour lectures per week. Prerequisites: Graduate standing. The physical basis of gravity and magnetic surveying. Reduction of gravity and magnetic data. Theoretical anomalies of common models; estimation of parameters of disturbing bodies; spectral analysis; design of filters for derivatives, continuation, and fields reduced to the pole. (SP) McPherson

251. Special Problems in Materials Science. (3) Three hours of lecture per week. Prerequisites: 201A-201B or consent of instructor. Selected topics in the theoretical, kinetic and phase transformation behavior of solid materials. Topics will generally be selected based on student interest in Mat.Sci. 201A-201B. The course will provide an opportunity to explore subjects of particular interest in greater depth. (SP) Evans

252. Group Studies, Seminars, or Group Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Advanced study in various subjects through special seminars on topics to be selected each year, informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for an entirely experimental basis. (1-12) (SP) Staff

253. Advanced Individual Study or Research. (1-12) Course may be repeated for credit. Individual investigation of advanced engineering problems. (1-12) (SP) Staff

254. Individual Study for Master's Students. (1-8) Units may not be used to meet either unit or residence requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Individual study for the comprehensive or language requirements in consultation with the field advisor. (1-8) (SP) Staff

255. Individual Study for Doctoral Students. (1-8) May not be used for unit or residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). (1-8) (SP) Staff

256. Special Problems in Subsurface Fluid Flow. (2) New course. Course may be repeated once for credit. Two 1-hour lecture per week. Prerequisites: Consent of instructor. Selected topics in the theoretical, kinetic and phase transformation behavior of solid materials. Topics will generally be selected based on student interest in Mat.Sci. 201A-201B. The course will provide an opportunity to explore subjects of particular interest in greater depth. (SP) Evans

257. Metallurgical Transport and Rate Phenomena. (3) Three hours of lecture per week. Prerequisites: Graduate standing in engineering. Heat, mass, and momentum transport and reaction kinetics in systems relevant to extractive metallurgy, mineral processing, and materials processing. (SP) Doyle

258. Advanced Electrochemical Techniques in Process Metallurgy. (2) New course. Two 1-hour lectures per week. Analysis of electrochemical methods for the extraction, refining and processing of metals in aqueous and molten salt systems. Thermodynamic and kinetic principles governing the development and operation of such processes. Offered odd-numbered years. (SP) Doyle
Mathematics
(College of Letters and Science)

Departmental Office: 870 Evans Hall, 642-6500
Chair: John W. Addison, Jr., Ph.D.

Professors:
John W. Addison, Jr., Ph.D. University of Wisconsin. Logic, combinatorics.
Robert M. Anderson, Ph.D. Yale University. Mathematical economics, computer science.
William G. Bade, Ph.D. University of California at Los Angeles. Functional analysis, operator algebras.
George M. Bergman, Ph.D. Harvard University. Rings, mathematics foundation.
Heinz-O. Bernhard, Ph.D. University of Göttingen. Classical analysis.
Paul R. Chemoff, Ph.D. Harvard University. Functional analysis, operator algebras.
Paul L. Chambef, Ph.D. University of California at Berkeley. Topology of Riemannian and complex manifolds.
Jerrold E. Marsden, Ph.D. Princeton University. Riemannian and complex manifolds.
C. Keith Miller, Ph.D. Rice University. Partial differential equations.

Assistant Professor:
Paul Concus, Ph.D. Harvard University. Fluid dynamics, numerical analysis.
Arthur E. Ogus (Vice Chair for Graduate Affairs), Ph.D. Harvard University. Algebraic geometry.
Berndt F. Urban, Ph.D. Columbia University. Numerical analysis, scientific computation.
Charles F. Hughes, Ph.D. Johns Hopkins University. Dynamics.

Adjunct Professor:
Rainer K. Sachs, Ph.D. Syracuse University. Relativity, biophysics.
Donald E. Sarason, Ph.D. University of Michigan. Functional analysis, operator theory.
Jack H. Silver, Ph.D. University of California at Berkeley. Mathematical logic, set theory.
Stephan Smale, Ph.D. University of Michigan. Dr. Sc. University of Warwick. Algorithm, numerical analysis.
Robert M. Solovay, Ph.D. University of Chicago. Mathematical logic, set theory.

Chair: John W. Addison, Jr., Ph.D. University of Wisconsin.
Department Office: 970 Evans Hall, 642-6550

The department offers undergraduate students a choice of two programs leading to the A.B. degree: mathematics particularly responsive to their needs. The requirements for both majors are summarized below. More detailed information is given in the Undergraduate Announcement, available from the undergraduate assistant in 986 Evans Hall.

General Major Requirements. Both major programs require a lower division base of Mathematics 1A-1B and 50A-50B. Courses 1A-1B must be acceptable. Mathematics 1A-1B must be completed with average grades of C or better. Math 50A and 50B must be completed with minimum grades of C in each (effective with classes taken fall 1988 and after). Transfer students should contact the undergraduate assistant in 986 Evans Hall for requirements for admission to the major. The minimum upper division major requirements are as follows:

Major in Mathematics. (a) Courses 104, 110, 113 and 185; (b) One course from each of the following three subject areas: I. Combinatorics (100, 102, 104, 107, 140, 141, 142); II. Logic and foundations (125A, 135); (c) At least eight upper division courses in all.

With the approval of the major adviser, students may count not more than two mathematically related courses for the major in mathematics and in other areas toward fulfillment of the major in mathematics.

Major in Applied Mathematics. (a) 104, 110, 113, 125A, and 185; (b) Three additional upper division courses, approved by a major adviser, which make up a coherent cluster in some applied area such as: actuarial science, biophysics, classical mechanics, computer science, decision theory, economics, fluid mechanics, geophysics, mathematical biology, numerical analysis, operations research, probability theory, quantum mechanics, systems theory. Many other clusters are also available.

Honors Program. In addition to completing the requirements for the major in mathematics or major in applied mathematics, students in the honors program must: (a) earn a grade-point average of at least 3.5 in upper division and graduate courses in the major and at least 3.5 in all courses taken at the University; (b) complete course 196 in which they will write a senior honors thesis, or pass two graduate mathematics courses with a grade of at least A (c) receive the recommendation of their major adviser. Students interested in the honors program should consult with their major adviser at least two semesters before graduation.

Preparation for Graduate Study

Students preparing for graduate work in mathematics are strongly advised to acquire a reading knowledge of two foreign languages, from among French, German, and Russian. Course H117, designed to challenge students' ability to do creative thinking, is useful for students preparing for graduate work. Undergraduate students also often take one or more of the following introductory graduate courses: 202A, 202B, 214, 225A-225B, 228A-228B, 250A-250B.

Graduate Programs

The department offers the M.A. degree in mathematics and Ph.D. degrees both in mathematics and applied mathematics. More detailed information including application procedures can be obtained from the graduate assistant, Department of Mathematics.

Courses and Seminars

Courses and seminars are listed below. More detailed and up-to-the-minute information on seminar offerings, instructors, textbooks, course and seminar
content, teaching, and grading methods, and schedules are posted outside 510 Evans Hall before the beginning of each semester.

Math P is intended for students who need to satisfy the quantitative reasoning requirement or who wish to take Math 1A or 16A but have not met the prerequisites.

Math 1A-1B is the calculus sequence intended for students planning majors in mathematics, physics, engineering, or the physical sciences. The sequence is also acceptable as a substitute for Math 16A-16B. It is designed to prepare students for further courses in mathematics.

Math 16A-16B is a terminal calculus sequence intended for students planning majors in the life or social sciences.

**Lower Division Courses**

P. Algebra and Trigonometry. (2) No credit will be given to students who take Math P after completing any other course in the department with the exception of Math 10. Two 1-hour lectures and two 1-hour sections per week. Prerequisites: Two years of high school math, plus a satisfactory grade in either the CEEB MAT test or the UCCS CU math diagnostic test. Consult the Math Department for details. A review of algebra, graphs, functions, exponential and logarithmic functions, trigonometry, right triangles, and trigonometric functions, sequences and series, and conics. Designed for students who wish to prepare for calculus. Two units recorded, but recognized as 4 units of work in computing study lists.

PS. Algebra and Trigonometry. (1-2) One or 2 units recorded, but recognized as 2 or 4 units of work in computing study lists. No credit will be given to students who take Math PS after completing any other course in the Math Department, with the exception of Math 16. Two 1-hour classes and two 1-hour discussions per week. Prerequisites: Two years of high school math. A self-paced version of Mathematics 1A-1B. Students are strongly urged to enroll in only 1 unit; units of credit can be adjusted upward at the end of the semester depending on the amount of work completed. (F,SP)

1A-1B. Calculus. (4A) Students will receive no credit for 1A after taking 2A, 3 or 6B; 2 units for 1A after 16A, no credit for 1B after 2A or 3; 2 units for 1B after 16B. Two hours lecture and two hours discussion; optional third hour lecture of workshop per week. Prerequisites: Three and one half years of high school math, including trigonometry and analytic geometry plus a satisfactory grade in one of the following: CEEB MAT test, an AP test, the UC/CSU math diagnostic test, or Math P. Consult the Math Department for details. A review of algebra, graphs, functions, exponential and logarithmic functions, trigonometry, right triangles, and trigonometric functions, sequences and series, and conics. Designed for students who wish to prepare for calculus. Two units recorded, but recognized as 4 units of work in computing study lists.

1A-1B. Calculus. (4A) Students will receive no credit for 1A after taking 2A, 3 or 6B; 2 units for 1A after 16A, no credit for 1B after 2A or 3; 2 units for 1B after 16B. Two hours lecture and two hours discussion; optional third hour lecture of workshop per week. Prerequisites: Three and one half years of high school math, including trigonometry and analytic geometry plus a satisfactory grade in one of the following: CEEB MAT test, an AP test, the UC/CSU math diagnostic test, or Math P. Consult the Math Department for details. A review of algebra, graphs, functions, exponential and logarithmic functions, trigonometry, right triangles, and trigonometric functions, sequences and series, and conics. Designed for students who wish to prepare for calculus. Two units recorded, but recognized as 4 units of work in computing study lists.

1A-1B. Calculus. (4A) Students will receive no credit for 1A after taking 2A, 3 or 6B; 2 units for 1A after 16A, no credit for 1B after 2A or 3; 2 units for 1B after 16B. Two hours lecture and two hours discussion; optional third hour lecture of workshop per week. Prerequisites: Three and one half years of high school math, including trigonometry and analytic geometry plus a satisfactory grade in one of the following: CEEB MAT test, an AP test, the UC/CSU math diagnostic test, or Math P. Consult the Math Department for details. A review of algebra, graphs, functions, exponential and logarithmic functions, trigonometry, right triangles, and trigonometric functions, sequences and series, and conics. Designed for students who wish to prepare for calculus. Two units recorded, but recognized as 4 units of work in computing study lists.
mathematical inclination and motivation. Emphasis is on rigor, depth, and hard problems. (SP) Staff

113. Introduction to Abstract Algebra. (Formerly 113A) Three hours of lecture per week. Prerequisites: Math 50A-50B. Sets and relations. The integers, congruences, numerical functions, theory of primes. Topics selected from: Diophantine analysis, continued fractions, partitions, quasiregular fields, asymptotic distributions, additive problems. (F) Staff

114. Second Course in Abstract Algebra. (New course) Three hours of lecture per week. Prerequisites: Math 113. Further topics on groups, rings and fields not covered in Math 113. Possible topics include: the Sylow Theorems and their applications to group theory; classical groups; abelian groups and modules over a principal ideal domain; algebraic field extensions; splitting fields and Galois theory; construction and classification of finite fields. This course requires at least twelve hours per week of effort including time spent in class and in outside reading and preparation. (F) Staff

115. Introduction to Number Theory. (4) Three hours of lecture per week. Prerequisites: 2B, 50B or 51. Divisibility, congruences, numerical functions, theory of primes. Topics selected from: Diophantine analysis, continued fractions, partitions, quasiregular fields, asymptotic distributions, additive problems. (F) Staff

117. Mathematical Problem Seminar. (Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. Recommended for exceptional students with strong mathematical inclination and motivation. Emphasis is on rigorous, depth, and hard problems. (SP) Staff

*120A-120B. Analysis for Applied Mathematics. (4-4) Three hours of lecture per week. Prerequisites: Math 113. Further topics on groups, rings and fields not covered in Math 113. Possible topics include: the Sylow Theorems and their applications to group theory; classical groups; abelian groups and modules over a principal ideal domain; algebraic field extensions; splitting fields and Galois theory; construction and classification of finite fields. This course requires at least twelve hours per week of effort including time spent in class and in outside reading and preparation. (F) Staff


125C-125D. Mathematical Logic. (4-4) Three hours of lecture per week. Prerequisites: 113 or consent of instructor. Sentential and quantificational logic. Formal grammar, semantical interpretation, formal deduction, and their interrelation. Applications to formalized mathematics, in particular, proof from model or proof theory. 125A: (FSP); 125B: (SP) Staff

126. Introduction to Partial Differential Equations. (4) Three 1-hour lectures per week. Prerequisites: 104. Classification of second-order equations, boundary value problems for elliptic and parabolic equations, existence and uniqueness theorems in simple cases, maximum principles, a priori bounds, the Fourier transform. (SP) Staff

128A. Numerical Analysis. (4) Three 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: 50B. Programming for numerical calculations, roundoff error, approximation and interpolation, numerical quadrature, and solution of ordinary and partial differential equations. Direct solutions of systems of linear equations. Practice on the computer. (F,SP) Staff

128B. Numerical Analysis. (4) Three hours of lecture and one hour discussion per week. Prerequisites: 110 and 128A. Iterative solution of systems of linear equations, eigenvalues and eigenvectors of matrices, applications to simple partial differential equations. Practice on the computer. (F,SP) Staff

130. The Classical Geometries. (4) Three hours of lecture per week. Prerequisites: 113 and 110. Topics chosen from the following list: axioms for affine and projective planes, planes over a division ring, duality, the coordinatization theorem, n-dimensional projective geometry over a field, coordinatization and classification, classification of hyperbolic groups and its subgroups, non-Euclidean geometry, inversive geometry.

132. Topics in Geometry. (4) Three hours of lectures per week. Prerequisites: 104 and 113, or consent of Instructor. Topics selected from such areas as classical projective geometry, non-Euclidean geometry, symplectic geometry, algebraic geometry, integral geometry, convexity, and elementary topology. (F)

135. Introduction to the Theory of Sets. (4) Three hours of lecture per week. Prerequisites: 104 and 113. Set-theoretical paradoxes and means of avoiding them. Sets, relations, functions, order and well-order. Proof by transfinite induction and definitions by transfinite recursion. Cardinal and ordinal numbers and their arithmetic. Countability and the Continuum Hypothesis. (F)

135H. Introduction to the Theory of Sets. (4) Three hours of lecture per week. Prerequisites: 104 and 113. Honors section corresponding to course 135 for exceptional students with strong mathematical inclination and motivation. Emphasis is on rigorous, depth, and hard problems. (SP) Staff

140. Metric Differential Geometry. (4) Three hours of lecture per week. Prerequisites: 104 or 120B or 121B. Frenet formulas, isoperimetric inequality, local theory of curves and surfaces, first and second fundamental forms. Gaussian and mean curvature, isometries, geodesics, parallelism, the Gauss-Bonnet-Von Dyck Theorem. (F)

141. Elementary Differential Topology. (4) Three hours of lecture per week. Prerequisites: 104 and 113, or consent of instructor. Lectures on special topics, which will be announced at the beginning of the semester. (F,SP) Staff

142. Elementary Algebraic Topology. (4) Three hours of lecture per week. Prerequisites: 104 or equivalent and linear algebra. Manifolds in n-dimensional Euclidean space and smooth maps, Sard's theorem, classification of compact one-manifolds, transversality and Intersection modulo 2. (F)

143. History of Mathematics. (4) Three hours of lecture per week. Prerequisites: 104 or equivalent and linear algebra. Manifolds in n-dimensional Euclidean space and smooth maps, Sard's theorem, classification of compact one-manifolds, transversality and Intersection modulo 2. (F)

145. Boolean Algebra. (4) Three hours of lecture per week. Prerequisites: 113A. Postulates, treatment as rings or lattices; relation to sentential calculus and calculus of classes; infinite operations; atoms; subalgebras, ideals, direct products; representation theorem.

160. History of Mathematics. (4) Three hours of lecture per week. Prerequisites: 113A, 120A, and 113. History of analytic geometry, analytic geometry, and calculus from ancient times through the seventeenth century and selected topics from more recent mathematical history. (F,SP) Staff

163. Tutorial in Upper Division Mathematics. (Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 104 or equivalent and linear algebra. Manifolds in n-dimensional Euclidean space and smooth maps, Sard's theorem, classification of compact one-manifolds, transversality and Intersection modulo 2. (F)


215A-215B. Algebraic Topology. (4/4) Three hours of lecture per week. Prerequisites: 215A-113 and point-set topology (e.g., 215B, 215A, 214 recommended (may be taken concurrently). Fundamental group and covering spaces, simplicial and singular homology theory with applications to combinatorial duality theory, duality theorem. Homotopy theory, fibrations, relations between homotopy and homology, obstruction theory, and topics from spectral sequences, cohomology operations, and characteristic classes selected. Staff. Sequence begins Fall.

219. Ordinary Differential Equations and Flows. (4) Three 1-hour lectures per week. Prerequisites: 214. Ordinary differential equations. Diffeomorphisms and flows on manifolds. Stable manifolds, generic properties, structural stability. Special topics selected by the instructor. (F)

220A. Applied Mathematics for Physical Sciences and Engineering. (4) Three hours of lecture per week. Prerequisites: 212A, 121B, or both 104 and 185 Ordinary and partial differential equations of mathematical physics and engineering. Fourier analysis, boundary value problems, applications to physical problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on nonlinear equations. More general types of equations and systems of equations. Sequence begins Fall.


224A-224B. Mathematical Methods for the Physical Sciences. (4/4) Three hours of lecture per week. Prerequisites: 128A-128B or equivalent experience with matrix computation. Direct solution of linear systems, including large sparse systems: error bounds, iteration methods, least square approximation, eigenvalues and eigenvectors of matrices, nonlinear equations, and minimization of functions. (F)

225A-225B. Metamathematics. (4) Three hours of lecture per week. Prerequisites: 214. Riemannian metric and Levi-Civita connection, geodesics and completeness, curvature, first and second variations of arc length. Additional topics such as the theorems of Myers, Synge, and Cartan-Hadamard, the second fundamental form, convexity and rigidity of hypersurfaces in Euclidean space, homogeneous manifolds, the Gauss-Bonnet theorem, and characteristic classes. (F)

238. Metamathematics of Set Theory. (4) Three hours of lecture per week. Prerequisites: 225B and 235A. Various set theories: comparison of strength transitive and natural models, finite axiomatizability. Independence and consistency of axiom of choice, continuum hypothesis, large cardinal hypothesis, etc. The measure problem and axiom of strong infinity. (F)

240. Riemannian Geometry. (4) Three hours of lecture per week. Prerequisites: 214. Riemannian metric and Levi-Civita connection, geodesics and completeness, curvature, first and second variations of arc length. Additional topics such as the theorems of Myers, Synge, and Cartan-Hadamard, the second fundamental form, convexity and rigidity of hypersurfaces in Euclidean space, homogeneous manifolds, the Gauss-Bonnet theorem, and characteristic classes. (F)

245A-245B. General Theory of Algebraic Structures. (4) Three hours of lecture per week. Prerequisites: 113 and 135. Structures defined by operations and/or relations, and their homomorphisms. Classes of structures determined by identities. Constructions such as free objects, objects presented by generators and relations, ultraproducts, direct limits. Applications of general results to groups, rings, lattices, etc. Course may employ study of complete ordered fields, Boolean algebras, or category theory and adjoint functors, or other aspects. 245B (SP); 245A: not offered 1988-89.

250A. Groups, Rings, and Fields. (4) Three hours of lecture per week. Prerequisites: 114 or consent of instructor. Group theory, including the Jordan-Hlder theorem and the Sylow theorems, applications to solvable and nilpotent groups and their ideals. Unique factorization domains and principal ideal domains. Modules. Chain conditions. Fields, including fundamental theorem of Galois theory, theory of finite fields, and transcendence degree. Staff. (F)

250B. Multilinear Algebra and Further Topics. (4) Three 1-hour lectures per week. Prerequisites: 250A. Tensor algebras and exterior algebras, with application to linear transformations. Commutative ideal theory, lo-
calization. Elementary specialization and valuation theory. Related topics in algebra. (SP) **Staff

**251. Ring Theory. (4) Three hours of lecture per week. Prerequisites: 250A. Topics such as: Noetherian rings, rings with descending chain condition, theory of the radical, and applications to modules, functors and derived functors, homological dimension of rings and modules. (SP) **Staff

**252. Representation Theory. (4) Three hours of lecture per week. Prerequisites: 250A. Structure of finite dimensional algebras, applications to representations of finite groups, the classical linear groups.

253. Homological Algebra. (4) Three hours of lecture per week. Prerequisites: 250A. Modules over a ring, homology, abelian categories, derived functors, projective and injective resolutions, derived functors and their applications, homological dimension of rings and modules. (SP)


256A-256B. Algebraic Geometry. (4;4) Three hours of lecture per week. Prerequisites: 250A. affine and projective algebraic varieties. Theory of schemes and morphisms of schemes. Smoothness and differentials in algebraic geometry. Coherent sheaves and their cohomology. Basic aspects of intersection theory and selected applications. Sequence begins fall.

257. Group Theory. (4) Three hours of lecture per week. Prerequisites: 250A. Topics such as generators and relations, infinite discrete groups, groups of Lie type, permutation groups, character theory, solvable groups, simple groups, transitive and cohomological methods. (SP) **Staff

**258. Classical Harmonic Analysis. (4) Three hours of lecture per week. Prerequisites: 206. Fourier series, Fourier transforms, convolution, Fourier inversion, Dirac distributions, tempered distributions, Hilbert spaces, applications to differential equations and complex analysis. (SP) **Staff

**259. Transformation Groups. (4) Three hours of lecture per week. Prerequisites: 214 and 215A. Topological groups, Haar measure, general theory of topological transformation groups, the existence of slices and applications, the Smith theory of periodic transformations.

260. Abstract Harmonic Analysis. (4) Three hours of lecture per week. Prerequisites: 206. Topological groups. Haar measure, Pontryagin duality, and structure theory of locally compact abelian groups, Peter-Weyl theorem for compact groups. Further topics may include finite abelian groups, Pontryagin duality for noncompact groups, also head in the direction of group representations for noncompact locally compact groups.

261A-261B. Lie Groups. (4;4) Three hours of lecture per week. Prerequisites: 214. Lie groups and Lie algebra, fundamentals of Lie groups, general structure theory, compact, nilpotent, solvable, semisimple Lie groups; classification theory and representation theory of semisimple Lie algebras and Lie groups, further topics may include Lie transformation groups, etc., if time permits. In view of its simplicity and its wide range of applications, it is preferable to cover compact Lie groups and their representations in 261A. Sequence begins fall.

265. Differential Topology. (4) Three hours of lectures per week. Prerequisites: 214 plus 215A or some familiarity with algebraic topology. Approximations, degrees of maps, vector bundles, tubular neighborhoods. Introduction to Morse theory, handlebodies, cobordism, surgery. Additional topics selected by instructor from characteristic classes, classification of manifolds, immersions, embeddings, singularities of maps. (SP) **Staff

271. Topics in Foundations. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (SP)

273. Advanced Numerical Analysis. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topic of current interest in numerical analysis and its applications.

273A. Ordinary Differential Equations. (4)
273B. Initial Value Problems. (4)
273C. Boundary Value Problems. (4)
273D. Finite Element Methods. (4)
273E. Topics in Numerical Linear Algebra. (4)
273F. Topics in Computational Physics. (4)
273G. Nonlinear Equations and the Minimization of Functions. (4)
273H. Monte Carlo Methods. (4)
273J. Approximation Theory. (4)
273J. Ill-Posed Problems. (4)
273K. Inverse Problems. (4)
273L. Topics in Algebra. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (F.SP)

275. Topics in Applied Mathematics. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (F.SP)

276. Topics in Topology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (F.SP)

277. Topics in Differential Geometry. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (SP)

278. Topics in Analysis. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (F.SP)

279. Topics in Partial Differential Equations. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. (SP)

280A-280B. Mathematical Theory of Relativity. (4;4) Three hours of lecture per week. Prerequisites: 140 or consent of instructor. Special theory of relativity, reformulation of classical physical theories in relativistic form, principles of equivalence, Einstein's theory of gravitational fields, astrophysical and cosmological problems. Additional topics chosen by the instructor.

290. Seminars. (1-4) Course may be repeated for credit. Varies. Topics in foundations of mathematics, theory of numbers, elementary number theory, topology, algebra, applications by means of lectures and informal conferences; work based largely on original memoirs. (F.SP) **Staff

295. Individual Research. (1-9) Course may be repeated for credit. Sections 1-30: letter grading; sections 31-60: must be taken on a satisfactory/unsatisfactory basis. By appointment. Intended for candidates for the Ph.D. degree. (F.SP) **Staff

299. Reading Course for Graduate Students. (1-6) Course may be repeated for credit. Sections 1-20: letter grading; sections 21-60: must be taken on a satisfactory/unsatisfactory basis. By appointment. Investigation of special problems under the direction of members of the department. (F.SP) **Staff

600. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By appointment. Prerequisites: For candidates for master's degree. Individual study for the comprehensive or language requirement in consultation with the field advisor. Units may not be used to meet either unit or residence requirements for a master's degree. (F.SP) **Staff

Professional Courses

300. Teaching Workshop. (3) Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour lectures per week, plus class visits. Designed for graduate student instructors with little or no teaching experience. The course consists of practical teaching, alternative to standard classroom methods, guided group and self-analysis of videotapes, reciprocal classroom visits, and an individual project. (F.SP) **Staff

301. Undergraduate Math Instruction. (1-2) May be taken for one unit by special permission of instructor. Course may be repeated once for credit. Must be taken on a passed/not passed basis. Prerequisites: Permission of Student Learning Center, as well as sophomore standing and at least a B average in two semesters of calculus. Apply at SLC, Building T-8, during pre-enrollment. Two to three hours of seminar and four hours (for 2 units) of tutoring per week at the Student Learning Center or the Professional Development Program. (F.SP) **Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 103. Introduction to Mathematical Economics. (3) Students who have taken Economics 104 will receive no credit for IDS 103. Three hours of lecture per week. Prerequisites: Math 50A-50B. Selected topics illustrating the application of mathematical techniques and economic theory. The course is intended for upper division students in mathematics, statistics, the physical sciences, and engineering, and for economics majors with adequate mathematical preparation. No economic background is required. Sponsoring departments: mathematics and economics. (SP)

Graduate Courses

IDS 213A-213B. Mathematical Economics. (3;3) Two hours of lecture per week. Prerequisites: Math 104 and 112 and Statistics 101. Mathematical analysis of economic theory. The problems treated involve wide a range of mathematical techniques and of economic principles as possible, including theories of preferences, utility, demand, personal probability, games and general equilibrium. This course requires at least 12 hours of work per week including outside work and preparation. Sponsoring departments: economics and mathematics. (F.SP)

Other Departments and Groups with Related Programs

Biostatistics
Electrical Engineering and Computer Sciences
Industrial Engineering and Operations Research
Logic and the Methodology of Science
Science and Mathematics Education

Statistics

*Not offered 1988-89
On leave, spring
ailed to active service
†Recipient of Distinguished Teaching Award
Mechanical Engineering (College of Engineering)

Department Office: 6189 Etchegray Hall, 642-1338
Chair: Clayton D. Mots, Jr., Ph.D.

Professors:
Stefan Blower, Ph.D. Brown University. Fluid mechanics.
David B. Bogt, Ph.D. Brown University. Elasticty, plasticity.
Michael F. Capanna, Ph.D. Brown University. Continuum mechanics.
Glen J. Gilmore, Ph.D. University of Michigan. Theoretical, numerical fluid mechanics.
A. Carlos Fernandez-Pello, Ph.D. University of California at Berkeley. General mechanics and continuum fluids.
Ralph Greif, Ph.D. Harvard University. Thermal radiation.
Freek E. Hauser, Ph.D. University of California at Berkeley. Finite element, mechanical components design.
Chet S. Hsu, Ph.D. Stanford University. Nonlinear dynamical systems.
Frederick S. Sherman, Ph.D. University of California at Berkeley. Viscous flow, gas dynamics.
Robert St. Bishop, Ph.D. University of California at Berkeley. General mechanics, combustion phenomena.

Graduate Programs

Both master's and doctoral programs are available.

Students may choose either a scientific emphasis in particular areas or integrated studies directed to professional objectives. Master of Science and Doctor of Philosophy degrees are the relevant degrees for the professional emphasis, and Master of Engineering and Master of Science degrees are the relevant degrees for the professional objective. Specialization is offered in the following areas: (1) Biomechanics; (2) Controls; (3) Design; (4) Dynamics and Dynamic Systems; (5) Environmental Engineering; (6) Fluid Mechanics; (7) Heat and Mass Transfer; (8) Manufacturing; (9) Mechanics of Deformable Materials; (10) Petroleum Engineering; (11) Thermodynamics. Departmental brochures and from the Annals of Engineering, under Graduate Program details on various aspects of graduate study are available from departmental brochures and from the Annals of Engineering.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

Lower Division. Mathematics 1A-1B, 54A-54B; Chemistry 1A, 7A-7B-7C; Engineering 7, 12, 36, 45; 17 units of electives.

Upper Division. Mechanical Engineering 102A-102B, 104, 105, 106, 109-109B-109; Electrical Engineering, Computer Sciences 100; Civil Engineering 133; 27 units of electives.

Mechanical Engineering Options.

The following groups of electives are presented to help undergraduate students focus their choices on specific professional goals. Each group contains more than one can be taken within the standard curriculum. See note footnotes. The electives need not be from any one single group.

Applied Mechanics. Engineering 117, 118; Mechanical Engineering 133, 134, 161, 162, 163, 173, 175, 185, 282; Mathematics 104. Mr. Johnson

Associate Professors:
Van P. Carey, Ph.D. State University of New York-Buffalo. Three-phase fluid motion, combustion.
John W. Deely, Ph.D. Stanford University. Spectroscopic and laser diagnostics.
Harold Frey, Ph.D. University of California at Berkeley. Composite materials.
David A. Doty, Ph.D. (Vice Chair) University of Wisconsin-Madison, reviewed habits, robotics.
Joseph A. Humphrey, Ph.D. Imperial College. Turbulence and combustion.
George C. Johnson, Ph.D. Stanford University. Ultrasonic, stress evaluation.
Philip Marcus, Ph.D. Princeton University. Computational fluids.
Albert S. Pinsard, Ph.D. Columbia University. Computer-aided design, design optimization (Acting).
Kent U. Uddin, Ph.D. University of Utah. Heat transfer, geotechnology.

Assistant Professors:
Alice M. Aggogi, Ph.D. Stanford University. Decision and management.
Patricia A. Eubank, Ph.D. Stanford University. Convective heat transfer.
Robert Horowitz, Ph.D. University of California at Berkeley. Automatic control systems design, robotics.

Fai Ma, Ph.D. California Institute of Technology. Dynamical systems, random vibrations, multiphase flow. John Hopkins University.

Geophysical fluid dynamics.

Professors:
Milton R. Pickus, Ph.D. (In residence) (Emeritus)
Kent S. Spiegel, Ph.D. (In residence) (Emeritus)
Lawrence Stark, M.D.

Mechanical Engineering includes the science and art of the formulation, design, development, and control of systems and components involving thermodynamics, fluid mechanics, mechanisms, and the conversion of energy into useful work. The mechanical engineer requires a thorough training in mathematics, physics, chemistry, and materials processing. Specialization in areas of materials, mechanics, fluid mechanics, thermodynamics, as well as intensive design and laboratory experience. The program of study includes basic subjects common to all engineering fields, fundamental subjects important to all mechanical engineers and specialization in one or more phase of mechanical engineering. Undergraduate specialization is provided in the choice of technical electives which may be selected from the subject areas of applied mechanics, automatic controls, electro-mechanical, systems analysis, energy conversion, fluid mechanics, heat and mass transfer, materials processing, mechanical design, naval architecture, nuclear engineering, cryogenics, thermodynamics, and biomedical, environmental, and petroleum engineering. Because of the widening range of technical problems and the limited amount of specialization available in the undergraduate curriculum, qualified students should consider graduate study to enhance their scientific and technological capability. Further details on undergraduate and graduate fields of emphasis in mechanical engineering are available in the undergraduate program in Mechanical Engineering. The department also offers a graduate brochure detailing the graduate program in Mechanical Engineering.

Graduate Programs

Both master's and doctoral programs are available. The student may choose either a scientific emphasis in particular areas or integrated studies directed to professional objectives. Master of Science and Doctor of Philosophy degrees are the relevant degrees for the scientific emphasis, and Master of Engineering and Doctor of Engineering degrees are the relevant degrees for the professional objective. Specialization is offered in the following areas: (1) Bioengineering; (2) Controls; (3) Design; (4) Dynamics and Dynamic Systems; (5) Environmental Engineering; (6) Fluid Mechanics; (7) Heat and Mass Transfer; (8) Manufacturing; (9) Mechanics of Deformable Media; (10) Petroleum Engineering; (11) Thermodynamics. Departmental brochures and from the Annals of Engineering, under Graduate Program details on various aspects of graduate study are available from departmental brochures and from the Annals of Engineering.

Lower Division Courses

92. Introduction to Mechanical Engineering. (1) Must be taken on a pass/fail basis. One hour of lecture per week. An outline of the field of mechanical engineering designed to acquaint the entering student with the profession and the activities of the Department.

F. Mort

Upper Division Courses

101. Introduction to Manufacturing Systems. (3) Three hours of lecture per week. Prerequisites: 102A, Engineering 45. Fundamentals of manufacturing systems; including machine tool control, CAM, processing considerations in manufacturing automation, robotics, integrated systems for assembly and inspection; use of case study method for design and selection of modern manufacturing systems; economics of manufacturing operations; group technology. (F) Dornfeld

102A. Mechanical Behavior and Processing of Materials. (3) Three hours of lecture per week. Prerequisites:
Mechanical Engineering 130. Elastic and plastic deformation under static and dynamic load conditions. Prediction and prevention of failure by yielding, buckling, fracture, fatigue, creep and wear. Environmental influences, residual stress effects. Selection, forming, cutting, heat treatment of materials based on design requirements. (F,SP) Staff

102B. Mechanical Engineering Design. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 102A and Engineering 28. Application of principles of mechanics, material science and manufacturing processes to the design of components and complete machines which must meet prescribed functional and performance requirements. Synthesis and analysis of a realistic machine design project. (F,SP) Staff

104. Engineering Mechanics II. (3) Three hours of lecture per week. Prerequisites: Engineering 36 (recommended); Mathematics 50B. Principles of Newtonian Dynamics of a particle or system of particles and of rigid bodies in one- and two-dimensional motions. (F,SP) Staff

105. Thermodynamics. (4) Four hours of lecture per week. Prerequisites: Chemistry 1A; Mathematics 50A; Physics 5A/7A. First and second laws of thermodynamics, thermodynamic properties, reversibility, availability, entropy production. Energy conversion cycles, statistical mechanics, and microscopically-based properties. (F,SP) Staff

106. Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: 104 and 105. Fluid properties; hydrostatics; mass, momentum and energy balances on finite control volumes;analysiscalculation of inviscid and viscous flows. Empirical description of turbulent flow. Model laws. Applications to flow around bodies and through conduits, meters, and machines. (F,SP) Staff

107A. Experimentation and Measurement. (3) Three hours of lecture per week for the first 10 weeks, no lectures for the last five weeks; three hours of laboratory per week for full semester. Prerequisites: 104, 105, 106, 109 (may be taken concurrently). EECS 100. Methods and techniques of experimental investigation of mechanical engineering phenomena and systems. Experimental design, measurement systems, data processing, and data reduction. Modelling of measurement and experimental systems. Technical communication skills. (F,SP) Staff

107B. Mechanical Engineering Laboratory. (4) Seven hours of laboratory per week. Prerequisites: 107A. Experimental investigation and analysis of engineering systems and phenomena of interest to mechanical engineering. Emphasis on experiments. Analysis of data and reporting of experimental results. (F,SP) Staff

109. Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105 and 106. Conductive, convective, and radiative transport of thermal energy, boiling and condensation heat transfer, heat exchangers. (F,SP) Staff

110. Mechanical Engineering—Project Engineering. (3) Three hours of lecture per week. Prerequisites: 107A (may be taken concurrently) and 102B. To introduce concepts of project engineering systems by having students complete preliminary designs of a realistic mechanical engineering system and by design seminars and conferences. (SP) Staff

122. Processing of Materials in Manufacturing. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 102A; Civil Engineering 130. Fundamentals of manufacturing processes (metal forming, metal cutting, welding and joining and casting); selection of metals, plastics, and other materials relative to the design and choice of manufacturing processes. (SP) Staff

128. Computer-Aided Mechanical Design. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 102A; Engineering 28, Civil Engineering 130, and Mathematics 50B, or consent of instructor. Introduction to interactive computer, computer graphics in a PLOT-10/1GL color graphics environment, and numerical methods in design and optimization of mechanical systems. (F,SP) Aggino, Risano


133. Mechanical Vibrations. (3) Three hours of lecture per week. Prerequisites: 104. An introduction to the theory of vibration and an introduction to the study of harmonic motion, resonance, transient and random excitation, application of Fourier analysis and convolution methods. Multidegree of freedom discrete systems including principal coordinates, and Rayleigh's principle. (SP) Steidel

134. Automatic Control Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Mathematics 50B; Physics 5C; Computer Science 1 [7]. Formulation of mathematical models of active and reactive, linear and non-linear dynamic systems; state equations and system stability; linear control systems; PID control; designer design in the frequency and time domains; discrete time and computer control of systems. (F) Tomizuka

136. Design of Microprocessor-Based Mechanical Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Computer Science 7. This course prepares for the conceptual design and prototyping of mechanical systems that use microprocessors to control their operation, acquire and analyze data, and interact with operators. The architecture of microprocessors is related to problems in mechanical systems through study of systems, including electro-mechanical components, control systems, and a variety of instruments. Laboratory exercises lead through studies of different levels of software, including machine (SP) Amsden

140. Combustion Processes. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 105; 106 (may be taken concurrently). Fundamentals of combustion, flame structure, flame spread, flammability, ignition, stirred reaction, kinetics, and nonequilibrium processes. Combustion in engines, power generation, and fire safety. (F) Pagni

142. Thermal Environmental Control. (3) Three hours of lecture per week. Prerequisites: 105, 106, and 109 (may be taken concurrently). Systems and processes for the production and control of thermal environments for human comfort and for mechanical systems. Specific topics include refrigerant component and system analysis, cryogenic systems, absorption refrigeration, psychrometrics, human comfort criteria, air-conditioning, solar radiation effects on buildings. The course emphasizes the use of computer simulation as a tool for analysis of thermal systems. (SP) Carey

148. Petroleum Engineering I. (3) Three hours of lecture per week. Prerequisites: Senior standing in engineering. Development of oil and gas producing properties to maximize recovery; multiple-phase flow, recovery mechanisms, enhanced recovery, economics. (SP) Naghdi

149. Petroleum Engineering II. (3) Three hours of lecture per week. Prerequisites: Senior standing in engineering. Production of oil and gas producing properties to maximize recovery; multiple-phase flow, recovery mechanisms, enhanced recovery, economics. (SP) Udell

151. Advanced Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105, 106, and 109. Basic principles of heat transfer and an introduction to applications. Subject areas include steady-state and transient system analyses for conduction, free and forced convection, boiling, condensation, and thermal radiation. (SP) Humphrey

161. Applied Fluid Mechanics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 105 and 106. Operating principles and characteristics of flow in conduits, lubrication systems, pumps, turbines, and compressors will be described, and an analysis by application of concepts of potential flow, laminar and turbulent flow will be made. (SP) Staff

162. Elementary Hydrodynamics. (3) Three hours of lecture per week. Prerequisites: Math 50A, 50B; Eng 117 recommended. This course provides an introduction to classical hydrodynamics aimed at senior undergraduates and first-year graduate students. The course in mainly theoretical and makes use of analytic techniques, especially complex variable theory, for solving two-dimensional and axisymmetric flow problems. Applications are made to flow past airfoils, hydrofoils, to internal channel flows, free streamline flows, and surface waves. Viscous effects are discussed briefly. (F) Morris

163. Introduction to Aero- and Hydrodynamics. (3) Three hours of lecture per week. Prerequisites: 105. Forces and moments acting on solid bodies moving through fluids are calculated, in order to evaluate power requirements, stability, and control forces for various vehicles. Concepts and techniques of potential-flow theory and boundary-layer theory are developed and applied. (SP) Laitone

170. Engineering Mechanics III. (3) New Course. May not receive credit if you have taken ME 104 fall 1988 through spring 1989 or ME 104B under quarter system. Two hours of lecture and one hour of discussion per week. Prerequisites: 104 as offered beginning fall 1988. Newtonian Dynamics of a particle or system of particles and of rigid bodies in three-dimensional motions. (SP) Leimbach


175. Intermediate Dynamics. (3) Three hours of lecture per week. Prerequisites: 104; Lagrangian Mechanics. Theory of constraints, virtual displacement and velocities, generalized coordinates, Lagrangian function, Hamilton's principle and Lagrange's equations of motion; first integrals; engineering applications to constrained motion of particles and rigid bodies, oscillations, gyrodymanics, and electro-mechanical problems. (F) Ma

185. Introduction to Continuum Mechanics. (3) Three hours of lecture per week. Prerequisites: Physics 5A/7A; Mathematics 50B. Kinematics of fluid motion, the concept of stress, conversion of mass and balance of linear momentum, angular momentum and energy. Mechanical constitutive equations for ideal fluid, linear elastic solid. (F,SP) Staff

188. Directed Group Studies for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Credit for 198 or 199 courses combined may not exceed 4 units in any single term. Prerequisites: Upper division standing and good academic standing. See College Bulletin for other restrictions. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Graduate standing, major advisor. Supervised independent study. Please see pages 81 and 82 of this catalog for description and prerequisites. (F,SP) Staff

Graduate Courses

207. Experimental Methods in Mechanical Engineering. (3) Four and one-half hours of meeting per week: either 1½ hours of lecture and 3 hours of laboratory or 3 hours of lecture and 1½ hours of laboratory per week. Prerequisites: Graduate standing. Principles of physical measurements; instrumental response and characteristics. Measurement techniques in fluid mechanics, heat transfer, combustion, and solid mechanics. Experimental design and experience in use of the computer for small temporary measurement systems. Term project. (SP) Hurbut

210. Biological Control Systems. (3) One and one-half hours of lecture and three hours of laboratory per week. Prerequisites: Graduate standing or permission of instructor. Engineering, analytical, and behavioral aspects of control theory, of complex biological systems; dynamical engineering evaluation of anatomical-physiological elements. Experimental methods applied to...
220. Case Studies in Mechanical Engineering. (2) One 2-hour lecture/discussion per week. Prerequisites: One graduate semester. Studies of selected problems that illustrate the application of methods of design and analysis in advanced engineering systems. (SP) Stieldel

221. Machine Tool Design and Control. (2) Two hours of lecture per week. Fundamental aspects of machine tool control and system, optimization of machining process, machine tool dynamics, and computer-aided design. (SP) Dornfeld

222. Applications of Theory of Plasticity. (2) Two hours of lecture per week. Application of the theory of plasticity to plastic deformation problems. Solutions by the yield criterion, the boundary element method, and the general approximations method. Numerical analysis of plastic deformation. (SP) Kobayashi

224. Mechanical Behavior of Engineering Materials. (3) Three hours of lecture per week. Prerequisites: Civil Engineering 130A/130 or consent of instructor. Treatment of plasticity, creep, fatigue, and fracture of structural and slender body and cyclic loads, with emphasis on approximate solutions which enable the prediction of service performance from simple tests. Failure due to fatigue, creep rupture, and plastic instability will also be covered. (F) Finnie

225. Fracture of Engineering Materials. (3) Three hours of lecture per week. Prerequisites: Civil Engineering 130A/130 or consent of instructor. Treatment of fracture from an engineering point of view. The topic covered will include: linear elastic fracture mechanics, crack propagation, propagation of fatigue, transition temperature approaches, statistical aspects of the strength of brittle solids, fracture of composites, and ductile fracture. (SP) Finnie

230. Real-Time Applications of Mini and Micro Computers. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: Engineering 130A or equivalent. Introduction to the use of microcomputers for engineering applications using software and hardware. (F) Auslander

231. Advanced Kinematics and Mechanisms. (3) Three hours of lecture per week. Prerequisites: 104. Kinematic analysis and synthesis of plane and spatial mechanisms. Emphasis on computer-aided design using modern numerical and matrix methods. Synthesis of plane and spatial mechanisms to guide a rigid body through multiple positions with finite and infinitesimal displacements. (SP) Tomizuka

232. Advanced Control Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 134 recommended. Input-output and state space representation of linear continuous and discrete time systems. Stability and the transient response, observers and state estimation, Modelling and identification, Design and analysis of single and multi-variable feedback control systems in transform and time domain. State observer. Feedback, Preview control. Application to engineering systems. (F) Tomizuka


243. Evaluation of Petroleum Production Processes. (3) Three hours of lecture per week. Prerequisites: Basic knowledge of economics. Physical and economic factors underlying the appraisal of oil and gas producing properties. Estimating reserves of oil and gas. Economic analysis of profitability, optimization of expenditures. (SP) Austerand

247. Subsurface Reservoir Characterization. (3) Three hours of lecture per week. Prerequisites: Basic geology and a course in mechanics of materials. Fundamentals of rock behavior, strength, failure theories, fracture toughness, behavior under confined stress and pore pressure; thermal stresses, thermal-chemical behavior, hydraulic fracturing; well stimulation and rock drilling. (SP) Huffman


251. Heat Conduction. (3) Three hours of lecture per week. Prerequisites: 151; Engineering 220A. Analytical and numerical methods for the determination of the conduction of heat in solids. (F) Fernandez-Pello

252. Heat Convection. (3) Three hours of lecture per week. Prerequisites: 151, 251; Engineering 220A. The transport of heat by moving fluids and its relation to convection in laminar and turbulent flow over surfaces and within ducts. (SP) Greif

253. Thermal Radiation. (3) Three hours of lecture per week. Prerequisites: 151. Thermal radiation properties of gases, liquids, and solids; the calculation of radiative transfer. (F) Daily


255. Thermodynamics II. (3) Three hours of lecture per week. Prerequisites: 254. Equilibrium and nonequilibrium properties of real and ideal gases, diffusion, diffusion through a porous to a chemically reacting systems, energy transfer, transport problems, laser physics, and spectroscopy of flames and other gas systems. (SP) Daily


258. Heat Transfer with Phase Change. (3) Three hours of lecture per week. Prerequisites: 151. Heat transfer associated with phase-change processes. Topics include thermodynamics of phase change, evaporation, condensation, nucleation and bubble growth, two-phase flow, convection boiling and condensation, melting and solidification. (SP) Carew

260. Waves in Fluid. (3) Three hours of lecture per week. Prerequisites: 261. Propagation of linear and non-linear waves in fluids. Wave interactions in gases, including reflections and diffractions. Shock dynamics. Dispersion and dissipation analogy with surface water waves. (SP) Hsu

261. Compressible Fluid Flow. (3) Three hours of lecture per week. Prerequisites: Graduate standing. Inviscid compressible flow. Steady one-dimensional, unsteady one-dimensional axisymmetric flows. Prandtl-Meyer flow and oblique shocks. Linearized supersonic and slender body theory. Similarity. (F) Sherman

262. Theory of Fluid Sheets and Fluid Jets. (3) Three hours of lecture per week. Prerequisites: 165 and 106, or equivalent. Conservation laws in three dimensions for inviscid and viscous fluids. Direct formulation of nonlinear theories for sheets and jets for these fluids with surface tension and gravity. Application to water waves, hydraulic jump, flow in waterfall, planing of a boat. Capillary instability in a viscous jet. (SP) Sherman

263. Turbulence in Engineering Flows. (3) Three hours of lecture per week. Prerequisites: 262A or equivalent. Fundamentals of turbulence. Analysis of flows of engineering interest, heat and mass transfer, and computational turbulence. Modelling and computations of turbulent flows. (SP) Humphrey


267. Geophysical Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: 262A or equivalent. An introduction to the fluid mechanics and atmospheric motions of the Earth's interior (mantle and core). Buoyant creeping flow. Rotation inside a sphere. Models of wave propagation in rotating fluid. (SP) Leirnann

271. Calculus of Variations and Optimal Control. (3) Three hours of lecture per week. An introduction to the classical calculus of variations for the simplest fixed endpoint problem. A geometric treatment of necessary and sufficient conditions for optimal control of deterministic systems. Applications to aerospace engineering, economics, and biological systems. (SP) Leirnann

273. Oscillations in Linear Systems. (3) Three hours of lecture per week. Prerequisites: 104 and 133. Response of discrete and continuous dynamical systems, forced oscillations, stability of stable and unstable, time-dependent and time-independent systems. Convolution integrals and Fourier and Laplace Transform methods. Lagrange's equations; eigenvalues; orthogonality; generalized coordinates; physical applications of Lagrange's equations to geometric and degeometric systems; Rayleigh's quotient. (F) Hsu


275. Advanced Dynamics. (3) Three hours of lecture per week. Prerequisites: 175. Review of Lagrangian dynamics. Legendre transform and Hamilton's equations; cyclic coordinates; canonical transformations; Hamilton-Jacobi theory. Integrability, Poincare map, normal form, chaos theory. (SP) Staff

277. Oscillations in Nonlinear Systems. (3) Three hours of lecture per week. Prerequisites: 175. Oscillations in nonlinear systems having one or two degrees of freedom. Qualitative and quantitative methods: graphical, iteration, perturbation, and asymptotic methods. Self-excitation oscillations, limit cycles, and domains of attraction. (SP) Hsu

279. Continuous Dynamic Systems Analysis. (3) Three hours of lecture per week. Prerequisites: Second...
280. Introduction to the Finite Element Method. (3) Three hours of lecture per week. Prerequisites: Math 268. Methods of tensor calculus and classical differential geometry. The tensor concept and the calculus of tensors, the Riemann-Christoffel tensor and its properties, Riemannian and Euclidean spaces. Geometry of a surface, formulas of Weingarten, and equations of Gauss and Codazzi. (F) Johnson

282. Theory of Elasticity. (3) Three hours of lecture per week. Prerequisites: 185 Fundamentals and general theorems of the linear theory of elasticity (in three dimensions) and the formulation of static and dynamic boundary value problems. Axially symmetric problems and two-dimensional problems of plane strain, generalized plane stress, and bending of plates. Representation of basic field equations in terms of displacement potential and stress functions. Some basic theoretical and practical solutions. (SP) Bogy

283. Wave Propagation in Elastic Media. (3) Three hours of lecture per week. Prerequisites: 185. Propagation of mechanical disturbances in unbounded and bounded media. Surface waves, wave reflection and transmission at interfaces and boundaries. Stress waves due to periodic and transient sources. Some additional topics may vary with instructor. (F) Bogy


285. Foundations of the Theory of Continuous Media. (3) Three hours of lecture per week. Prerequisites: 185. A general development of thermodynamics of deformable media and the related entropy inequalities. Thermomechanical response of dissipative media, including those for viscous fluids and nonlinear elastic solids. A discussion of invariance, internal constraints, material symmetry, and other special topics. (SP) Naghdi

286. Theory of Plasticity. (3) Three hours of lecture per week. Prerequisites: 185. Formulation of the theory of plasticity relative to loading surfaces in both strain space and stress space and associated loading criteria. Nonlinear constitutive equations for perfectly plastic deformations. Classical treatments of buckling problems, snap through and other global stability problems. Stability theory based upon nonlinear three-dimensional theory of elasticity. (SP) Hsieh

288. Theory of Shells. (3) Three hours of lecture per week. Prerequisites: 185, 281, and 285. A direct formulation of a general theory of shells and plates based on the concept of Cosserat (or Directed) surfaces. Nonlinear constitutive equations for imperfectly plastic deformations. Linear theories and special nonlinear theory with small strain accompanied by large or moderately large rotation. Applications. (SP) Johnson

290A. Topics in Nonlinear Oscillations. (2) Two hours of lecture per week. Prerequisites: 277. Oscillations in nonlinear systems having many degrees of freedom. The geometrical methods of dynamics applied to nonlinear vibrations. Definition and determination of nonlinear normal modes. Current topics in nonlinear oscillations.

290B. Topics in Continuum Mechanics. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 185. Selected topics from recent developments in linear and nonlinear theories of continuum mechanics, e.g., a general theory of contact (or directed) media, nonlinear theory of diffusion, theory of electroelastically and magnetoelastic continua, elasticity and viscoelasticity theories which bear upon modern concepts of material behavior. Topics may change from year to year.

290C. Topics in Dynamic Games. (2) Two hours of lecture per week. Prerequisites: 271 or equivalent. Introduction to the theory of dynamic many-player games. Nash equilibrium strategies, two-person games, cooperative games. Applications to engineering, economics, bargaining, collision avoidance, etc.

290D. Physico-Chemical Aspects of Particulate Flows. (3) New course. Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate standing: ME 161 or ChemEng 171; consent of instructor. Introduction to the fundamental aspects of heat, mass and momentum transport between immiscible phases, one of which is dispersed. Derivation and practice of partial differential equations, constitutive equations, and auxiliary physico-chemical relations. Analysis of systems involving erosion/corrosion, chemical reaction, non-Newtonian flow, interfacial phenomena, and turbulence. (SP) Humphrey

290E. Theoretical Analysis and Control of Electronic Systems. (3) New course. Three hours of lecture per week. Prerequisites: ME 151 or equivalent. Introduction to cooling technology for electronic systems, future needs and trends for electronic cooling, analysis and control of various cooling techniques and their associated physical phenomena. (SP) Tien

290G. Kinetic Theory of Rarefied Gases. (2) Two hours of lecture per week. Introduction to the molecular theory of gases with emphasis on computer-based Monte Carlo methods for rarefied gas flows. Convergent approaches to complex systems problems involving 1-, 2-, and 3-dimensional geometries and flows of gas mixtures will be discussed. (SP) Hurbut


290M. Expert Systems in Mechanical Engineering. (3) Three hours of lecture per week. Prerequisites: 107A or 102B or equivalent. Introduction to artificial intelligence and decision analysis in mechanical engineering. Fundamentals of analytical design, probability theory, failure analysis, risk assessment, and Bayesian and logical reasoning. Application to expert systems in probabilistic mechanical engineering design and failure diagnostics. Use of automated inference diagrams to codify expert knowledge and to evaluate optimal design decisions. (SP) Agogino

290P. Design Theory and Methodology. (3) New course. Three hours of lecture per week. Prerequisites: Graduate standing, 128 and 102B or equivalent. This course will cover fundamental studies of mechanical systems design, including classical and modern theories and practical experiences from all of the engineering disciplines. Design is the process by which products, processes and systems are created to perform desired functions. (F) Agogino

290Q. Dynamic Control of Robotic Manipulators. (3) Three hours of lecture per week for the first five weeks; four hours of laboratory per week for the remaining ten weeks; four hours of laboratory per week for 15 weeks. Prerequisites: 232, 233, or consent of instructor. Dynamic and kinematic analysis of robotic manipulators.


290R. Automatic Control Laboratory. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: ME 134. Applications of dynamic system modeling, systems theory, and automatic control techniques to mechanical, electrical, optical, and other systems. Investigations include computer simulation and analog and digital feedback control. (F) Auslander

283. Simulation and Group Research. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Graduate standing. Advanced studies in various subjects through special seminars on topics to be selected each year. Inform group studies of special problems, group participation in comprehensive design projects, or group research on complete problems for analysis and experimentation. (FSP) Staff

299. Individual Study or Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Graduate standing. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). (FSP) Staff

Professional Courses

301. Teaching of Mechanical Engineering at the University Level. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. One hour of seminar per week (for 1 unit). Weekly seminars and discussions on effective teaching methods. Educational objectives. Theories of learning. The lecture and alternative approaches. Use of media resources. Student evaluation. Laboratory and seminar in mechanical engineering. Practice teaching. This course is open to teaching assistants of mechanical engineering. (FSP) Staff

Medieval Studies

(College of Letters and Science)

Chair: Carolyn Dinshaw, Department of English
Graduate Adviser: Robert Brentano, Department of History

Medieval studies are currently undertaken in a joint departmental program that prescribes the standards of training in a major subject, while broadening the student's experience in other aspects of the field. The degree granted in recognition of achievement is the Ph.D. in Medieval Studies. Each student is expected to fulfill the Ph.D. requirements of the major department of study, which administers the program of study. In addition, each student pursues seminars and workshops in two outside departments, one of which is History (unless that is the department of the major). The program includes a special examination in Latin, consisting of representative passages from medieval authors. Interested students should apply for admission to the individual department in which they would do their major work.

On leave, spring
Recall to active service
Recipient of Distinguished Teaching Award
There is no undergraduate major. Students whose interests lie in the medieval period should consider the possibility of setting up an individual major for research in medieval history and literature (Announcement of the College of Letters and Science).

The student is also urged to consult the medieval offerings in the departments of: Art and History of Art, Classics, Comparative Literature, Dramatic Art, English, French, German, History, Italian, School of Law, School of Library and Information Studies, Linguistics, Music, Near Eastern Studies, Philosophy, Pictorial, Romance Philology, Scandinavian, Slavic, South and Southeast Asian Studies, Spanish and Portuguese, and the Graduate Theological Union. An updated list of such offerings is issued each fall by the chair of the committee.

Upper Division Course

150. Studies in Medieval Culture. (3) Course may be repeated for credit. Three one-hour lectures per week. Taught by the Distinguished Visiting Professor for the current year on a topic related to his or her specialty. (SP)

Graduate Courses

200. Introduction to Research Materials and Methods. (2) Must be taken on satisfactory/unsatisfactory basis. One 2-hour meeting per week: lecture and discussion. Prerequisites: Graduate standing. Basic materials and resources in fields represented in the Medieval Studies program, and in some subjects involving expertise in more than one discipline (e.g. liturgy, codicology). Emphasis on research aids and critical evaluation of their use. (F) Staff

250. Seminar in Medieval Culture. (3) Course may be repeated for credit. One three-hour lecture per week. Prerequisites: Graduate standing. Taught by the Distinguished Visiting Professor for the current year on a topic related to his or her specialty. (SP)

Microbiology and Immunology

(Declaration of Letters and Science)

Department Office: 3573 Life Sciences Building, 845-9777
Chair: Marian E. Koeshland, Ph.D.
Professors:
James Allison, Ph.D. University of Texas. Molecular Immunology
Phyllis B. Bazil, Ph.D. University of California. Immunology
Alexander N. Glazer, Ph.D. University of Utah. Molecular capability, synthetic system
Phyllis B. Bazil, Ph.D. University of Utah. Molecular Immunology
Naotaka Kikuchi, Ph.D. University of Chicago. Molecular Immunology
Hitoshi Sakano, Ph.D. Kyoto University. Molecular biology, and viral genetics
Renate Leighton, Ph.D. University of British Columbia. Microbial. molecular and developmental genetics
Robert I. Mitchell, M.D. Stanford University. Cellular molecular and developmental biology
James Allison, Ph.D. University of Texas. Molecular Immunology
Hitoshi Nikaido, M.D., D. Med. Sc. Keio University. Microbial and biochemical microbiology
Leon Wolff, Ph.D. (Emeritus) Yale University. Immunology, cell biology
David Szwarc, Ph.D. University of California. Microbial development, molecular genetics
Leon Wolff, Ph.D. (Emeritus) Yale University. Immunology, cell biology
Professor:
Phyllis B. Bazil, Ph.D. Oregon Health Sciences University. Molecular Immunology
Asst Professors:
Ekładowicz, P., Ph.D. Oregon Health Sciences University. Bacterial genetics, virology mechanisms
Hitoshi Sakano, Ph.D. Kyoto University. Molecular biology Nahata Shins, Ph.D. All India Institute of Medical Sciences, New Delhi. Cellular and molecular Immunology
Adjunct Professors:
H. Claudia Harry, Ph.D. University of Pittsburgh. Immunology
G. Blin, M.D. Cambridge University. Cell biology and tumor virology
Major Advisers: Mr. Allison, Mr. Glazer, Mrs. Good, Mr. Leighton, Mr. Mishell, Mr. Ohman, Mr. Shastri, Mr. Zusman.

Pregraduate Advisers: Mrs. Blair. Leighton
Graduate Advisers: Mr. Sakano, Mr. Nikaido.

Students who are interested in the major in microbiology and immunology are urged to consult the major adviser concerning the specific courses to be taken as a basis for the major.

The Department of Microbiology and Immunology offers an undergraduate major in microbiology and immunology. Students entering the microbiology and immunology undergraduate major, administered according to the upper division plan, needs training in microbiology at the upper division level on the basis of preparation for the lower division level in general biology and physical science. Plan I is strongly recommended for all students who plan to undertake subsequent graduate work. Honor students with a special interest in immunology may arrange an individual major program in this area with the approval of the undergraduate adviser.

The Major

Minimum Scholarship: Required for graduation in the major are grades of C- or better in 100 and 100L, 101L and 101L. Biochemistry 102 and 102L, BEHS 103 and 103L.

Plan I

Lower Division. Chemistry 1A-1B, 5, 8A-8B or 112A-112B; Mathematics 16A-16B or 1A-1B; Physics 8A-8B; and Physics 8A-8B. Two 1/2-hour lectures per week. Prerequisites: 100 and/or 100L. Minimum of 8 units of additional upper division course work in other pertinent subjects in the biological sciences such as virology, histology, cell biology, and general biology. Students earning A in at least one of the above courses may be exempted.

Upper Division. Microbiology 100-100L, 101, 101L; Biochemistry 102 or 100A-100B, 102L or 101; Chemistry 103A or Genetics 102 or the equivalent; plus a minimum of 8 units of additional upper division course work in other pertinent subjects in the biological sciences such as virology, histology, cell biology, and general biology. Students earning A in at least one of the above courses may be exempted.

Honors Program. With the consent of the major adviser, students with an overall grade-point average of 3.3 or higher and a grade-point average of 3.3 or higher in courses in the major may apply for admission to the honors program. Students enrolled in the program must take at least 4 units of research courses (H195 and/or H196) and must present the results of their research in a paper and in a seminar at the end of their last semester. The honors program adviser will help plan each honors program individually; approval of the program by the honors program adviser is required. The honors program adviser is authorized to exempt students from the honors program requirements concerning specific courses or sequences of courses in the major. Students interested in enrolling in the program should consult the honors program adviser (Mrs. Good).

Preparation for Graduate Study. For the pursuit of graduate work in either microbiology or immunology, the undergraduate training outlined under Plan I is preferable. Other courses strongly recommended as background for future graduate work are Chemstry 130A or Chemstry 130A (for students who have taken Chemstry 112A).

The Graduate Program

The Department offers the M.A. and Ph.D. degrees in microbiology and immunology. The M.A. program is designed to prepare students for the Ph.D. degree in microbiology or immunology. Information is available from the graduate adviser in 3573 Life Sciences Building.

Lower Division Courses

2. Enology—The Microbiology and Biochemistry of Winemaking. (1.5) One 1/2-hour lecture/discussion per week. Prerequisites: High school biology and high school chemistry. The microbial history, ecology, biochemical physiology, and genetics of organisms and their contribution to the production and stability of various wine types produced throughout the world. Microbiological and biochemical factors affecting wine quality will also be discussed. One take-home midterm (essay) and one take-home final (essay) will be employed to determine student performance. (F) Leighton

8. Cancer and Immunology. (2) Students who have taken or will take 10 will receive no credit for 8. Must be taken on a passed/not passed basis. Two 1/2-hour sessions per week. Prerequisites: High school biology, freshman or sophomore status. Lectures and discussion centering on the factors involved in the development of cancer and the role that the immune system can play in its detection and its prevention. Topics will be limited in number, but exploration of depth and analysis for freshmen who plan to major in a biological science. (F) Blair

10. The Microscopic World. (3) Students who have received credit for 6 or 8 will receive only 2 units for 10. Must be taken on a passed/not passed basis. Two 1/2-hour lectures per week. Prerequisites: High school chemistry or Chemistry 1A; high school biology or Biology 1A. An introduction to the biology of microorganisms and the immune system; the fundamental principles of and major advances in microbiology and immunology. Intended for students interested in microbiology; suitable for those not majoring in a biological science. (SP) Blair, Leighton

Upper Division Courses

100. Introduction to Microbiology. (3) Three 1-hour lectures per week. Prerequisites: Biology 1A, Chemistry 5, Chemistry 8A-8B. A survey of general microbiology which introduces the methodology of microbiology and stresses the basic biological properties of microorganisms, and prokaryotic cells in particular, including their growth, physiological diversity, structure, and ecology. (F) Kuest, Glazer, Nikaido

100L. Microbiology Laboratory. (3) One 1-hour lecture and two 4-hour laboratories per week. Prerequisites: 100 (may be taken concurrently). Experimental work, designed to accompany course 100, which acquaints students with the morpologic, physiologic, and biochemical properties of microbial microorganisms, and prokaryotic cells in particular. Students who have taken 100P may enroll in 100L. (SP) Kuest, Glazer, Nikaido

101. Molecular Genetics of Microbial Cells. (3) Students who have taken 150 during the 1983-84 or 1984-85 academic years who receive no credit for 101. Two 1/2-hour lectures per week. Prerequisites: 100, Biochemistry 100A, or 102 (may be taken concurrently). Genetic and biochemical approaches to the study of the structure and function of microbial cells. Covers microbial genetics, molecular biology, microbial biochemistry, and microbial genetics, including plasmid biology, transposable genetic elements, recombinant DNA

101P. Microbial Genetics of Microbial Cells. (3) Students who have taken 150 during the 1983-84 or 1984-85 academic years who receive no credit for 101. Two 1/2-hour lectures per week. Prerequisites: 100, Biochemistry 100A, or 102 (may be taken concurrently). Genetic and biochemical approaches to the study of the structure and function of microbial cells. Covers microbial genetics, molecular biology, microbial biochemistry, and microbial genetics, including plasmid biology, transposable genetic elements, recombinant DNA
methodology, and the properties of bacterial viruses. (SP)

Kustu, Zusman

101L. Experimental Problems in Microbial Genetics. (2) Students who have taken 153A during the 1983-84 or 1984-85 academic years will receive no credit for 101L. One 1-hour lecture and three 3-hour workshops per week for the first one-half semester. Prerequisites: 100L and Chemistry 5. Laboratory projects designed to acquaint students with biochemical and genetic techniques used in the study and manipulation of bacteria, their viruses, plasmids, and other molecular aspects of microorganisms. Illustrates principles presented in course 101, and required of all Plan I majors. (SP) Ohman, Kustu, Leighton

103. Introductory Immunology. (3) Two 1-hour lectures and one 2-hour discussion per week. Prerequisites: Biology 1A; Biochemistry 102 recommended. Description of the immune system; cellular and humoral immunity; antigen-antibody reactions; antibody molecules; immunoglobulin genes, cells and molecular mediators that regulate immune responses. (F,SP) Good, Mishell, Sakano, Shastri

103L. Experimental Problems in Immunology. (2) Students who have taken 153B during the 1983-84 or 1984-85 academic years will receive no credit for 103L. One hour of lecture and three 3-hour workshops per week for the second one-half semester. Prerequisites: 100L and 103 (may be taken concurrently) or equivalent; Chemistry 5; and consent of instructor. Experimental work in acquiring basic molecular and cellular methods employed in immunological research. Illustrates principles presented in course 103. (SP)

104. Industrial Microbiology. (2) Two 1-hour lectures per week with consent of instructor. A survey of modern developments emphasizing the application of the knowledge of fundamental microbiology to industrial processes. Topics include production of metabolites, enzymes, and single-cell proteins; genetic manipulation of microorganisms; recovery of minerals, metabolites, enzymes, and single-cell proteins; genetic and energy production. (SP) Glazer, Nikaido

H195. Individual Study. (2-4) Course may be repeated for credit. Individual conferences. Prerequisites: Senior status: honors list. Readings, discussion, and intensive study of a particular subject in the current research literature, leading to a written term paper. Open to students in their senior year who are eligible for the departmental honors program. (F,SP)

H196. Laboratory Research. (2-4) Course may be repeated for credit. Schedule to be arranged. Prerequisites: Consent of instructor. Conduct of a laboratory research project. Open to students in their senior year who are eligible for the departmental honors program. (F,SP)

Staff

197. Expiration Work. (3) New course. Course may be repeated for up to 6 units of credit. Must be taken on a passed/not passed basis. Schedule to be arranged with faculty sponsor. Prerequisites: Upper division standing and consent of instructor. Supervised experience relevant to specific aspects of microbiology or immunology in off-campus organizations. Prior approval of faculty sponsor based upon written proposal required for enrollment. Individual meetings with faculty sponsor. Final written report approved by faculty sponsor required for course credit. (F,SP)

Staff

198. Directed Group Study and Research in Microbial Molecular Genetics. (2-4) Must be taken on a passed/not passed basis. Consent of instructor required. One 1-hour group lecture/discussion, one to two hours of student/instructor discussions and 8 to 12 hours of laboratory research per week. A series of lectures, student presentations, and laboratory research in microbial molecular genetics. (F,SP)

Leighton

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Schedule to be arranged. Prerequisites: Consent of instructor. Supervised study and enrollment restricted by the regulations listed on pages 81 and 82 of this catalog. (F,SP)

Staff

Graduate Courses

202A. Advanced Immunology. (3) Two 1/2-hour lectures and one hour of discussion per week. Prerequisites:

Undergraduate courses in biochemistry, immunology, molecular biology, and genetics, or consent of instructor. The immune response; antigen-antibody reactions; structure and function of antibody molecules; immunoglobulin genes and V(D)J recombination; lymphocyte differentiation; cellular interactions; and mechanisms of immunity and tolerance. (F) Koshland

202L. Immunology Laboratory. (1-5) Course may be repeated for credit. Two 1-hour lectures or seminars per week, plus 12 to 18 hours of laboratory per week. Prerequisites: 103 or 202A or the equivalent or consent of instructor. Students will work on projects involving a variety of molecular and cellular immunological techniques including production of recombinant antibodies and participate in seminars on the application of immunological methods to current research problems. Students with specialized needs may take portions of the course on a modular basis. (F) Sakano, Good

203. Microbial Metabolism. (2) Course may be repeated for credit when topic changes. One 1-hour lecture and one hour of seminar and discussion per week. Prerequisites: 100L, 101, or equivalent; Biochemistry 100A-100B or equivalent; course in molecular genetics recommended. Selected subjects in the physiology of various microorganisms, with special emphasis on the use of biochemical genetics and recombinant DNA methodology for analyzing the intermediary metabolism of microbes. Topics will vary from year to year. (F) Staff

205L. Molecular Immunogenetics Laboratory. (1-6) Course may be repeated for credit. Three hours of lecture and 18 hours of laboratory per week. Prerequisites: Undergraduate courses in immunology and molecular biology, or consent of instructor. Students will participate in projects involving a variety of molecular-biological techniques. Gene cloning and sequence analysis of cloned DNA will be included. Students with specialized needs may take portions of the course on a modular basis. (SP) Sakano, Good

212. Seminar in Current Research. (1) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion period per week. Prerequisites: Graduate standing in the department. A review of current research being conducted by faculty of the department. Required of all first-year graduate students in Microbiology and Immunology. (F,SP)

Staff

214. Introduction to Research. (3-5) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Laboratory and discussion periods per week will be arranged. Prerequisites: Consent of instructor. Conduct of laboratory research project. Open to students in their senior year who are eligible for the departmental honors program. (F,SP)

Staff

216. Seminar in Tumor Immunology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture or seminar per week. Prerequisites: A course in tumor biology and consent of instructor. Student presentation and discussion of current research on the immunobiology of neoplastic cells. (F,SP)

Blair

220. Current Research in Microbiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar with continuous registration. Paper presentation in seminar. Consent of instructor. Prerequisites: Consent of instructor. Advanced research seminars in the Department of Microbiology and Immunology or Group in Microbiology. Presentations by graduate students and others of topics selected from the current literature. Conferences organized and limited to graduate students in Microbiology during every semester of residence. (F,SP)

Staff

222. Cyanobacterial Physiology and Biochemistry. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar and discussion per week. Prerequisites: Graduate standing or consent of instructor. The physiology, cell structure, and biochemistry of the cyanobacteria (blue-green algae). Topics vary and may include cyanobacterial taxonomy, evolution, considerations, light-lowering systems, intracellular organelles, and nitrogen fixation with special reference to heterocyst structure and development. (SP) Glazer

225. Transposable Genetic Elements. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar and discussion per week. Prerequisites: 203A or consent of instructor. An introduction to transposable genetic elements in general. Characteristics of both extrinsic and intrinsic regulatory substances and their interactions with extrinsic regulatory substances and regulatory elements. The course will examine what is currently known about several adjuvants and host factors derived from bacterial, viral, and eukaryotic sources. This course will address the role of the role of these substances in regulating qualitative as well as quantitative aspects of immune function. Offered every numbered year. (SP)

Staff

226. Immunochemistry of the T Lymphocyte. (2) Course may be repeated for credit with consent of instructor. One 1-hour lecture/discussion per week. Prerequisites: 202A or consent of instructor. Prerequisites: Consent of instructor. Thymus-derived lymphocytes play a central role in the immune system, recognizing foreign antigens in the context of self-antigens, and carry out both effector and regulatory functions. This course will cover developmental, cellular, and molecular aspects of the T-cell system, with emphasis on the differentiation of T-cells, acquisition of antigenic repertoire, and the molecular biology of antigen recognition. The course is designed primarily for graduate students in immunology and genetics, but enrollment restricted by the regulations listed on pages 81 and 82 of this catalog.

227. Mechanisms of Eukaryotic Gene Expression: The Immune System as Model. (2) New course. Course may be repeated with consent of instructor. One 1-hour lecture/discussion per week. Prerequisites: 202A or consent of instructor. One of the major unresolved problems in modern biology is the regulation of eukaryotic gene expression. This course will use genes involved in the immune response as model systems to tackle this problem. The course will cover the genetic control of gene products, T-cell antigen receptors, and major histocompatibility antigens will be analyzed to illustrate the regulatory mechanisms that have been defined and the questions that remain to be addressed. This course is intended for advanced graduate students not only in immunology but also in general eukaryotic molecular biology. Offered odd-numbered years. (SP) Koshland, Sakano

230. Regulation of the Immune Response. (2) New course. Course may be repeated for credit. One 1-hour lecture/discussion per week. Prerequisites: 203A or consent of instructor. One 1-hour lecture/discussion per week. Prerequisites: 203A or consent of instructor. Prerequisites: Consent of instructor. The mechanism of immune regulation is of fundamental importance. This course will examine the interactions of both extrinsic regulatory substances and intrinsic regulatory substances (cytokine-derived hormones) with antigen-specific, clonally restricted, immunocompetent cells. Macrophages are often pivotal to these processes being principal targets of adjuvants and secretors of immunoregulatory hormones. This course will examine what is currently known about several adjuvants and cytokine-derived hormones and will address the question of the role of these substances in regulating qualitative as well as quantitative aspects of immune function. Offered even-numbered years. (SP)

Staff

229. Research Seminar. (1) New course. Course may be repeated for credit with consent of instructor. One 1-hour seminar per week. Prerequisites: Graduate standing or consent of instructor. Introductory lectures followed by student presentations and discussion of current research. Topics to be covered include mechanisms of transformation, the properties of viral oncoproteins and transforming proteins, the role of host factors and cellular oncogenes, and cellular oncogene activation. Offered even-numbered years. (SP)

Staff

270. Research Seminar. (1) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar per week. Seminar presentation and evaluation in area of student's research interest. (F,SP)

Staff

280. Research. (1-12) Course may be repeated for credit. Course schedule to be arranged. Prerequisites: Graduate standing or consent of instructor. Conduct a laboratory research project. (F,SP)

Staff

289. Special Study for Graduate Students. (1-3) Course may be repeated for credit with consent of instructor. One 1-hour seminar per week. Prerequisites: Consent of instructor. (F,SP)

Staff

On leave, spring

Recalled to active service

Recipient of Distinguished Teaching Award
001. Individual Study for Master's Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Schedule to be arranged. Prerequisites: Consent of instructor. Individual study is available in consultation with faculty adviser(s). Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP) Staff

002. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Schedule to be arranged. Prerequisites: Consent of instructor. Individual study in consultation with the student's faculty adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. degree. May be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 282. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and discussion per week. Prerequisites: Consent of Instructor, Reviews and reports of current research in tumor biology. Sponsoring departments: Biomedical and Environmental Health Sciences, Zoology, Physiology, and Microbiology. (F,SP) Staff

Middle Eastern Studies

(College of Letters and Science)

Group Major Office: 361 Campbell Hall, 642-6884

Undergraduate Advisers: Mr. Brinner (899 Evans, 642-6182/2757); Ms. Stahl (333 Talmage, 642-7090/5292); Mr. Michalak (207 Moses, 642-8208).

The interdisciplinary major in Middle Eastern Studies offers an opportunity to study a region of historic and cultural importance whose current development is bound up with the political, economic, and cultural developments of our own society. The Middle East encompasses the Arab world, Turkey, Iran, and Israel. This program is designed to allow students to pursue a broad and balanced course of study which will familiarize them with the languages, culture, and history of the basic geographic regions: archeologic, graphic, ethnographic, ethnic and cultural change. The program draws on over 200 Middle East-related courses available in 15 different departments of the University.

The program is under the supervision of an interdepartmental committee of faculty members organized through the Center for Middle Eastern Studies of the Institute of International Studies. Students will be assisted in planning their programs by a faculty committee representing several academic departments and by a major adviser who will help to define courses of study which suit individual needs.

The Center for Middle Eastern Studies is located at 207 Moses Hall, and is open 9 a.m. to noon Monday through Thursday. The head of the center is Dr. Lawrence Michelak. Students are encouraged to use the center's resources.

Major Program

Lower Division. A. Required Introductory Course: Near Eastern Studies 10, a survey introducing the fundamentals of Middle Eastern history and culture, geography, and the ethnology and current economic, political, and developmental problems. Taught by faculty from the several departments contributing to this program, this course is a prerequisite for upper division lecture courses. Recommended immediately: Middle Eastern Studies 20. Approaches to the Middle East from Selected Disciplines.

B. Language—Students are required to take two years of a Middle Eastern language: Arabic, Hebrew, Persian, or Turkish. (In the case of Arabic and Hebrew, this will entail four lower division semester courses; in the case of Persian and Turkish, two lower division and two upper division courses).

Upper Division Survey Program. Students will choose at least one course in each of the following three groups, so as to provide a broad introduction to the geographic, archeologic, and history of the Middle East, its history and cultures, and current political, economic, and social development.

A. Anthropology 181, The Near East; Geography 166, The Arid Lands; Geography 167, The Middle East.


C. Political Science 142A-142B, Middle East Politics; Economics 172, Case Studies in Economic Development.

Concentration. In addition to the interdisciplinary survey, the student will pursue advanced studies, focusing on a region, discipline, or thematic problem relating to the Middle Eastern region. The program of advanced and more specialized study may be flexibly designed in consultation with the advisor to meet the interest of students and to create a coherent and integrated perspective on some aspect of Middle Eastern affairs. Courses in this part of the program may be selected from any of the courses in the catalog, Courses in Middle Eastern Studies, available from the Center for Middle Eastern Studies, 207 Moses Hall, or in the Division of Special Programs, 301 Campbell Hall. The courses should be selected with a view toward developing a knowledge in-depth of a particular aspect of the subject. Specialized fields of study may include advanced language study, religious and cultural studies, history, contemporary trends in economic development and social change, urbanization, nation building, the impact of imperialism and colonialism on the Middle East, or any topic agreed upon between the student and the adviser. The student will take a minimum of four courses to meet the requirements of this part of the program. The courses selected may not include those already taken to fulfill the upper division survey requirements. The following sample programs are given purely for illustrative purposes and do not indicate any requirements for the program.

Culture and Language


Middle East Religions

Near Eastern Studies 140, 141, Islamic institutions; Near Eastern Studies 132, 133, Judaism in Late Antiquity; Near Eastern Studies 143A-143B, Islam in Iran.

Economic Development and Social Change

Geography 101, Cultural Geography of Urban Environments; Geography 104, The City in the Third World; Political Science 142A-142B, Middle East Politics; History 109C, Modern History of the Middle East.

Recommended Courses. Strongly recommended are courses which are not necessarily Middle East-related, but which will serve to give methodological, conceptual, and general religious studies background to the Middle Eastern region. Such courses should enable students to relate their area of Middle East concentration to other disciplines and fields of study. In consultation with the adviser, students will choose courses appropriate to their own program of study. Examples of such courses are the following:

Anthropology 155, Economic Anthropology; Anthropology 158, Religion and Anthropology; Geography 130, Natural Resources and Population; Economics 171, Economic Development; Economics 181, International Economic Relations; Political Science 126A-126B, International Political Economy; Sociology 112, Sociology of Religion.

Senior Paper or Seminar. Each major in the program will participate in a tutorial or seminar group with a faculty member of the program to do a research paper on a topic within the Middle Eastern area. Students must register for 1-4 units of Middle Eastern Studies 190 for a letter grade.

Honors Program. Senior students with a grade-point average of 3.3 in the courses of the group major and in all work completed in the University will be eligible for an honors degree. The honors program will require, in addition to the normal requirements for the major, the preparation of a thesis based upon the senior paper and further research in Middle Eastern Studies (NES H195). The thesis will be supervised by a member of the faculty appropriate to the student's interest and will be approved by the committee of advisers for the program. Students must have completed MES 190 and must register for 1-4 units of Middle Eastern Studies 195 for a letter grade.

Units. The program requires a minimum of 30 and a maximum of 36 upper division units.

Lower Division Courses

20. Approaches to the Middle East from Selected Disciplines Seminar. (1) May be taken for credit. Prerequisites: Near Eastern Studies 10. A weekly seminar of guest speakers, each reviewing approaches to the Middle East from disciplines such as anthropology, political studies, philosophy, etc. The seminar introduces students to the work of several major Berkeley Middle East-related faculty and others. (SP) Staff

Middle Eastern Studies

(College of Letters and Science)

H195. Honors Thesis. (1-4) Individual conferences. Prerequisites: Senior standing, one year of language in the major, at least 15 upper division units in the major, and NES 10. With the guidance of a faculty member of the program, the preparation and presentation of a senior thesis pertaining to the student's individual area of concentration within the Middle Eastern studies major. (F,SP) Staff

190. Senior Thesis. (1-4) Individual conferences. Prerequisites: Senior standing, a grade of A in a language course, at least 15 upper division units in the major, and NES 10. With the guidance of a faculty member of the program, the preparation and presentation of an honors thesis based upon the senior paper and further research in Middle Eastern Studies. The thesis must be supervised by a member of the faculty appropriate to the student's interest and must be approved by the Middle Eastern Studies advisory committee. (F,SP) Staff

195. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. One to four hours of independent study per week per group, depending on credit. Prerequisites: Senior standing, a grade of A in a language course, at least 15 upper division units in the major, and NES 10. Satisfactory/unsatisfactory basis. Schedule to be arranged. Each group is supervised by a member of the faculty. A written proposal must be approved by the Middle Eastern Studies faculty adviser. A paper is required. (F,SP) Staff

189. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. One to four hours of independent study per week per group, depending on credit. Credit conditional upon the approval of the faculty adviser of the group. Prerequisites: Senior standing, a grade of A in a language course, at least 15 upper division units in the major, and NES 10. Satisfactory/unsatisfactory basis. Schedule to be arranged. Each group is supervised by a member of the faculty. A written proposal must be approved by the Middle Eastern Studies faculty adviser. A paper is required. (F,SP) Staff
Military Officers’ Education Program (ROTC) (Special Studies)

Military Officers’ Education Program (ROTC) / 259

Military Affairs

Lower Division Courses

1. American Military Experience: Revolution to Vietnam. (3) Two 1-hour lectures and 1-hour discussion per week. Examines major themes in the history of the United States: the growth and development of the armed forces, the evolution of civil-military relations, the emergence of the military as a factor in American history, the role of military technology, and the changes in military strategy. (F)

2. The Military in American Society. (3) Two 1-hour lectures and 1-hour discussion per week. An introduction to the military profession, with emphasis on the relationship between the military institution and the individual, the government, and the society. Investigates the need for national defense and studies the causes of war. (SP)

3. Defense Leadership and Management. (2) One 2-hour lecture per week. An analytical study of management schools, principles, and philosophies as a basis for developing effective leadership. Emphasis on behavior and leadership development. (SP)

20. Evolution of European Warfare. (2) One 2-hour lecture per week. Historical survey and analysis of the causes and nature of war from the Greeks of 500 B.C. through the France of 1789-1815. The theme of the course is “The Man on Horseback.” Historians and authors employed include Herodotus, Thucydides, Plutarch, Caesar, Villhardoul, and Napoleon.

Upper Division Courses

120. The Evolution of American Warfare: 1607-1900. (3) Two 1/2-hour lectures or one 3-hour lecture per week. Historical analysis of American theory of warfare from colonial period and Revolution through Spanish American War. Social, economic, and political influences are examined, tracing the evolution of the American military. Effects of institutions on organizational structures, technology, and the practice of warfare are emphasized. (F)

121. The Evolution of American Warfare: 1900-1980. (3) Two 1/2-hour lectures or one 3-hour lecture per week. Military history of World War I and II, survey of modern revolutionary warfare. Influence of modern technology on American military organizations. The development of a global military strategy; the impact of the social fabric of the nation on the military as the United States evolved into a world power. Examination of historical theorists on revolutionary warfare in its contemporary form. (SP)

124. War in Literature. (3) Three 1-hour lectures per week. Interdisciplinary exploration of novels and narratives of war as artifacts of popular culture reflecting American attitudes toward war as both an institution and a personal experience. Traces four themes in particular: war as a right to existence of the individual in modern mass society, the military as a subculture within American society, and America’s role as self-styled redeemer nation. (SP)

140. The North Atlantic Treaty Organization (NATO). (3) Two 1-hour lectures per week. Two-hour seminar on NATO and its role as a forum for political and military strategy in the post-Cold War era. Emphasis on the evolution of European warfare. (SP)

145A-145B. National Security Forces in Contemporary American Society. (3) Two 1/2-hour seminars per week. Prerequisites: Upper division standing and consent of instructor. Conceptually examines the Armed Forces as an integral element of American Society. Considers examines contemporary issues in civil-military relations and the national and international environment in which U.S. Defense policy is formulated and implemented. (SP)

154. The History of Littloral Warfare. (3) Two 1-hour lectures per week. Analysis of the theory, origins, historical evolution, and impact of man’s attempts to project seapower ashore. A case study approach is used to study major developments in amphibious warfare. (SP)

170. Comparative Military Systems: The Third World. (3) Two 1-hour lectures and one 1-hour discussion per week. Concentrates on the paradigms for analyzing internal conflict, the role of the military in the state, and external influences of the advanced states on developing countries. Special emphasis will be given to the evolution of national military regimes, their impact on the socio-political development of the targeted country, and the cause of the coup detail. (F)

171. Comparative Military Systems: USSR, PRC, and Mid-East. (3) Two 1-hour lectures and one 1-hour discussion per week. Comparative analysis of the current Sino-Soviet and selected Middle Eastern military systems in the roles they relate to the socioeconomic and political organizations of their respective countries. Special emphasis on discussions of development of their decision making and command structures and the relationships of the military with their respective governments. (SP)

199. Supervised Independent Study and Research. (1-4) Course may be arranged. Prerequisites: Upper division standing and consent of instructor. Supervised independent study and research for undergraduate students who desire to pursue topics of their own selection. (F, SP)

Aerospace Studies (Air Force ROTC)

Department Office: 10 Callaghan Hall, 642-3572

The Department of Aerospace Studies offers students in virtually all academic areas the opportunity to qualify for a commission in the United States Air Force while simultaneously completing university graduate and undergraduate degree requirements. Two accredited AFROTC programs are available:

- Entering freshmen may elect the general military course or, for students who have at least two full academic years remaining in their degree program, the department offers a two-year professional officer course.
- Students interested in the general military course may be eligible to compete for scholarships which cover the costs of tuition, books, and most fees; also a $10 per month allowance is paid to eligible student on the college scholarship. Freshmen and sophomores competing for scholarships should contact the department.
- Students not taking the general military course may still be eligible for the two-year professional officer course. This upper division program is open to students who have at least four years of full-time study remaining in their academic program. Selection for the professional officer course depends on the factors of aptitude, intelligence, college grades, and performance at a six-week field training camp. Students selected for the professional officer course are provided uniforms, textbooks, and a $100 per month allowance while they are in the program. Selection for entry into the professional officers course is made in January; therefore, applicants need to be completed by December of the year preceding entry into the program. Normally, upper division standing is required to enter the two-year program, but exceptions can be made for lower division students who can complete degree requirements in two years. It is also possible to take all or part of the professional officer course as a graduate student.

Both the two-year and the four-year AFROTC programs emphasize student participation and involvement. Classes are conducted as seminars and call for student discussion. In addition, there is a weekly one and one-half hour leadership seminar for major and junior officers that is mandatory for all AFROTC cadets. In this laboratory, students become involved in the management of their own cadet organization. Students also participate in projects, visits to Air Force bases, and flight orientations.

Completion of the program to earn an Air Force commission requires enrollment during each semester in a specified course in Aerospace Studies or Military Affairs. The normal sequence for the four-year program is as follows: MA1, AS1, MA2, AS135A, AS135B, MA145A, MA145B. Students enrolled in the two-year program need only take the upper division courses. All courses count for credit.

Aerospace Studies courses are open to all University students. Students from other institutions may participate in the AFROTC program through cross-enrollment arrangements or through University Extension. For further information on enrollment requirements and procedures, contact the department staff at 10 Callaghan Hall or phone (415) 642-3572.

Lower Division Courses


*Not offered 1988-89
1On leave, spring, fall
2On leave, fall
3Recalled to active service
*Recipient of Distinguished Teaching Award
flecting the nature and control of the military. Examines current U.S. defense needs and the Air Force in terms of theory, function, mission, and organization. Major command structures are studied. (SP)

2. The Growth and Development of Air Power. (1)
One 1½-hour lecture/discussion per week. Prerequisites: Consent of instructor. Traces the historical evolution of air power, its concepts, strategies, theories, and applications. Emphasizes the impact of changing technology and the contribution of specific historical episodes on the growth and development of air power. (F)

Upper Division Courses

135A-135B. Aerospace Management and Leadership. (3-4)
One 1½-hour lecture/lab per week. Prerequisites: Consent of instructor. A study of contemporary management practices. Includes study of individual and group behavior, functions and theories of management, systematic decision-making, the communication process, case analysis, leadership theories, managerial ethics, personnel administration, and the organizational environment. (FSP)

Professional Courses

442. Light Aircraft Operation. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Preparation for qualification as Federally Licensed Private Pilot. Federally recognized regulations, basic meteorology for pilots, navigation by dead reckoning and piloting, radio and radio navigation, elementary aerodynamics and aircraft structures. (SP)

Military Science (Army ROTC)

Department Office: 73 Harmon Gymnasium, 642-3374

The Army Officer Education Program offers a variety of courses of general interest focused on the study of the military as a social institution, adventure training opportunities, and a program of laboratory work in practical military skills. The program provides an opportunity to examine service in the Army while earning a baccalaureate degree. A student who completes the program may earn a commission in the Regular Army, Army Reserve, or National Guard. Graduate or undergraduate students can complete the Military Science requirements through a four-year, three-year, or two-year program. The four-year and three-year programs involve the basic and advanced courses; the two-year program involves only the advanced course.

1. The basic course is designed for students who are eligible to serve in the military, and it confers no service obligation. The purpose is to expose the student to the Army while concurrently developing leadership skills applicable to both civilian and military environments.

2. The advanced course is designed for students who expect to receive their commissions within two years. It is composed of a series of Military Science and Military Affairs courses taken over a period of four semesters. Each student is required to attend a noncredit laboratory which is a practical application of the material learned in the classroom. Also required of all students is the advanced camp, a six-week summer training program held at Fort Lewis, Washington. Resources of the Army, air assault, and nontraditional warfare training are also available to a limited number of cadets.

The two-year program involves direct placement in the advanced course. It is available to students, graduate or undergraduate, who have completed any of the following: enlisted military service, a six-week basic training camp, or three years of Junior ROTC.

Financial Assistance and Scholarships. All advanced course students receive $100 per month (nontaxable) for up to ten months a year. Outstanding students may compete for two, three, or four-year ROTC scholarships. One need not be enrolled in the pro-

gram to compete for a two, three, or four-year ROTC scholarship. A scholarship includes tuition and fees; required textbooks and other materials, and a $100 per month stipend. Advanced course scholarship students are obligated to serve as officers in the military for eight years, either on active duty or in the Army National Guard or Reserves, or a combination of the two.

Military Science courses are open to all University students. Students from other area institutions may participate in the Army ROTC program through cross-enrollment arrangements or through University Extension.

For more information concerning Army ROTC or the Department of Military Science, contact the staff at 73 Harmon Gymnasium or call (415) 642-3374.

Lower Division Courses

1. Leadership Laboratory. (0) The laboratory may be taken for eight semesters. Must be taken on a passed/not passed basis. Two hours of instruction and practical application in leadership and associated military skills. The instruction includes organization and management of military units, physical training, drill and ceremonies, land navigation techniques, survival skills, and extensive first aid training. (FSP)

2A-2B. U.S. Army and National Security. (1) New course. One hour of lecture per week. Introductory survey of the U.S. Army. Explores evolutionary factors affecting the nature and control of the military. Examines current U.S. defense needs and the Army in terms of function, mission, organization, personnel management, and military education. Consideration is also given to the structure and missions of NATO and the structure, equipment, and operational doctrine on the Soviet Army. (FSP)

4. Human Environmental Stress Adaptations. (2) One 2-hour lecture and one laboratory per week plus one field trip. Theoretical and historical analysis of human adaptability to hostile environments. Survival in desert, mountain, jungle, and arctic environments is analyzed. (FSP)

Upper Division Courses

100. Army Management and Leadership. (2) One 2-hour lecture per week plus one laboratory per week. Prerequisites: Upper division standing and consent of instructor. A comparative study of contemporary civilian and Army management. An interdisciplinary approach to management and leadership examining individual and group behavior, leadership theories, communication, organizational and task analysis, motivation and organizational development, and analysis of leadership potential models. (SP)

Professional Courses

430. Fundamentals of Terrain Representation and Military Operations. (3) One 3-hour lecture per week and one 1-hour laboratory per week. Introduction to topographic maps and aerial photographs and their relationship to land navigation. Conceptual linkage to basic military tactics. Topics include map coordinate systems, scale and distance relationships, intersection and resection, photo interpretation, squad and platoon operations, and the use of resource planning techniques. (F)

Naval Science (Navy ROTC)

Department Office: 25 Callegahan Hall, 642-3552

The Department of Naval Science offers several programs of instruction for men and women leading to regular or reserve commissions in the U.S. Navy or U.S. Marine Corps. Naval Science courses are open to all university students or may be taken through University Extension.

Students enrolled in one of the four-year Naval ROTC programs will normally complete the following courses during their two years as part of their overall academic load: One term of a foreign language; the basic engineering course in the Naval Architecture Department (NA 10); a two-course sequence listed under Military Affairs covering the Military in American Society (MA-1) and the American Military Experience (MA-2); and Naval Ships' Systems (NS401). Scholarship students must take one year of calculus and calculus-based physics.

Students enrolled in both the four-year and the two-year programs will complete the following courses in their equivalent numbered military years:
(a) Organizational Behavior (BA 150); (b) for Navy-Option students, Navigation (NS 12A-12B); or for Marine-Option students, a two-course sequence in the Evolution of Warfare (NA 120 and NA 121) and the History of Littoral Warfare (MA 154). National Security Policy (PS 20) is required of all students.
1. NROTC Three-and-four Year Scholarship Program: Nationwide competition is open to physically qualified men and women between the ages of 17 and 21 with waivers available for prior active duty to maximum commissioning year age of 29. U.S. citizenship is required. High school seniors and college freshmen are eligible to apply. Successful applicants receive full payment of tuition, fees, books and $100 per month during the school year. Three summer training cruises are required. Upon graduation, the student receives a commission in the Regular Navy of Marine Corps with a four-year active duty obligation. (Obligated service is not incurred until the start of the sophomore year in the four-year scholarship program.) Application deadline is December 1.

2. NROTC Four-Year College Program: Open to physically qualified men and women between the ages of 17 and 23, with the same active duty waiver as above possible. U.S. citizenship is required prior to start of junior year. College students may enroll in the college program until the start of the sophomore year. Participants receive uniforms, Naval Science books, and $100 per month stipend in their junior and senior years. They complete one summer training cruise. Upon graduation, the student receives a commission in the Naval or Marine Corps Reserve with a three-year active duty obligation. (Obligated service is not incurred until the start of the sophomore year in the four-year college program.) Scholarships may be offered to highly qualified college program students.

3. NROTC Two-Year Scholarship Program: Nationwide competition open to academically and physically qualified men and women who will be entering their junior year of college (or their third year in a five-year curriculum). U.S. citizenship is required. One year of calculus and one semester of physics are required prior to entrance into the program. Two-year scholarship students must not reach their 25th birthday prior to June 30 of the year in which graduation and commissioning are anticipated. Waivers to age 29, however, are possible for prior service. Candidates for the two-year scholarship attend a week summer training period at the Naval Science Institute in Newport, Rhode Island, prior to the start of their junior year. Graduates of the Naval Science Institute will receive full payment of tuition, fees, books, and $100 per month during their last two years in college. One summer training cruise is required. Upon graduation, the student receives a commission in the Regular Navy or Marine Corps with a four-year active duty obligation. Application deadline is December 1 of the sophomore year.

4. NROTC Two-Year College Program: Open to physically and academically qualified men and women who will be entering their junior year of undergraduate study (or their third year in a five-year curriculum). The age limit is 21, with waivers available for prior active duty as above. U.S. citizenship is required. Candidates attend the Naval Science Institute in Newport, Rhode Island, during the summer prior to their junior year. Graduates of the NROTC unit as juniors and receive uniforms, Naval Science books, and $100 per month stipend in their last two years in college. One summer training cruise is required. Upon graduation, the student receives a commission in the Naval or Marine Corps Reserve with a three-year active duty obligation. Application deadline is normally May 1 of sophomore year. For further information, direct inquiries to the chair of Naval Science, 25 Callaghan Hall.

Lower Division Courses
1. Introduction to Naval Science. (0) Must be taken on a passed/not passed basis. Two hours of lecture and discussion per week. A general introduction to the naval profession and to the concepts of sea power. Instruction emphasizes the physical, technical, organizational, and warfare components of the Navy and Marine Corps. Included is an overview of officer and enlisted ranks and rates, training and education and career patterns. The course also covers naval courtesy and customs, military justice, leadership, and nomenclature. The course acquaints the student with the professional standards expected of an officer in the naval service. (F)

2. Sea Power and Maritime Affairs. (12) Two hours of lecture/discussion per week. Prerequisites: Consent of instructor. The study of the history and development of sea power, its concepts, theories and applications. Emphasizes the impact of world situation, U.S. national interest, changing technology, and naval leadership on the evolving concept of sea power. Relates historical developments to current trends. Examines briefly U.S. Merchant Marine and Soviet Navy's impact on sea power policy formulation. (SP)

12A. Navigation and Naval Operations I. (3) Three hours of lecture and one hour laboratory per week. Theory, principles, and procedures of terrestrial celestial navigation and piloting techniques. A study of coordinate systems, including the celestial coordinate system, nautical charts and publications, position fixing, dead reckoning, and methods of celestial navigation, and the theory and prediction of tides and current. (F)

12B. Navigation and Naval Operations II. (3) Three hours of lecture and one hour laboratory per week. Prerequisites: 12A or consent of instructor. Introduction to the various aspects of ship operations at sea. Principles of terrestrial navigation including the rules of the road for prevention of collisions at sea, vector analysis of relative motion, ship behavior and characteristics in maneuvering, piloting techniques, celestial navigation, and meteorology. (SP)

Professional Courses
400A through 400H. Naval Laboratory. (0) Grading on a pass/no pass basis. The laboratory corresponds to the student's standing within the university. Freshmen register, in turn, for 400A-B; Sophomores for 400C-D; Juniors 400E-F; Seniors 400G-H. Two hours of instruction and practical application in leadership and associated military skills. The course is planned on professional training not of an academic nature. The laboratory is intended for topics such as drill and ceremonies, physical fitness and swimming testing, cruise preparation, crew evaluation, sail training, safety awareness, preparation for commissioning, personal finances, insurance, and applied exercises in naval ship systems, navigation, naval operations, naval administration, and military justice. Other topics and special briefings will be conducted as determined by the Chief of Naval Education and Training or the professor of naval science. (F/SP)

401. Naval Ship's Systems. (3) Three hours of lecture per week. An introduction to the physical theory or design of the ship's electrical, magnetic wave generation and propagation; the design and use of electronic, electro-mechanical, and pneumatic systems; and the combination of these systems to perform detection and analysis of objects sharing and traversing common environments. (F)

411. Leadership and Management I. (0) Must be taken on a passed/not passed basis. Two hours of lecture/discussion per week. A comprehensive advanced-level study of organizational behavior and management in the context of the naval organization. Topics include a survey of the management function of planning, organizing, and controlling; an introduction to individual and group behavior in organizations, and extensive study of motivation and leadership. Major behavioral theories are explored in detail. Practical applications are explored by the use of experiential exercises, case studies, and laboratory discussion. Other topics include decision-making, communication, responsibility, authority, and accountability. (F)

412. Leadership and Management II. (0) Must be taken on a passed/not passed basis. Two hours of lecture/discussion per week. The study of naval junior officer responsibilities in naval administration. The course covers organization modeling and analysis, personnel administration, human resource management, directives and correspondence, naval personnel administration, document management and maintenance, and supply systems. A course in the Naval and Marine Corps of the NROTC curriculum builds on and integrates the professional competencies developed in prior course work and professional training. (SP)

Molecular and Physiological Plant Biology

(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 305 Hilgard Hall, 642-3848

Professors:
Bob B. Buchanan, Ph.D. (Molecular Plant Biology)
William Z. Canes, Ph.D. (Botany)
Joseph J. Ciciani, Ph.D. (Biology)
Joseph G. Hancock, Jr., Ph.D. (Plant Pathology)
E.N. Hearst, Ph.D. (Plant and Soil Biology)
Andrew O. Jackson, Ph.D. (Plant Pathology)
Russell L. Jones, Ph.D. (Plant Pathology)
Watson M. Laetsch, Ph.D. (Vice Chancellor, Undergraduate Affairs) (Chancellor's Office)
John E. Nord, Ph.D. (Plant and Soil Biology; Forestry and Resource Management)
Richard Malin, Ph.D. (Molecular Plant Biology)
Anastasios Melis, Ph.D. (Molecular Plant Biology)
J.T. Moore, Ph.D. (Plant Pathology)
LaVerne R. Parker, Ph.D. (Phytochemistry)
Renee Z. Sung, Ph.D. (Genetics)

Associate Professors:
Lewis Feldman, Ph.D. (Botany)
Gilbert Grummet, Ph.D. (Botany)
Brian J. Staskawicz, Ph.D. (Plant Pathology)
John W. Taylor, Ph.D. (Plant Pathology)

Assistant Professors:
Robert L. Fischer, Ph.D. (Molecular Plant Biology)

Lecturer:
Alex Quintin, Ph.D. (Phytochemistry)

Graduate Advisor: Richard Malin.

The Graduate Group in Molecular and Physiological Plant Biology was formed to permit students to obtain advanced degrees in modern areas of plant sciences. The graduate program is directed by an interdepartmental group consisting of faculty members from several academic units (Botany, Chemistry, and Microbiology). Molecular Plant Biology, Plant and Soil Biology, and Genetics. Graduate study leading to the Ph.D. degree is offered.

The program emphasizes fundamental training in the plant sciences. The student chooses one of three academic options, each concentrating on a different aspect of plant science: plant physiology, molecular plant biology, and plant systematics. Although deficiencies can be removed during the early stages of graduate study.

*Not offered 1988-89
†On leave, spring, fall
‡On leave, fall
§Recalled to active service
&Recipient of Distinguished Teaching Award
Molecular Biology
(College of Letters and Science)

Department Office: 229 Stanley Hall, 642-1722
Chair: Nicholas R. Cozzarelli, Ph.D.

Professors:
Elizabeth H. Blackburn, Ph.D. University of Cambridge.
Eugene M. Darnell, Ph.D. University of Rochester.
Michael R. Botchan, Ph.D. University of California at Berkeley.
John C. Gerhart, Ph.D. University of California at Berkeley.

Assistant Professors:
Kathryn V. Anderson, Ph.D. University of California at Los Angeles.
Bizabeth H. Blackburn, Ph.D. University of Cambridge.
Harrison Echols, Ph.D. University of Wisconsin.
Nicholas R. Cozzarelli, Ph.D. Harvard Medical School.

Professors:
Motrion Williams, Ph.D. Emertus Cornell University.
Donald A. Glaser, Ph.D. California Institute of Technology.
Huekoy Williams, Ph.D. Cornell University.

Assistant Adjunct Professor:
Marletta Dunaway, Ph.D. Rice University.

**The Undergraduate Major**

The department administers a program leading to the A.B. degree with a major in molecular biology. The main focus of this program is the description and analysis of biological phenomena at the molecular level.

**The Major Program**

Lower Division
Chemistry 1A-1B, 8A-8B; Biology 1A-1B; Mathematics 16A-16B; Physics 8A-8B.

Upper Division
Molecular Biology 100A-100B, 101; Mathematics 100A; Chemistry 130A-130B; related electives (4).

Recommended: The Math 1 and Physics 7 series in place of the Math 16 and Physics 8 series. Additional courses in the life sciences chosen in accordance with a plan approved by the departmental adviser. A reading knowledge of at least one foreign language (French, German, Japanese, or Russian).

Honors Program. With the consent of the major adviser, students may enroll in the honors program no later than the beginning of the senior year. For enrollment in the program and for graduation with honors, a minimum GPA of 3.4 or higher is required, both in courses satisfying the requirement of the major and in all courses taken in the University. To complete the honors program, students must complete at least two units of course H196 and one unit of H190 and write a superior thesis based on research. Certain graduate courses in molecular biology will be open to honors students on approval of the instructor and adviser.

Graduate Program

The department offers a program of graduate study leading to the Ph.D. degree. This program emphasizes training and performance in laboratory research. Current areas of research activity include: structure and function of viral and cellular genomes; the nature of mutation and recombination; molecular biology of development; control mechanisms in the growth of viruses, bacteria and animal cells; and biological ultrastructure, development of neural connections, nucleocytoplasmic interactions in development.

Students interested in pursuing graduate work in molecular biology are advised to obtain a good background in biology, chemistry, physics, and mathematics. Biochemistry and genetics form the specific foundation for much of the instructional work in the department. The general preparation required of all graduate students is essentially that outlined above for the undergraduate major program.

Students are expected to take Molecular Biology 200A and 200B and other graduate courses chosen in consultation with the graduate adviser.

Each student serves as a graduate student instructor as a research assistant (RA) or the Ph.D. degree. In the qualifying examination the student must demonstrate proficiency in research as well as a general knowledge of different areas of molecular biology. Incoming students with adequate undergraduate preparation should plan on finishing their Ph.D. requirements, including the dissertation, within four to five years.

**Lower Division Courses**

1. Introduction to Molecular Biology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Designated for those not specializing in science. The molecular basis of life. Contemporary description of genetics, mutation, evolution, growth, and reproduction, with emphasis on viruses and simple organisms. Extension to higher organisms and medical and economic implications. (SP) Clark

2.00A. General Molecular Biology. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: Biology 1A. Molecular biology of prokaryotic and eukaryotic cells and viruses. Cell and virus structure, molecular basis of heredity, protein synthesis, gene regulation. Genes and chromosomes in eukaryotic cells. (F) Clark

3.00B. General Molecular Biology. (4) Three 1-hour lectures and two 1-hour discussions per week. Prerequisites: 100A or consent of instructor. Molecular biology of eukaryotic cells and interacting cell populations. Regulation of gene expression. Structure and function of the cytoplasm, subcellular organelles and cell membrane. Morphogenesis and differentiation in development, intracellular communication, growth regulation in tissues. (SP) Clark

101. Molecular Biology Laboratory. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: 100A-100B or 100A and concurrent enrollment in 100B. The experimental techniques of molecular biology with an emphasis on the informational macromolecules of viruses, bacteria and cells of higher organisms. (F,SP) Blackburn

120. Molecular Virology. (3) Three 1-hour lectures per week. Prerequisites: Chemistry 8A-8B and Biology 1A-1B. Consideration of viruses as infectious particles having chemical, physical, and hereditary characteristics. (F) H190. Research Seminar. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Enrollment in Molecular Biology Honors Program and concurrent enrollment in H196. Seminar on presentation and evaluation of the scientific literature and the student's research results in the area of the research project covered under H196. (F,SP) Staff

H196. Research. (1-3) Course may be repeated for credit. Laboratory research and written report. Prerequisites: Enrollment in Molecular Biology Honors Program. Laboratory research followed by a written report. Open to advanced students under direction of a member of the staff. (F,SP) Staff

198. Current Topics in Molecular Biology. (1.5) Must be taken on a passed/not passed basis. One and one-half hour meetings. Prerequisites: Consent of instructor. Group studies of selected topics in molecular biology. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Laboratory research.

**Graduate Courses**

200A. Advanced Molecular Biology. (3.5) Two 1-1/2 hour lectures per week and one hour of discussion per week. Prerequisites: Biology 1A-1B or Microbiology 100A; Biochemistry 100A or 102, and physical chemistry. Genetics, biochemistry, molecular biology, and replication of the structures of viruses and of cells; biosynthesis of nucleic acids proteins; metabolic regulation. (F) - Cozzarelli, Echols

200B. Advanced Molecular Biology. (3) Two 1-1/2 hour lectures and one 1-hour discussion per week. Prerequisites: Biology 1A-1B or Microbiology 100A; Biochemistry 100A or 102, and physical chemistry. Cell structure and gene expression in eukaryotes; cellular differentiation, macromolecular synthesis, chromosomal organization. (SP) Anderson, Botchan, Harland

202. Research Review in DNA Structure and Function. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One and one-half hours of lecture per week. Presentation and discussion of current research and literature on DNA structure and function. (F,SP) Cozzarelli, Dunaway, Echols

208. Research Review in Viruses as Models for Eukaryote Gene Expression. (2) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: Consent of instructor and course in molecular biology. Discussion of recent developments in eukaryote viral and cellular regulation. Research papers and new concepts in transcription and RNA replication. Consideration of the particular emphasis upon virus-cell interactions. (F,SP) Botchan

210. Special Topics in Molecular Biology. (1-3) Course may be repeated for credit. One hour of lecture per week per unit. A course dealing with the areas of current interest in molecular biology. (F,SP)

211. Introduction to Research in Molecular Biology. (1-4) Course may be repeated for credit. Laboratory research, conferences, Prerequisites: Consent of instructor and course in molecular biology. An introduction to research methods and research approaches in particular areas of molecular biology. (F,SP)

217. Research Reviews in Animal Cells and Viruses. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Consent of instructor and course in molecular biology. Review of current literature and discussion of original research by staff and students. (F,SP)

220. Molecular Biology of Animal Viruses. (2) Two 1-hour lectures per week. Prerequisites: Biology 1A-1B or Microbiology and Immunology 100A; Biochemistry 100A or 102. Structure, replication, mutations, and host-cell interactions of animal viruses.

232. Seminar on Bacterial Viruses. (1) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Consent of instructor and course in molecular biology. Review of current literature and discussion of original research. Subjects covered are the initiation of DNA replication, the regulation of transcription at the initiation and termination stages, DNA packaging, interference and destruction of host nucleic acids, molecular cloning, and the heat shock response. (F,SP) Calendar

234. Seminar on Gene Expression in Drosophila. (2) New course. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Consent of instructor and course in molecular biology. Research on gene regulation in Drosophila and other eukaryotes. (F,SP) Beckendorf

236. Seminar in Developmental Genetics of Drosophila. (2) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites:
Consent of instructor and course in molecular biology.
Discussion of the current literature in the area of
developmental genetics of the Drosophila embryo.
Particular emphasis on experimental approaches and techniques,
ranging from classical embryology and classical genetics
to molecular genetics and biochemistry. (F,SP)

251. Research Review in Bacterial Genetics. (2)
New course. May be repeated for credit. Must be taken
on a satisfactorily/unsatisfactory basis. One 1½-hour
lecture per week. Prerequisites: 100A or consent of instructor.
Review of current literature and discussion of original research.
Subjects covered are the role of rec gene products in genetic recombination,
with special emphasis of recA, recF, recC and recP products, and genetic
approaches to testing computer models of protein
structure. (F,SP)

270. Research Seminar. (1) Course may be repeated for
credit. One 1-hour seminar per week. Prerequisites:
211 or 280, which may be taken concurrently. Seminar on
presentation and evaluation of results in area of
student's individual research interests. (F,SP) Staff

280. Research. (1-12) Course may be repeated for
credit. Laboratory research, conferences. Individual re-
search under the supervision of staff member. (F,SP) Staff

290. Seminar. (1) Course may be repeated for credit.
One 1-hour seminar per week. Recent topics in molecular
biology. Topics to be announced in advance of each
semester. Enrollment in more than one section is per-
mitted. (F,SP) Staff

299. Special Study for Graduate Students. (1-5)
Course may be repeated for credit. Reading and con-
ferences. Meetings to be arranged. Reading and con-
ference under the direction of a staff member. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6)
Must be taken on a satisfactorily/unsatisfactory basis.
Prerequisites: Consent of instructor. Permission of staff
in consultation with the major field adviser, intended to provide an opportunity for
qualified students to prepare themselves for the various examinations required of candidates for the Ph.D.
(F,SP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 205. Development Review. (1) Course may be
repeated for credit. Must be taken on a satisfactorily/
unsatisfactory basis. One 2-hour seminar per week.
Prerequisites: Consent of instructor: A seminar devoted to the
analysis of major problems in animal and plant
embryology. Type determination, pattern formation,
cell and tissue interactions, and mechanisms of mor-
phogenesis with emphasis on regulations and integration of
developmental events at the cellular, molecular and
related levels of organization. Sponsoring departments:
Molecular Biology and Zoology. (SP)

Related Courses in Other Departments by Molecular Biology Faculty

Biology 1A. General Biology. (4) See Biology for
complete description of this course.

Biology 110. Variation, Adaptation and Transfor-
mation of Animal Cells. (2) See Biology for a complete
description of this course.

(3) See Biochemistry for complete description of this course.

Biochemistry 206. Physical Biochemistry. (3) See
Biochemistry for complete description of this course.

Biochemistry 251. Molecular Biology of Eukaryotic Mi-
croorganisms. (2) See Biology for complete description of this course.

Physics 250. Special Topics in Physics. (2-4) See
Physics for complete description of this course.

Molecular Plant
Biology

(College of Natural Resources)

Division Office: 605 Hilgard Hall, 642-3884
Chair: Bob B. Buchanan, Ph.D.

Professors:
Bob B. Buchanan, Ph.D. Duke University, Plant
biochemistry.
Lowell N. Lewis, Ph.D. Michigan State University, Plant
physiology, plant molecular biology.
Richard Malin, Ph.D. University of California at Berkeley.
Biochemistry, bioenergetics, photosynthesis
Anastasios Melis, Ph.D. Florida State University.
Biophysical enzymology, photosynthesis
Peter H. Quail, Ph.D. University of Sydney, Plant molecular biology, plant biochemistry

Daniel L. Aman, Ph.D. Doster (Hon.) University of
California at Berkeley. Photosynthesis and nitrogen

Chair: Bonnie C. Wade, Ph.D.

Department Office: 104 Morrisbn Hall, 642-2678

Music (College of Letters and Science)

Department Office: 104 Morrison Hall, 642-2878
Chair: Bonnie C. Wade, Ph.D.

Professors:
Philip Bradley, Ph.D. Cambridge University, Chorus, English
Renaissance, Britten
Brendan Cooper, Ph.D. Yale University, Medieval music,
historiography
Alan Curtis, Ph.D. University of Illinois. Early music
performance, opera
Edwin Dugger, M.F.A. Princeton University, Composition,
electronic music.
Richard Felciano, Ph.D. University of Iowa. Composition,
contemporary music, sound art.
Daniel Haerl, Ph.D. Harvard University. Classical period,
French Renaissance

*On leave, spring
**Recalled to active service
†Recipient of Distinguished Teaching Award
All students who wish either to audit or to enroll in performance courses should consult the Schedule of Classes for information on audition appointments.

Students who plan to major in music or take any of the courses listed for minors under Group II must take the music placement examination, which is offered each semester in the week before instruction begins, as announced in the Schedule of Classes and the Department of Music Brochure for music majors. The placement examination determines admission to the major as well as placement in or exemption from the musicianship and harmony sequences. The examination may be taken on an advisory basis. The Department of Music Brochure for music majors may be obtained by writing or calling the Department of Music office.

Prospective music majors are encouraged to begin the music program early, preferably in their freshman year. Pre-major advisors and all members of the faculty are available throughout the year to consult with students interested in the music program.

The Major

Lower Division

During the first two years, students receive training in musicianship and harmony. Advanced placement in this sequence (or exemption from it) is determined by the music placement examination. Students lacking basic keyboard skills will also participate in a small group piano class. Students who are encouraged to begin the upper division Performance Requirement (a) in their first or second year of study.

First Year. Musicianship A-B; Harmony 1A-1B.
Second Year. Musicianship C-D; Harmony 2A-2B; History of Western Music I, 70A-70B.

Recommended. Performance courses as listed in upper division requirement (a).

Upper Division

Students complete a minimum of 24 semester units of upper division music major courses from the series 130-179, which must include the following requirements: (a) Performance: A two-semester sequence of either Music 141, University Symphony, or Music 144, University Chorus; and two additional courses from the performance series 140-149. (b) History of Western Music II, 170A-170B. (c) Additional courses to complete the minimum of 24 units in the series for majors 130-179. Interdepartmental courses offered through the Department of Music are accepted for the major.

Honors Program. Advisor: Mr. Newcomb. Qualified students majoring in music are invited to consult the advisor concerning studies which they may propose to undertake. Research projects in music history, composition, analysis, performance, or other areas of specialization will be considered. A minimum of 4 units of Honors Course (H195) is required of seniors who wish to obtain departmental honors at graduation.

Teaching Training. Consult major advisors.

The Minor

Lower Division

One year of harmony and musicianship (four courses): either the major series A-B and 1A-1B or the non-major series 20A-20B and 25A-25B; Music 27 or equivalent.

Upper Division

A minimum of five courses. At least two must be taken from courses numbered in the 140s and at least two must be taken from courses numbered in the 150s and 160s (including IDS 135). With instructor’s approval, courses numbered between 151-179 may be substituted for courses in the 120s and 130s.

All courses taken in the minor must be taken for a letter grade.

Graduate Programs

The Department of Music offers programs leading to the M.A. and Ph.D. degrees, with specialties in composition or in scholarship and criticism, including the history of music, analysis, and ethnomusicology (not in music education or performance). All students working for the Ph.D. degree are required to serve as graduate student instructors for one year. Applications for admission are considered only once a year for the fall semester; the deadline for application is January 5. Applicants are asked to take the department’s placement examinations in music history and theory (listening, counterpoint, dictation, and sight reading). Arrangements for taking the exam must be made by December 15.

Medieval Studies. Please see Index for information on Medieval Studies.
128. Music of Johannes Brahms. (3) Three hours of lecture and one 1-hour listening section per week. Prerequisites: Consent of instructor. Survey of the principal literature of the period, from Beethoven to Stravinsky. (F) Senturia

128H. The Piano Concerto. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: Consent of instructor. A study of the development of the 19th century piano concerto. (F) Kerman

*128J. Music from the Middle Ages to the High Ren. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: Consent of instructor. Survey of Russian music including liturgical chant, 18th-century folk music sources, and art music into the 20th century.

*128. Russian Music. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: Consent of instructor. A study of selected repertories from the 14th to the 17th centuries.

Ethnomusicology

Lectures, listening assignments, and readings in translation, with live or videotaped performance demonstrations. Laboratory sections offer practical experience performing on instruments indigenous to the regions studied. No previous musical experience is required.

*130A. Afro-American Music. (3) Three hours of lecture per week. Study of the Afro-American music tradition from its West African origins to the various forms at the end of the 19th century.


133A. Music of the Southeast Asia Tradition. (3) Three 1-hour lectures and one 1-hour laboratory per week. Surveys the musics of Indonesia (Java and Bali), Thailand, Cambodla, Laos, Malaysia, and the Philippines—cultures which share instrument types but have developed distinctive musical styles. (SP) Wade

*133B. Music of India. (3) Three 1-hour lectures and one 1-hour laboratory per week. Includes the classical music traditions of both North and South India (Hindustani and Karnatak). Emphasis on class listening.

*134A. Music of the East Asia Tradition. (3) Three hours of lecture and one hour of laboratory per week. Surveys the musics of China, Tibet, Korea, Vietnam, and Japan—cultures which share instrument types but have developed distinctive musical styles.

134B. Music of Japan. (3) Three hours of lecture and one hour of laboratory per week. Traditional classical music of Japan: Shinto ritual music, the imperial court orchestral music and dance, koto and shakuhachi forms, chamber music for shamen and koto, theatrical genres of kabuki and noh. Reading in music and pertinent Japanese literature in translation. (F) Wade

*137. The Arts in Culture. (4) Four hours of lecture and one hour of listening section per week. Considers the cultural study of music, dance, theater, and art by historians and social scientists. Material focuses on diverse areas of the world.

*138. Music of Hispanic America. (3) New course. Three 1-hour lectures and one hour of laboratory per week. Survey of folk and popular musical traditions of Mexico and Central America, the Caribbean, in Andean and Platine regions, Venezuela, Colombia and Brazil. Emphasis on the convergence of African, indigenous, and Spanish styles.

Performance

Admission to all performance courses is determined by audition during the period of advance enrollment. All courses in this group may be repeated for credit.

Performance courses should be taken in a two-semester sequence beginning in fall.

140. Javanese Gamelan. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. A performing course for the study and practice of Indonesian music and instruments. (F,SP)

141. University Symphony Orchestra. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. Prerequisites: audition. (F,SP) Senturia

*142. University Concert Band. (2) Formerly 143. Course may be taken for credit or audit. Course may be repeated for credit. Two 2-hour rehearsals per week. Prerequisites: audition. (F,SP)

144. University Choruses. (2) Course may be repeated for credit. Two 1-hour rehearsals and 1-hour section per week. Prerequisites: audition. Section 1, The University Chorus, is primarily concerned with major works for chorus and orchestra. Section 2, Repertory Chorus, is a smaller group drawn from the University Chorus, that aims at a high standard of ensemble singing and explores the lesser-known choral repertoire. (F,SP) Brett

146. Chamber Music Ensemble. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. Chamber music for strings, winds, piano, percussion, and voice. (F,SP)

147. Contemporary Chamber Music Ensemble. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. A group organized to perform and study compositions representing recent developments in music. (F,SP) Fecliano

148. African Music Ensemble. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. Performance of West African music with particular emphasis on the music of Ghana. Practical instruction in traditional instrumental and vocal techniques. (F,SP) Ladzekpo

*149. Collegium Musicum. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. Performance of Renaissance and Baroque music for voices and instruments.

Group II

Courses primarily for students whose major subject is music.

Note: Musicianship (A-B-C-D), Harmony (1A-1B-1C-1D), and Counterpoint (1A-2A-3A-4A) are all prerequisites to the major and must be taken concurrently unless the requirement is satisfied by examination.

Lower Division Courses

A-B. Musicianship. (3-3) Three 1-hour meetings per week. Prerequisites: Majors only: A is prerequisite to B; B is prerequisite to C; C is prerequisite to D. (F,SP) Sequence begins (F) Dana, Davidson, Swackhammer

C-D. Musicianship. (3-3) Three 1-hour meetings per week. Prerequisites: B is prerequisite to C; C is prerequisite to D. A continuation of A-B. (F,SP) Sequence begins (F) Dana, Davidson, Swackhammer

1-1B. Harmony. (4-4) Three class hours per week. Prerequisites: 1A is prerequisite to 1B. Diatonic harmony, study of scales and modes, and analytical studies. Emphasis will be on written exercises. (F,SP) Sequence begins (F) Staff, Daguerre in charge

2A-2B. Harmony. (4-4) Three class hours per week. Prerequisites: 1B; 2A is prerequisite to 2B. Advanced diatonic, chromatic, and early 20th-century harmony; Emphasis will be on written exercises. (F,SP) Sequence begins (F) Staff

70A-70B. History of Western Music I. (4-4) Three hours of lecture and one discussion meeting per week. Prerequisites: 1B or consent of instructor.

A. Introduction to music history and criticism, and practice in analytical methods for music of all periods, with emphasis on listening, exercises, and papers. The second half of the semester will be devoted to a study of music from ca. 1700-1750. (F) Heartz

B. A study of music from 1750-1850. For a continuation, see 170A-170B. (SP) Heartz

Upper Division Courses

150. Instrumental and Vocal Instruction. (1) Course may be repeated for credit if an average grade of B is earned. One-hour laboratory per week. Prerequisites: Must be a music major. Advanced private instruction in keyboard, stringed, woodwind, brass, and percussion instruments and in voice. (F,SP) Staff, Brett in charge.

Theory

Upper Division Courses

151. Introduction to Composition. (4) Three class hours per week. Prerequisites: 2B, 154A, and consent of instructor. A study of motive structure, its extension and elaboration, and forms, such as scherzo, sonata, variation, and song, based on 18th- and 19th-century models. (SP)

152. Advanced Musicianship. (2) Course may be repeated for credit. Three 1-hour class meetings per week. Prerequisites: D, 2B, 405D, and consent of instructor. Continuation of the skills acquired in prerequisite courses, with an emphasis on score reading skills (including use of the voice) and the realization of Baroque figured bass lines. Increased emphasis on 20th-century and contemporary practice. (F,SP) Dana

153. Fugue. (4) Students who have taken 206 or 106 may not receive credit for 153. Three hours of lecture and one hour of listening section per week. Prerequisites: 154B. A study of subjects, answeres, countersubjects, expositions, episodes, and strict fiving leading to the writing of complete fugues. Regular written assignments required.

154A-154B. Counterpoint. (4) Three class hours per week. Prerequisites: 2B.

A. A study of species counterpoint. Regular exercises in two and three voices required. Group discussion and analysis. (F)

B. A study of 18th-century counterpoint. Regular exercises required. Analysis of chorale preludes, two- and three-part inversions, canons, and fugue expositions. (SP)

155A-155B. Composition. (4) Three class hours per week. Prerequisites: 151. A study of formal problems using 20th-century compositional materials. (F,SP)

156. Studies in Musical Analysis. (3) Three class hours per week. Prerequisites: 2B. The study of various analytical techniques and their application to important works of music. (F) Imbrie

157. Orchestration. (4) Three class hours per week. Prerequisites: 2B and 154B. A study of the techniques of 18th-, 19th-, and 20th-century orchestration. Analysis of scores and assignments in scoring for selected instrumental combinations. (SP) Thow

161. Instrumental Conducting. (3) Three 2-hour classes per week. Prerequisites: 2B, 152, and 156 recommended. A systematic study of baton techniques and modern orchestral instruments. Students gain experience in reading and conducting modern orchestral scores. (SP) Senturia

162. Choral Conducting. (3) Two 2-hour classes per week. Prerequisites: 2B, 152, and consent of instructor. A study of choral literature of various styles and periods with emphasis on conducting techniques and score reading. (F) Brett

History and Literature

Analytical and historical studies of the music of important composers and periods in the development of Western music. Emphasis on the detailed study

*Note offered 1988-89
*On leave, spring
*On leave, fall
*Recipients of Distinguished Teaching Award

On leave, spring
*On leave, active service
*Recipient of Distinguished Teaching Award

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of selected representative compositions, through scores, recordings, and assigned readings.

Upper Division Courses

170A-170B. History of Western Music II. (4/4) Three hours of lecture and one discussion section per week. Prerequisites: 70A-70B or consent of instructor. 170A is a study of music from the Middle Ages to ca. 1700 and 170B, music from ca. 1750 to the present. (F,SP) Taruskin

*171A. The Performance of Medieval and Renaissance Music. (3) Three class hours per week. Prerequisites: 2B and 70B, or consent of instructor; experience in playing an instrument or singing. A study of the music of the Middle Ages and the Renaissance, with emphasis upon performance practices and styles.

*171B. Monteverdi. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor.

171C. The Performance of Baroque Music. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor; experience in playing an instrument or singing. A study of music from ca. 1600 to 1750, with emphasis upon performance practices and styles. (SP) Curtis

*171D. J.S. Bach. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor.

*171E. Purcell. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. Emphasis will be upon the dramatic music.

*172A. Mozart. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. Emphasis will be upon the dramatic music.

*172B. Beethoven. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. Emphasis will be upon the dramatic music.

*172C. Schubert. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. Emphasis will be upon the dramatic music.

*173A. The Symphony: 1825-1910. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of the development of the symphony as a form.

173B. Art Song of the Nineteenth Century. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of the Art Song with emphasis upon the music of Schubert and Schumann.

173C. Wagner's Ring of the Nibelung. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of the four operas of Wagner's Ring cycle.

173D. Schubert to Brahms. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of the Art Song with emphasis upon the music of Schubert and Schumann.

174B. Studies in Twentieth-Century Music. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of representative compositions from each major development of music in the 20th century.

174F. Studies in Afro-American Music. (3) Three hours of lecture per week. Prerequisites: 2B and 1300B, or consent of instructor. Detailed analysis of specific musical forms. Unique aspects of the musical organization, improvisational techniques, and value system will be explored. (SP) Wilkins

*176. The History of the Organ. (3) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of the organ with emphasis on the development of national styles. The unique inscriptions in the Music Department's collection will be studied in detail. Term paper assigned.

Honors and Special Studies Courses

Upper Division Courses

H195. Honors Course. (2-4) Course may be repeated for credit. Prerequisites: Consent of instructor, student's advisor, and honors program advisor. Attendance at seminar offered during the fall semester and completion of a thesis, or, in exceptional cases, supervised independent study projects. Projects must complete a minimum of 4 units in order to receive departmental honors. Restricted to seniors with an overall GPA of 3.3 and 3.3 in the major. (F,SP) Taruskin

196. Group Special Study for Advanced Undergraduates. (2-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Not to count for more than 4 units in any one term. (F,SP) Kerman

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

Consent of instructor must be obtained before enrollment in any graduate courses.

Graduate Courses

200. Introduction to Musical Scholarship. (4) Three class hours per week. Principles and methods of scholarly research in music, especially history of music; bibliography, use of documents, and project design. Presentation of results in written and oral forms. (F) Newcomb

201. Workshop in Electronic Music. (4) Course may be repeated for credit. One 3-hour class meeting and nine hours of laboratory per week. A consideration of compositional machinery skills necessary to operate the analog equipment in the electronic music studio; practical application of musical acoustics to the available equipment; compositional assignments. (F,SP)

202. Seminar in Contemporary Music. (4) Course may be repeated for credit. Three class hours per week. Students in 20th-century music. (F,SP) Kerman, Thow

203. Seminar in Composition. (4) Course may be repeated for credit. Three class hours per week. Prerequisites: 2B and 70B, or consent of instructor. A study of relevant problems and compositional techniques of contemporary music. Original compositions required of students. Group discussion and criticism. (F,SP) Dugger

204. Studies in Musical Analysis. (4) Three class hours per week. Application of analytical principles to a group of compositions and the intensive study of at least one major work. (SP) Imbrie

205. Organology. (4) Three hours of lecture per week. Prerequisites: 2B and 70B, or consent of instructor. A study of musical instruments from diverse perspectives including physical characteristics, classification systems, symbolisms, iconography, and performance techniques.

210. Proseminar in Music History. Three class hours per week. Studies in the history and literature of Western music, dealing with representative composers, music and topics. The courses listed below will be given in rotation.

210A. Gregorian and Medieval Chant. (4) 210B. Medieval Polyphony. (4) (SP) Crocker

210C. The Sixteenth Century. (4) 210D. The Seventeenth Century. (4) (F) Heartz

210E. The Eighteenth Century. (4) 210F. The Nineteenth Century. (4)

210G. The Twentieth Century. (4)

*211. Musical Paleography. (4) Three class hours per week. Translation of documents, especially from European Middle Ages and Renaissance, with emphasis on systems of notation.

*212. Seminar: Medieval Studies. (4) Course may be repeated for credit. One 3-hour class per week. A highly specialized study of medieval music. The topic will change each time the course is offered.

213. Seminar: Studies in the Sixteenth Century. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study of sixteenth-century music. The topic will change each time the course is offered. (SP) Brett

*216. Seminar: Studies in Baroque Music. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study in Baroque music. The topic will change each time the course is offered.

*217. Seminar: Studies in Classical Music. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study in Classic music. The topic will change each time the course is offered.

218. Seminar: Studies in Romantic Music. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study in Romantic music. The topic will change each time the course is offered. (F) Heartz

219. Seminar: Jazz. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study of Jazz. The topic will change each time the course is offered.

220. Seminar: Problems in Criticism. (4) Course may be repeated for credit. Three class hours per week. A specialized course in musical criticism. The topic will change each time the course is offered.

221. Textual Criticism and Editing. (4) Three hours of class per week. Prerequisites: Consent of instructor. Techniques of editing and musical notation; problems associated with making modern editions of music in older notational systems. Consideration of multiple sources (e.g., discarding filiation among manuscripts and constructing a stemma, different editions of printed sources), and the relation of critical techniques to good editorial practice.

222. Seminar: Studies in Russian Music. (4) Course may be repeated for credit. Three class hours per week. A highly specialized study in Russian music. The topic will change each time the course is offered.

225. Introduction to Modern Music Theory. (4) Three class hours per week. Prerequisites: Consent of instructor. Theoretical models for tonal and atonal music; conceptual basis and application of the work of Schenker, Babbitt, Forte, Perle, and others.

230. Topics in Asian Music. (4) Course may be repeated for credit. Three class hours per week. A highly specialized course in ethnomusicology, dealing with a different culture in each term. Study of music, dealing with representative composers, music, and topics. The courses listed below will be given in rotation.


235A. Issues and Theories in Ethnomusicology I. (4) Three class hours per week. An introduction to the field, methods, theories, and work of scholars, philosophers, musicologists, and other humanists in the field of ethnomusicology. (F) Wade

235B. Issues and Theories in Ethnomusicology II. (4) Three class hours per week. An introduction to the ideas, methods, theories, themes, and work of anthropologists, sociologists, folklorists, linguists, and other social scientists in the field of ethnomusicology. (SP) Wade

235C. Topics in Ethnomusicology. (4) Course may be repeated for credit. Three class hours per week. A highly specialized course in ethnomusicology. The topic will change each time the course is offered. (F) Wade

238A. Ethnomusicology Methods: Field Research. (4) Formerly 236. Course may be repeated for credit. Three class hours per week. Prerequisites: 235A-235B. Techniques, equipment, research and data collection, analysis, documentation, notation, translation, and conducting research in music of Asian cultures. The topics will change each time the course is offered.

238B. Ethnomusicology Methods: Transcription. (4) Three class hours per week. Prerequisites: 235A-235B. A study of transcription systems developed for different musical traditions. Equal emphasis on practical transcription techniques and their theoretical basis. About five meetings per semester. Meetings for the
Native American Studies

(Special Studies or College of Letters and Science)

Program and Major Office: 3415 Dwainelle Hall, 642-6717
Coordinator: Terry P. Wilson, Ph.D.

Professor:
Paula Gunn Allen, Ph.D. (Laguna Pueblo)
Associate Professors:
Ciera Sue Kidwell, Ph.D. (Chippewa-Chocktaw)
Terry Wilson, Ph.D. (Potawatami)

Assistant Professor:
Rory Snowarow Fausteti, J.D. (Siksika/Blackfoot)

Undergraduate Major Advisors: Mr. Wilson, Ms. Hopper.

The Native American Studies Program exists to provide a point of academic focus and identity for Native American students and to broaden the understanding of other students interested in the history, culture, and contemporary situations of Native Americans.

The curriculum has been structured to provide courses that deal with both historical and cultural analysis of Native American cultures and contemporary legal and social institutions that affect Native American life. The program stresses not only sound academic preparation in the classroom but also students' flexibility to take part in community-oriented education through field work or studies directed toward community situations and problems.

Choice of Program

An student can complete the major in Native American Studies in the College of Letters and Science (A.B. degree) or in the Department of Ethnic Studies (A.B. degree). Students in each program are subject to the requirements of the respective college or department.

The Major

The major program in Native American Studies leads to an A.B. degree. Admission to the program requires written approval from a program academic adviser who will assist in working out an appropriate course of study. Consultation with the adviser prior to admission into the major should be held no later than the first semester of the junior year. Students will be required to outline their academic and professional goals.

Requirements

1. University Requirements. (a) Completion of 120 units, at least 36 of which must be in upper division courses; (b) Maintenance of at least a 2.0 grade-point average; (c) Completion of senior residence.

2. Major Requirements. (a) 50: Native Americans in Contemporary Society; (b) 71A-71B: History of Native Americans in North America; (c) Ethnic Studies 20 or 21; (d) 101: Native American Sovereignty; (e) ES194: Quantitative Methods of Community Research or ES195: Selected Issues in Third World Research; (f) 15 units of upper division NAS courses; (g) three upper division courses supportive of major. One course from Ethnic Studies Group Major. Two courses from outside NAS and the Department of Ethnic Studies. Courses in support of major, available from main office, must be approved by an academic adviser.

3. Breadth Requirements—Special Studies (for College of Letters and Science breadth requirements, see the college announcement), (a) 1A and 1B: Reading and Composition (an equivalent); (b) two courses outside the major; (c) Natural Science: one course; (d) three upper division courses outside the major and Ethnic Studies Department.

The Honors Program

Native American Studies Program provides a program leading to the A.B. degree with honors. A student must have junior standing; a 3.5 GPA overall; and a 3.5 GPA in the major. To complete the degree with honors the student will be required to undertake a senior research project (195S) that will be specified as an honors project and will be graded according to standards determined by the faculty as being of honors quality. A committee of three faculty members will establish criteria and grade the project.

The Minor

Lower Division. Course: Native American Studies 50, 71A, 71B.

Upper Division. Five courses: Sovereignty: Native American Studies 101; History: one course; Native American Studies 173, 175, 176, 177; Electives: Three courses in Native American studies.

Lower Division Courses

1A. Native American Studies Reading and Composition. (3) Three hours of lecture per week. Prerequisites: Satisfaction of Subject A requirement. Expository composition directed toward the needs of Native American students. The writing requirement shall be set at a norm of 8000 to 10,000 words per semester; a minimum of 8000 words is to be divided among six to eight papers in each half of the requirement. (F) Staff

1B. Native American Studies Reading and Composition. (3) Three hours of lecture per week. Prerequisite: Course 1A: Satisfaction of Subject A requirement. Continued emphasis on development of proficiency in expository composition with increased attention to Native American literary traditions. The writing requirement shall be set at a norm of 8000 to 10,000 words per semester; a minimum of 8000 words is to be divided among six to eight papers in each half of the requirement. (SP) Staff

50. The Native American in Contemporary Society. (3) Three hours of lecture per week. Analysis of political issues and problems of Native Americans on reservations and urban areas. Major topics of the Bureau of Indian Affairs, the U.S. Public Health Service, the relocation system, the reservation system, discrimination, urban life, Indian organizations, stereotypes, the "New Indian." (F,SP)

52. Native American Creative Writing Workshop. (3) Three hours of lecture per week. Prerequisites: 1A-1B, or consent of instructor. Native American literary forms and presentation in storytelling, oratory, drama, etc. Development of creative writing skills using those forms and presentations as a basis for expression. (F) Allen

71A. History of Native Americans in North America. (3) Three hours of lecture per week. History of the original native people in North America, discussion of the diversity of Native American cultures and normality of value systems of those cultures; consideration of the impact of European contact to 1776. (F,SP) Black

71B. History of Native Americans in North America. (3) Three hours of lecture per week. Prerequisites: 71A or consent of instructor. Course deals with the political, cultural, legal, and military relationships between the various American Indian tribes and the U.S. Government from 1776 to the present. (SP) Wilson

Upper Division Courses

101. Native American Sovereignty. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. Examination of Native American rights as a product of the history of Anglo-American economic, legal, political, social, and intellectual thought. This course will examine property rights, political identity, and cultural integrity through theoretical and historical phases from the colonial period to the present. (F)

*Not offered 1988-89
1On leave, spring, fall
2On leave, spring
3Recipient of Distinguished Teaching Award

Interdepartmental Studies Courses

Upper Division Courses

*IDS 135. Mozart and Beaumarchais: The Figaro Cycle. (4) Three hours of lecture plus extensive listening assignments. Prerequisites: Major in French or Music, or consent of instructor. Beaumarchais' plays as a portrait of European society on the eve of the French Revolution, and their musical settings by Mozart and other composers. May include Mozart's Don Giovanni and Cosi fan tutte, both composed in response to the success of Le Nozze di Figaro. Don Giovanni will be studied in conjunction with Millon's Don Juan. Sponsoring departments: Music and French. (SP)

The Honors Program

The Native American Studies Program provides a program leading to the A.B. degree with honors. A student must have junior standing; a 3.5 GPA overall; and a 3.5 GPA in the major. To complete the degree with honors the student will be required to undertake a senior research project (195S) that will be specified as an honors project and will be graded according to standards determined by the faculty as being of honors quality. A committee of three faculty members will establish criteria and grade the project.

The Minor
103. Survey of Native American Tribal Government. (3) Three hours of lecture per week. Analysis of the development of tribal government and policy including political institutions, the tribal society, inter-tribal alliances, and effects of European contact. (SP)

104. Native American Economic Development. (3) Three hours of lecture per week. Prerequisites: 71A or consent of instructor. Analysis of impact of U.S. economic policies on Native American resources. Emphasis on the effect of federal legislation, BIA regulations, and corporate interests on tribal economic life. Consideration of alternative strategies of development. (SP)

110. Introduction to Research Problems of Native American Communities. (3) Three hours of lecture per week. Prerequisites: 71A, or consent of instructor. This course is designed to establish a familiarity with the methods and logic of scientific inquiry, from origin through development of a research topic. Emphasis is on social science methodology, theory, assumptions and problem solving. (F) Staff

111. Proposal Writing for Native American Communities. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. This course is designed to address special problems as well as alternative approaches to topic definition of thesis development in NAS research through writing and submission of proposals. (SP) Staff

151. Native American Philosophy. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. A study of the philosophical and metaphysical aspects of Native American world views, with emphasis on systems of knowledge, explanations of natural phenomena, and relationship of human beings to nature through ritual and ceremonial observances. (SP) Kidwell

152. Native American Literature. (3) Three hours of lecture per week. Prerequisites: 151 is recommended but not required. An analysis of the written and oral tradition developed by Native Americans. Emphasis will be placed on the oral as opposed to the verbatim (literary, linguistic, psychological, historical, and cultural) imming Native American literature. (Fall) Allen

153. Native American Poetry. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. A study of Native American poetry from ethnographic sources and contemporary writers. Consideration of Native American poetry as literature within traditional and alternative definitions of the word, and of the cultural background of Native American poetry and its sources. (Spring) Allen

154. Mythic Tribal Literature. (3) Three hours of lecture per week. Prerequisites: 50, 71A, Consent of Instructor. A study of a mythic type of narrative and its oral oral and literary aspects. The course will include either a survey of mythic literature, or a seminar in a single tribe's literature. (Fall) Staff

155. Native American Medicine. (3) Three hours of seminar per week. Prerequisites: 71A, Anthropology 3, or consent of instructor. Analysis of the role of health and illness among Native American cultures. Emphasis will be placed on ethnographic sources and contemporary writers. Consideration of Native American medicine as an area of study within traditional and alternative definitions of the word, and of the cultural background of Native American medicine and its sources. (Fall) Allen

158. Native Americans and the Cinema. (3) Three hours of lecture per week. Prerequisites: 50, Consent of Instructor. An overview of the role of women in traditional Indian societies and in the modern world. Changes in Indian societies occasioned by contact with Europeans and how these changes have affected the role of women. The film industry will be used to illustrate major changes in Indian society. (SP) Wilson

177. Plains Indian History. (3) Three hours of lecture per week. Prerequisites: 50 or consent of instructor. This course will cover the entire range of Plains Indian History from archeological sites to the social movements of the 1970's. It will stress the changes evidenced by the tribes as they met the challenges of ecological, economic, and historical forces. (F) Wilson

195. Native American Studies Honors Course. (3) Course may be repeated for credit. Prerequisites: Consent of instructor. This course will cover the entire range of Plains Indian History from archeological sites to the social movements of the 1970's. It will stress the changes evidenced by the tribes as they met the challenges of ecological, economic, and historical forces. (F) Staff

197. Field Work in the Native American Community. (1-3) Course may be repeated for credit if the project varies. Prerequisites: Consent of instructor and upper division standing preferred. Individual conferences to be arranged. Supervised experience related to specific aspects of the Native American community in campus settings. Individual and group written reports required. (F,SP) Coordinator

198. Supervised Group Study. (1-3) Course may be repeated for credit if the project varies. Must be taken on a pass/No Pass basis. Prerequisites: Consent of instructor and upper division standing preferred. Individual conferences to be arranged. Group discussion, research, and reporting on topics assigned. (F,SP) Coordinator

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit if the project varies. Must be taken on a pass/No Pass basis. Prerequisites: Upper division standing and consent of instructor. Individual conferences to be arranged. Individual student, with consent and guidance of an instructor, researches an interest not covered in the courses offered in the program. (F,SP) Coordinator

152A. Ship Dynamics. (3) Two 1/2-hour lectures per week. Prerequisites: 151 (may be taken concurrently);
252B. Ship Dynamics. (3) Two 1½-hour lectures and four hours of lab per week. Prerequisites: 152A. Elementary water-way theory. Rigid-body dynamics of ships and offshore platforms. Motions and loads in a seaway. Statistical description of sea surfaces. Laboratory experiments on ship-motion behavior in the ship model tank. Prediction of steering and maneuvering characteristics. (SP) Yeung

253. Marine Engineering. (2) Two 1-hour lectures per week. Prerequisites: Mechanical Engineering 105B or consent of instructor. A description and analysis of the important characteristics of marine propulsion and auxiliary machinery systems, especially as they interact with the design of the ship as a whole. (SP)

154. Ship Structures. (3) Two 1½-hour lectures per week. Prerequisites: 151, CE 130. Introduction to the specialized features and structures of their design and construction. (SP) Webster

198. Directly Related Group Studies for Advanced Undergraduates. (1-4) Units for semester course awarded upon discretion of the adviser. Course may be repeated for credit. Must be taken on a pass/no pass basis. To be arranged. Prerequisites: Consent of instructor. Group studies of selected topics which will vary from year to year. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Must be taken on a pass/no pass basis. Individual conferences. Prerequisites: Consent of Instructor and major supervisor. See pages 81 and 82 of this catalog for description and prerequisites. (F,SP) Staff

Graduate Courses

240A-240B. Theory of Ship Structures. (3-3) Three 1-hour lectures per week. Prerequisites: 152B, 154 or consent of instructor. Hull response to primary vertical, horizontal, and torsional loads. Isotropic and orthotropic plate theories and their applications to ship hulls and ocean structures. A probabilistic description of ocean waves and wave loads acting on ships and ocean structures, input-output relations, response in long- and short-crested seas, extreme-value statistics of wave loads, analysis of uncertainty in full-scale, modes of failure, reliability concepts and design considerations. (F,SP) Mansour, Poulting

241A-241B. Hydrodynamics of Ships. (3-3) Three 1-hour lectures per week. Prerequisites: 152A-152B or consent of instructor. Theory of similarity and model testing. Boundary-layer theory and frictional resistance. Wave resistance: Air and hydrofoil theory. Added-mass theory. Theory of motion of floating bodies or ships in calm water and waves. (F,SP) Webster, Yeung

Near Eastern Studies (College of Letters and Science)

Department Office: 609 Evans Hall, 442-3757

Professors:

Hamid Algar, Ph.D. Cambridge University. Islamic and Iranian studies.
Robert B. Alter, Ph.D. Harvard University. Hebrew literature, modern and biblical.
Guilty Aspartate, Ph.D. University of California at Berkeley.
Ariel A. Bloom, Ph.D. Munster University. Semitics, Arabic, and Islamic literatures.
William M. Brinner, Ph.D. University of California at Berkeley. Islamic institutions: Arab/Judo-Arabic.
Wolfgang J. Heimpl, Ph.D. University of Heidelberg. Mesopotamian cultures, Sumerian.
Mounah A. Khoury, Ph.D. Harvard University. Classical and Modern Arabic.
Philip K. Skaggs, Ph.D. Harvard University. Arabic poetry, rhetoric, and grammar.

Associate Professors:

William C. Hickson, Ph.D. Harvard University. Turkish literature.
Martin Schwartz, Ph.D. University of California at Berkeley. Old Middle Arabic, Indo-European, Zoroastrian, poetics.
Kent R. Weeks, Ph.D. Yale University. Egyptian archaeology and medicine.

Visiting Associate Professor:

David J. Biale, Ph.D. University of California at Los Angeles. Modern Jewish history and philosophy.

Visiting Professors:

David Elowitz, Ph.D. Columbia University. Hellenistic Jewish thought.

Lecturers:


Daniel A. Topovic, Ph.D. University of California at Berkeley. Sumerian language, literature, religion.

O. Hayes, Ph.D. University of California at Los Angeles. Comparative semitics, Arabic linguistics, Akkadian.

Husam Jaradi, Ph.D. Cambridge University. Persian literature, history, civilization.

Isabel M. Kiewczak, Ph.D. University of California at Berkeley. Mesopotamian, Canaanite, Biblical languages and literatures.

David B. Lerman, B.A. University of California at Berkeley, Ancient Egyptian language and literature.

Jaleh Piramzi, Ph.D. University of California at Berkeley. Persian history, Persian language and literature.

Maurice B. Salhi, Ph.D. University of California at Berkeley. Arabic linguistics, modern Arabic.

Graduate students in the department contribute to the library holdings of the University and supplement their programs with selected courses in Palestinian archaeology, Biblical studies, and Semitic epigraphy and philology.

The Majors

A. The Major in Near Eastern Studies

Major guidelines for each discipline are available in the departmental office. With the consent of the department, portions of the requirements may be fulfilled by related courses in other departments.

1. In Arabic, Hebrew, Persian, and Turkish: Prerequisite: the elementary courses in the language, or their equivalents. It is recommended that these be taken beginning in the freshman year.

The major requires from 18 to 24 upper division language units, depending upon the student's major. Six or 8 upper division language units.

2. In Assyriology and Hittitology, Old Iranian Studies, and Egyptology: A basic reading knowledge of German is recommended. The major requires from 18 to 24 upper division language units, depending upon the language undertaken, plus 6 upper division language units or 8 in Egyptology.

B. The Major in Ancient Near Eastern Archaeology and Art History

1. Mesopotamian Archaeology. This option requires at least 30 semester units of upper division and 24 upper division semester units. The 6 lower division units must be taken from: Near Eastern Studies 10, 15, 16, 17, 18, 20, 25, Anthropology 2, or another lower division anthropology course. The
24 upper division units are to be selected from the lecture courses offered by the department. The following courses are required: Near Eastern Studies 104-105B and 103-103B. Each student should consult the undergraduate adviser for the planning of his or her individual program.

2. Egyptian Archaeology: This option requires that students take Near Eastern Studies 18, 102A-102B, and Egyptian 100A-100B, 101A-101B. Students also must have 8 units from Near Eastern Studies 15, 20, and Anthropology. Additionally, students must take 12 units, of which one course must be from the following list:


Honors Program: With the consent of the undergraduate adviser, a student with an overall grade-point average of 3.3 or higher and a grade-point average of 3.5 or higher in courses completed in the major may apply for admission to the honors program. The requirements of this program include the completion of the honors thesis during the student's senior year. For a complete description of the program, please inquire at the Department Office.

The Minors

In each of these programs Option A is open to students with little or no background in the language. Option B is for students who have completed the equivalent of two years of university-level course work. For lists of courses which may be taken to fulfill the minor course requirements, please inquire at the department office.

- The Minor In Arabic, Option A. Required courses: Arabic 20A-20B (in addition to Arabic 1A-1B). Five upper-division courses: Arabic 100A; two one-semester literature courses (in Arabic); two one-semester courses in Arabic culture/history.

- The Minor In Arabic, Option B. Required courses: Seven upper-division courses: five one-semester courses in Arabic language or literature (in Arabic); two one-semester courses in Arabic culture/history.

- The Minor In Hebrew, Option A. Required courses: Hebrew 20A-20B (in addition to Hebrew 1A-1B). Five upper-division courses: Hebrew 100A-100B, Hebrew 104A-104B; a one-semester course in Hebrew culture/history.

- The Minor In Hebrew, Option B. Required courses: Seven upper-division courses: five one-semester courses in Hebrew literature (in Hebrew); two one-semester courses in Hebrew culture/history.

- The Minor In Persian, Option A. Required courses: Persian 1A-1B. Five upper-division courses: Persian 100A-100B; Persian 101A-101B; a one-semester course in Persian culture/history.

- The Minor In Persian, Option B. Required courses: Seven upper-division courses: five one-semester courses in Persian literature (in Persian); two one-semester courses in Persian culture/ civilization.

- The Minor In Turkish, Option A. Required courses: Turkish 1A-1B. Five upper-division courses: Turkish 100A-100B; Turkish 101A-101B or Turkish 102A-102B; a one-semester course in Turkish culture/history.

- The Minor In Turkish, Option B. Required courses: Seven upper-division courses: five one-semester courses in Turkish literature (in Turkish); two one-semester courses in Turkish culture/history.

Graduate Program

Graduate programs leading to the M.A. and Ph.D. degrees are offered in the following languages and literatures: Arabic, Hebrew, Persian, and Turkish. The Graduate Program is also offered in the following fields of Near Eastern Studies: Archaeology, Art History, History, Semitics, and Islamic studies.

Graduate Degrees

Applicants for graduate study should have fulfilled the equivalent of the departmental requirements for the A.B. in their proposed area of study. The department encourages its own graduate students to take advantage of courses in other departments which will advance their fields of study. Upon approval by the graduate adviser, such courses may be recognized as fulfilling portions of the departmental course work requirements for graduate degrees.

The M.A. Degree. The M.A. is obtained according to Plan I and Plan II as outlined below. A complete description of Graduate Division requirements for this degree is found in the Graduate Education section of this catalog. The requirements outlined for the plan adopted, must be passed. A reading examination in either French or German (another language may be substituted on approval of the major adviser).

Plan I: Program in archaeology and art history. This plan requires an M.A. thesis and 20 units of course work.

Plan II: All other programs of the department. This plan requires 24 units of course work, including work in one major and one secondary Near Eastern language. Two scholarly papers written independently or in collaboration with course work will also be required. Written comprehensive examinations are required of all students to test (a) working knowledge of pertinent languages; (b) general knowledge of the history and culture of the Near East, with emphasis on knowledge of other subjects suggested by the student's degree committee.

The Ph.D. Degree. Students must have completed an appropriate M.A. program to be eligible for the Ph.D. program. Admission to candidacy for the Ph.D. degree depends on successful completion of the following requirements: (1) Ph.D. course work; (2) reading examinations in French and German (proficiency in a European or other modern language is acceptable if the student's field of emphasis may be substituted on approval of the graduate adviser); (3) proficiency in one or two Near Eastern languages, as required for the student's field of study. (For language majors, proficiency will be tested through the written preliminary examinations, which will cover at least two Near Eastern languages. For Egyptian archaeology and art history majors, proficiency will be tested through the written preliminary examinations, which will cover an ancient Near Eastern language. Other students in archaeology and art history must pass a proficiency examination in an ancient or modern language before taking the preliminary examinations; (4) fieldwork (for art history and archaeology majors); (5) written preliminary examination and the oral qualifying examination; (6) a prospectus of the dissertation approved by the student's Ph.D. examination committee.

After admission to candidacy, the student is to fulfill the requirements for the dissertation as outlined in the Graduate Education section of this catalog. For further information on these graduate programs, contact the graduate assistant in 605 Evans Hall.

Special Programs

Concurrent Degree Program in Near Eastern Studies and Librarianship (M.A./M.L.S.). This program is sponsored by the Department of Near Eastern Studies and the School of Library and Information Studies and is open to qualified applicants with a B.A. degree in Arabic, Persian, Turkish, or Hebrew. The program leads to the M.A. in Near Eastern Studies and the M.L.S. with two possible specializations: (1) Islamic Bibliography, (2) Jewish Bibliography.

The Joint Doctoral Program in Near Eastern Religions. This program, which combines the faculty and library resources of the University of California at Berkeley, and the Graduate Theological Union, is a flexible course of study, probing in depth the archaeology, history, languages, literatures and thought patterns of the ancient Near East and Egypt, with special emphasis on the expression indigenous to their cultures. Applicants must have the Ph.D. degree as their goal. They should possess an M.A. or the equivalent in Near Eastern Studies or a related field and should have proficiency in two appropriate ancient languages equivalent to that obtainable through an undergraduate degree in those languages. Applicants must be admitted into both the Graduate Theological Union and the University of California at Berkeley; the degree is conferred jointly by both institutions.

The Graduate Program in Ancient History and Mediterranean Archaeology (see index for the location of this program) is flexible in that the requirements for the dissertation as outlined in this catalog. Further information on these graduate programs is available. Applicants may obtain further information through the Graduate Program in Ancient History and Mediterranean Archaeology.

The ancient studies faculty of this department are members of the faculty group for this program.

Near Eastern Studies

Courses listed under Near Eastern Studies are taught in English. Courses listed under language headings are language courses and assume an appropriate level of knowledge of that language.

The Schedule of Classes issued prior to each semester, semester by semester, does not include these courses. Please inquire at the Department Office for further information on these graduate programs. Courses offered by the Department of Near Eastern Studies, including when and by whom each course will be given.

Lower Division Courses

10. Introduction to the Near East. (4) Three 1-hour lectures and 1 hour of discussion per week. The background and present status of the ethnic and religious groups in the Arab states, Turkey, Israel, and Iran.

12. Middle Eastern Religions. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. The major religions, religious trends and experiences of the Middle East from the earliest strata to the present. Readings, discussions, and research papers.

15. Introduction to Near Eastern Art and Archaeology. (4) Three hours of lecture and one hour of discussion per week. The civilizations of Western and Central Asia from prehistoric times to the Persian Empire.

16. Introduction to Islamic Art. (4) Three 1-hour lectures plus one hour of discussion per week. The art and architecture of Islamic lands from the seventh to the seventeenth century.

17. Introduction to Languages and Scripts of the Near East. (4) Three 1-hour lectures plus one hour of discussion per week. A survey-history of the chief languages and writing systems of the Near Eastern continuum, with emphasis on their main characteristics and relationships, and their role in developments of society, literature, and art.

18. Introduction to Egyptology. (4) Three 1-hour lectures plus one hour of discussion per week. A survey of the art and architecture of dynastic Egypt and their relations to the social and political institutions of the ancient Near East.


20. History and Culture of Ancient Western Asia. (3) Three hours of lecture per week. Students who have completed any part of NES 20A-20B will not receive credit for NES 20. Three 1-hour lectures plus one hour of discussion per week. A survey of the civilizations of the Near East with special emphasis on ancient Mesopotamia, from its origins to Hellenistic times.

23. Topics in Near Eastern Archaeology. (3) Formerly 21. Course may be repeated for credit. One 3-hour lecture per week. Limited to 10 students. Priority given
to freshmen and sophomores. Course will treat one of the early cultures or civilizations of the ancient Near East. Research and research paper.

25. Ancient Babylonian Legenda and Myths. (3) Three hours of lecture per week. Lectures on and readings of the Gilgamesh Epic, Creation and Flood Myths and other Mesopotamian literary texts in translation.

26. Introduction to Judaism. (3) Three 1-hour lectures per week. The nature of classical Judaism, its major cultural and intellectual expressions in the Middle Ages, and transformations in the modern era.

27. Hebrew Literature in Translation. (3) Three hours of lecture per week. Readings from all periods and genres of Hebrew and Judeo-Arabic literature.

28. Topics in Near Eastern Studies. (3) One three-hour seminar per week. Prerequisites: Limited to 10 students, priority given to freshmen. Course will deal alternatively with one of the civilizations of the Near East. Research and research paper.


30. Introduction to Islam. (3) Three 1-hour lectures per week. Comprehensive introduction to doctrines, rites, and institutions of Islam.

31. Introduction to Sufism. (3) Three 1-hour lectures per week. Survey of Islamic mysticism, its principles, and historical expression.

Upper Division Courses

101A-101B. History of Ancient Egypt. (4;4) Three 1-hour lectures per week and one hour of discussion per week. Prerequisites: Near Eastern Studies 18 or consent of instructor. A chronological survey of the history of Ancient Egypt from prehistoric times down to the conquest of Alexander the Great. Particular attention will be paid to the textual record and problems of its interpretation.

102A-102B. Archaeology of Ancient Egypt. (4;4) Three lectures of three hours each and one hour of museum section per week. Prerequisites: NES 18 or equivalent or consent of instructor. A survey of the archaeological material available for the reconstruction of Egyptian culture and society.

A. Early prehistorical through the First Intermediate Period. B. The Middle and New Kingdoms. Special emphasis will be given to current archaeological theories and recent discoveries. Extensive use will be made of the Lowie Museum Collection.

103. Religion of Ancient Egypt. (3) Prerequisites: 18 or consent of instructor. Three 1-hour lectures per week. A survey of the religious beliefs of the ancient Egyptians, based primarily upon the written sources.

104. Selected Topics in Mesopotamian History. (3) Course may be repeated for credit. Prerequisites: 18 or consent of instructor. Three 1-hour lectures per week. A survey of the religious beliefs of the ancient Egyptians, based primarily upon the written sources.

105A-105B. Ancient Mesopotamian Documents and Literature. (3;3) Three lectures of three hours per week. A representative survey of original third-millennium cuneiform texts in translation. A. The Sumerian religious and scholastic tradition; myths of creation, hymns, epics and early historical material. B. Assyro-Babylonian historical and legal documents and private and royal correspondence; kingship and the cult; divination, astrology and magic; the classic literary works.

106. Art and Architecture of Ancient Egypt. (4) New course. Three 1-hour lectures and one hour of discussion per week. Prerequisites: NES 18, or equivalent, or consent of instructor. Stylistic and iconographic study of Egyptian art and architecture from predynastic times until the end of the First Intermediate Period (c. 6000-2000 BC).

107. Ancient Egyptian Literature and Documents. (3) Students who have taken NES 17A4 may not receive credit for 107. Three hours of lecture per week. Prerequisites: (1) Four courses: Historical and thematic survey of the major genres of ancient Egyptian texts from the Old Kingdom through the Graeco-Roman Period (c. 2500 BC-first century AD). Special attention will be paid to the Poetic, Wisdom, and Historical and Artistic characteristics of the documents discussed.

120A-120B. Near Eastern Art. (4;4) Three hours of lecture and one hour of discussion per week. A. The Neolithic through the Kassite period. B. The Iron Age through Sasanian times.

121A-121B. Islamic Art. (4;4) Three 1-hour lectures and one hour of discussion per week. Topics in Islamic art and architecture from the rise of Islam to the present.

122A-122B. Iranian Archaeology. (4;4) Three 1-hour lectures and one hour of discussion per week. A survey of the archaeology of Iran from Paleolithic times down to the Sasanian period.

123A-123B. Mesopotamian Archaeology. (4;4) Three 1-hour lectures and one hour of discussion per week. A survey of the archaeology of Mesopotamia.

124A-124B. Archaeology of the Eastern Mediterranean. (3;3) Three 1-hour lectures per week. The aim of this course is to investigate specific archaeological problems by means of a general survey of archaeological sites in Cyprus, Jordan, Israel, and Syria. The time period covered will be Classical/Late Neolithic-Middle Bronze (about 5000-1600 BC).

130A-130B. History of Ancient Israel. (3;3) Three hours of lectures per week. The patriarchal age through the Hellenistic period.

131. Aspects of Biblical Religion. (3) Two 1½-hour lectures per week. The teachings of ancient Israel’s priests, prophets and sages on various universal problems.

132. Judaism and Hellenism. (3) Three hours of lecture per week. The impact of the impact of Hellenism on Judaism through a detailed study of various apocryphal and pseudonymous Alexandrian writings. Special attention will be paid to the relationships of the philosophical works of Philo Judaeus and their relations to Greek philosophy and early Christianity.

133. Judaism in Late Antiquity. (3) Three 1-hour lectures per week. The emergence and development of classical Judaism, its pietists, institutions, thought, and literature.

134. Talmud and Midrash in Translation. (3) Three 1-hour lectures per week. Reading and translation of selections from Talmudic Midrashic literature, their use for a history of Jewish thought and their historical development and place within the broader Jewish and general context (1st to 8th centuries Common Era).

135. Modern and Contemporary Jewish Thought. (3) Three 1-hour lectures per week. An analysis of modern Jewish movements and ideas. Topics include Spinoza, Hasidism, The Enlightenment, Jewish religious movements in America, Zionism, Buber, Rosenzweig, Kaplan, Heschel.

140. Topics in Islamic Thought and Institutions. (3) Course may be repeated for credit. Three 1-hour lectures per week. Selected topics from Islamic intellectual history.

*Not offered 1988-89
1On leave, spring, fall
2On leave, fall

141. Modern and Contemporary Islamic Thought. (3) Three 1-hour lectures per week. A survey of leading Muslim thinkers and movements of the past two centuries.

142. Shi’ite Islam. (3) Three 1-hour lectures per week. The beliefs, traditions, and practices of the Shi’ite school of Islam.

143A-143B. Islam in Iran. (3;3) Three 1-hour lectures per week. A general survey of the religious history of Iran in the Islamic period, covering the rise and development of religious institutions, the elaboration of the religious sciences, Sufism, and sectarian movements.

144. Introduction to Islamic Law. (3) Three 1-hour lectures per week. The origins and evolution of the legal precepts of Islam.

145. Islamic Bibliography. (3) Course may be repeated for credit. Three 1-hour lectures per week. A survey of primary sources in the Islamic religious sciences.

150A-150B. Arabic Literature in Translation. (3;3) Three 1-hour lectures per week. A. Survey of Arabic literature from its origins in pre-Islamic poetry through its historical development during the Umayyad and Abbasid periods. No knowledge of Arabic is required.

B. Survey of Arabic literature in its development from the post-Abbasid period to the present. No knowledge of Arabic is required.

150. Religions of Ancient Iran. (3) Three 1-hour lectures per week. Principally devoted to Zoroastrianism and Manicheanism but with some attention to Indo-Iranian origins, and relevance of Iranian religion for the history of Hellenistic Gnosticism, Judaism, and Islam.

151. Introduction to Comparative Study of Iranian Languages. (3) Three 1-hour lectures per week. Prerequisites: Consent of instructor. Survey of the languages of the Iranian branch of the Indo-European family of languages.

163A-163B. History of Persian Literature. (3;3) Three 1-hour lectures per week. A. Classical Persian literature from Firdawsi to the 15th century. B. Persian literature from the 15th century to the contemporary period.

170A-170B. Turkish Literature in Translation. (3;3) Three 1-hour lectures per week. A study of Turkish literature in translation, drawing on texts from the 8th to the 20th century. Readings will be chosen to illustrate the development within specific genres: lyric poetry, drama, folk tale, etc.

171. Ottoman City and Society. (3) Three 1-hour lectures per week. Surveys aspects of the civilization and culture of the Ottoman Empire (14th-15th century). Emphasis on reading and interpreting original sources (in English). Topics include religion, slavery, holy war, class structure, legal institutions, and response to change.

172. Turkish Sufi Literature. (3) Three hours of lectures per week. An introduction to the study of Turkish Sufism and its major literary works. No knowledge of Turkish is required.

H195. Senior Honors. (2-4) Must be taken on a pass/fail not pass basis. Prerequisites: Limited to senior honors candidates. Directed study centering upon preparation of an honors thesis.

190. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a pass/fail not pass basis. Variable meetings. Instruction in areas not covered regularly by regularly scheduled courses: Phoenician, Cypriote, Syrian Archaeology.

195. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail not pass basis. Variable Enrollment is restricted by regulations shown on pages 81 and 82 of this catalog.

*On leave, spring
Recruited to active service
Recipient of Distinguished Teaching Award
Graduate Courses

220A-220B. Seminar in Near Eastern Art. (4-4) Formerly 230A-230B. Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing. Graduate seminar on specific aspects of the arts of Western and Central Asia. Topics to be announced at first seminar meeting. Students who take two semesters in succession may be assigned credit and grade at the end of the sequence.

221A-221B. Seminar in Islamic Art. (4-4) Formerly 240A-240B. Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: Consent of instructor. Topics will vary according to student interest.

222A-222B. Topics in Near Eastern Art and Archaeology. (4-4) New course. Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Course to be taught jointly by two members of the staff. Students who take two semesters in succession may be assigned credit and grade at the end of the sequence. Seminar on the comparative study of the art and archaeology of the ancient Near East in the first millennium BC.

233A-233B. Seminar in Near Eastern Archaeology. (4-4) Formerly 293A-293B. Course may be repeated for credit. One 3-hour meeting per week. Research into a selected aspect of Near Eastern archaeology.

224A-224B. The Archaeology of Israel and Jordan. (3-3) Formerly 291A-291B. Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: 102A-102B or 122A-122B or 124A-124B or consent of instructor. Individual study of special areas of research which illustrate issues, problems, or methods in archaeological research. Emphasis on results of archaeological research for understanding the history and culture of people living in these lands during: A. Early, Middle, and Late Bronze Ages (ca. 3000-1200 BC). B. Iron Age, the Persian, Hellenistic and Roman periods (ca. 1200 BC—AD 135).

226. Problems in Egyptian Archaeology. (4) Course may be repeated for credit when subject matter changes. Three hours of seminar per week. Prerequisites: Two semesters of 102 or the equivalent, or consent of instructor. Topics will vary and may deal with a particular chronological period or with a particular class of archaeological material. Work with museum specimens or with field data may be involved.

228. Seminar. (1-4) Course may be repeated for credit. Variable. Prerequisites: Consent of instructor. Special topics in Near Eastern Studies. Topics vary and are announced at the beginning of each semester.

229. Individual Research. (4-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study for the comprehensive or language requirements in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree.

651. Individual Studies for Master's Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Variable. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the M.A. degree. May not be used for unit or residence requirements for the doctoral degree.

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Arabic

Lower Division Courses

1A-1B. Elementary Standard Arabic. (5.5) Formerly Arabic 2A-2B. Four recitations per week. A presentation of literary Arabic, leading to the reading of a variety of classical and modern texts.

17A-17B. Readings in Current Arabic Newspapers. (1,1) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour of lecture and recitation per week. Prerequisites: Arabic 1B or 2A. Reading of current Arabic newspapers from various countries. Emphasis is on acquiring skill in rapid reading of this genre and in vocabulary acquisition. Selections will be chosen so that both second- and third-year Arabic students can benefit.

20A-20B. Intermediate Arabic. (5.5) Five 1-hour recitation sessions per week. Prerequisites: 1A-1B or 2A-2B. Sequence begins fall.

Upper Division Courses

100A. Arabic Grammar and Syntax. (3) Three hours of lecture per week. Prerequisites: 20A-20B. Discussion of the grammar, syntax, semantics, and styles of Arabic, as reflected in literary texts.

100B. Arabic Grammar and Syntax. (3) Three hours of lecture per week. Prerequisites: 100A, or consent of instructor. Discussion of the grammar, syntax, semantics, and styles of Arabic, as reflected in literary texts. Texts may be selected on the basis of increasing difficulty, are assigned for rapid reading at home and form the basis for a variety of exercises (such as brief summaries in Arabic) aimed at increasing students' active command of the language.

101A-101B. Spoken Arabic. (3.5) Course may be repeated for credit. Three 1-hour meetings per week. Prerequisites: 1A-1B or 2A-2B. Practice of speaking an Arabic dialect.

104. Literary Arabic Usage. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 100A. Rapid reading of newspapers and literary texts. Training in the usage of the literary language in writing and speaking and development of skill in Arabic penmanship.

105. Classical Arabic Poetry. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A-20B. Reading and literary analysis of classical poetry.

106. Classical Arabic Prose. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A-20B. Reading and literary analysis of classical prose.

107. Arabic Historical Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A-20B. Readings of selected texts from various periods.

108. Arabic Religious and Philosophical Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A-20B. Selected texts from various periods.

109. Modern Arabic Literature: Poetry. (3) Course may be repeated for credit. Three hours of reading/recitation per week. Prerequisites: 20A-20B. Selected readings from modern Arabic verse.

110. Modern Arabic Literature: Prose Writings. (3) Course may be repeated for credit. Three hours of reading/recitation per week. Prerequisites: 20A-20B. Fiction, essays, and drama.

111A-111B. Survey of Arabic Literature (In Arabic). (3,3) Course may be repeated for credit. Three 1-hour class meetings per week. Prerequisites: 100A. This course is designed primarily for majors and prospective minors in Arabic studies.

A. The Classical Periods: A literary-historical survey of Arabic literature from pre-Islamic times to the middle of the thirteenth century, with emphasis on the more important achievements of major Arab authors.

B. The Post-Arabic and Modern Periods: A literary-historical survey of Arabic literature from the middle of the thirteenth century to the present.

H195. Senior Honors. (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

198. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Instructors in areas not covered by regularly scheduled courses.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog.

Graduate Courses

200. Advanced Syntax. (3) Course may be repeated for credit when subject matter varies. Three hours of class per week. Prerequisites: 100A. Major syntactic phenomena of classical and modern literary Arabic will be analyzed from the viewpoint of the indigenous tradition and of western Semitic linguistics.

201. Arabic Dialectology. (3) Three hours of class per week. Prerequisites: At least two years of Arabic and one year of another Semitic language or equivalent. A comparative approach to the Arabic dialects; their relationship to literary Arabic and other Semitic languages.

205. Classical Arabic Poetry. Course may be repeated for credit. Three hours of class per week. Prerequisites: 105. Intensive study of classical poetry.

206. Classical Arabic Prose. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 106. Intensive study of classical prose.

207. Arabic Historical Texts. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 107. Intensive study of historical texts.

208. Arabic Legal Texts. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Two years of Arabic. Selected readings in Islamic law.

209A-209B. Readings in the Qur'an. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Three
years of Arabic. Selected readings in Arabic from the Qur'an, traditional Islamic exegesis, and other secondary material.

210. Judeo-Arabic Texts. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Two years of Arabic. A survey of literary, historical, and religious material in Judeo-Arabic. Introduction to paleography, grammar, and varieties of Judeo-Arabic style from 9th-13th centuries. Readings will vary.

21A-211B. Hispano-Arabic Literature. (3,3) Credit and grade to be awarded upon completion of course. Course may be repeated for credit. Three hours of class per week. Prerequisites: 100A. Significant writers of poetry and prose from the 10th and 11th centuries will be read and discussed.

212. Topics in Modern Arabic Literature: Poetry, (3) Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: 102. Intensive study of modern poetry in relation to the cultural tradition.

213. Topics in Modern Arabic Literature: Prose. (3) Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: 110. Intensive study of modern prose in relation to the cultural tradition.

Cuneiform

Upper Division Courses

100A-100B. Elementary Akkadian. (4,4) Two 1½-hour meetings per week. Prerequisites: Background in German and French recommended. Introduction to cuneiform script and grammar, reading of selected cuneiform texts. Sequence begins fall.

101A-101B. Intermediate Akkadian. (2,2) Three hours of class per week. Prerequisites: 100A-100B, background in German and French recommended. Reading of selected texts, including law codes, letters, myths, and epics. Sequence begins fall.

102A-102B. Elementary Sumerian. (4,4) One 3-hour meeting per week. Prerequisites: Background in German and French recommended. Introduction to Sumerian grammar and writing.

103A-103B. Intermediate Sumerian. (3,3) One 3-hour meeting per week. Prerequisites: 102A-102B, background in German and French recommended. Introduction to Cuneiform Sumerian Hittite language and grammar with reading of selected historical and religious texts. Sequence begins fall.

H155. Senior Honors. (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

189. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Prerequisites: Consent of instructor. Special topics in Cuneiform. Topics vary and are announced at the beginning of each semester.

Graduate Courses

200A-200B. Advanced Akkadian. (3,3) Course may be repeated for additional credit. One 3-hour meeting per week. Prerequisites: 101A-101B. Reading of a variety of genres of Akkadian documents and literature. Texts selected are based on the individual needs of participating students.

206A-206B. Advanced Hittite. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 204A-204B. Reconstruction and critical reading of Hittite texts belonging to different literary genres (epics, mythology, annals, law codes, political treaties, rituals, etc.) or Introduction to Hieroglyphic Luwian.

210A-210B. Advanced Sumerian. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 204A-204B. Reading of selected texts with the purpose of initiating students into the diverse genres of Sumerian literature.

298. Seminar. (1-4) Course may be repeated for credit. Variable. Prerequisites: Consent of instructor. Special topics in Cuneiform. Topics vary and are announced at the beginning of each semester.

Egyptian

Upper Division Courses

100A-100B. Elementary Egyptian. (4,4) Three 1-hour meetings per week. Middle Egyptian grammar and texts.

101A-101B. Intermediate Egyptian. (3,3) Three 1-hour meetings per week. Prerequisites: 100A-100B. Readings in Middle Egyptian hieroglyphic and hieratic texts.

102A-102B. Elementary Coptic. (4,4) Three 1-hour meetings per week. Prerequisites: German and Greek recommended. A. Introduction to Sahidic dialect. B. Readings in Sahidic, other dialects.

H155. Senior Honors. (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

189. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Prerequisites: Consent of instructor. Special topics in Egyptian. Topics vary and are announced at the beginning of each semester.

Graduate Courses

200A-200B. Readings in Coptic. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 201A-201B and 204A-204B. Reading of texts of a particular genre or period: Coptic Gnostic literature, the New Testament in Coptic texts, Shennute and other native Coptic authors.

201A-201B. Later Stages of Egyptian. (3,3) Three hours of class per week. Prerequisites: 204A-204B. Reading texts of a particular genre or period: Coptic Gnostic literature, the New Testament in Coptic texts, Shennute and other native Coptic authors.

202A-202B. Egyptian Texts. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Concurrent or previous enrollment in 201A-201B or consent of instructor. Philological analysis of texts of a single genre and period.

298. Seminar. (1-4) Course may be repeated for credit. Variable. Prerequisites: Consent of instructor. Special topics in Egyptian. Topics vary and are announced at the beginning of each semester.

Hebrew

Lower Division Courses

1A-1B. Elementary Hebrew. (5,5) Five 1-hour lectures and one hour of laboratory per week. Prerequisites: None or equivalent.


15A-15B. Hebrew Conversation. (2,2) Two 1-hour meetings per week. Prerequisites: 20A or equivalent. Conversations and discussion of contemporary topics selected from Israeli newspaper articles. Course is conducted on two levels; intermediate and advanced, simultaneously.

20A-20B. Intermediate Hebrew. (5,5) Five 1-hour meetings per week. Prerequisites: 1A-1B.

Upper Division Courses

100A-100B. Advanced Hebrew. (3,3) Two 1½-hour meetings per week. Prerequisites: 20A-20B or equivalent. Advanced Hebrew especially designed for those going on to the study of modern Hebrew literature, vocabulary building, grammar review, and literary analysis of a sampling of modern texts.

101A-101B. Biblical Hebrew Texts. (3,3) Course may be repeated for credit. Three 1-hour meetings per week. Prerequisites: 20A-20B or equivalent. The tools and procedure of biblical exegesis applied to simple narrative texts.

102A-102B. Postbiblical Hebrew Texts. (3,3) Course may be repeated for credit with consent of instructor. Three 1-hour meetings per week. Prerequisites: 20A-20B or equivalent. Texts from the rabbinic period (Mishnah, Tosefta, Talmud, and Midrash) and an introduction to the languages of rabbinic texts.

103A-103B. Later Rabbinic and Medieval Hebrew Texts. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 20A-20B or equivalent. Study of midrashic, exegetical, halakhic (legal), poetic, apocalyptic, messianic, or historical texts.

104A-104B. Modern Hebrew Texts. (3,3) Course may be repeated for credit with consent of instructor when material varies. Three hours of lecture per week. Prerequisites: 100A-100B or equivalent. An introductory study of selected texts in Hebrew literature from the European Enlightenment to contemporary-Israeli poetry and fiction.

105A-105B. The Structure of Modern Hebrew. (3,3) Course may be repeated for credit. Three hours of lecture per week. An analysis of Hebrew grammar, vocabulary, morphology, history of the language, fixed expressions, discourse analysis, contrasting features of Hebrew and English in the context of contemporary linguistic theories.

106. Introduction to Bibliography of Jewish Studies. (3) Two hours of lecture per week. An introduction to the history, methods, and scope of bibliographic work in Jewish studies; descriptive bibliography, indexes, and reference tools for students of Jewish literature. Sample problems in bibliographical research.

107A-107B. Structure of Modern Hebrew and Teaching of Hebrew. Speakers of English. (3,3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Hebrew or the equivalent, or consent of instructor. Theoretical and applied analysis of the structure of modern Hebrew, its development and usage and its application to methods and techniques of teaching Hebrew to English speakers.

108. Levels of Modern Hebrew. (3) Course may be repeated for credit as texts vary. Three 1-hour lectures per week. Prerequisites: 104A-104B or equivalent. Syntax, semantics, lexicon and styles of Modern Hebrew, from the literary language to slang, as reflected in representative texts.

111. Intermediate Biblical Texts. (3) New course. Course may be repeated for credit. Three hours of class **On leave, spring**

**Recipient of Distinguished Teaching Award**

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per week. Prerequisites: Hebrew 101A-101B or equivalent. A systematic study of the prophets beginning with Isaiah.

H195. Senior Honors. (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honor candidates. Directed study centered upon preparation of an honors thesis.

198. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog.

Graduate Courses

201A-201B. Advanced Biblical Hebrew Texts. (3;3) Credit and grade will be awarded upon completion of sequence. Course may be repeated for credit. Three hours of class per week. Prerequisites: 101A-101B. The exegesis of a biblical book in the light of its ancient Near Eastern background.

202A-202B. Advanced Late Antique Hebrew Texts. (3;3) Course may be repeated for credit. Although three hours of class per week. Prerequisites: 102A-102B-102C. Historical and literary study of Hebrew and Aramaic Judaic texts (e.g., Talmud and Midrash).

203A-203B. Advanced Medieval Hebrew Texts. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 103A-103B-103C and 104A-105B-105C. Literary analysis of bibliographic Hebrew texts, either prose or poetry, chiefly from the biblical medieval period.

204A-204B. Advanced Modern Hebrew Texts. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 105A-105B and one of 101A-101B, 102A-102B, or 103A-103B. Selected topics in the development of Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction.

205. Ancient and Modern Hebrew Literary Texts. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 100A-100B or consent of instructor. Focus on biblical texts seen from a literary point of view, attempting to establish connections with later Hebrew literature.

208. Seminar. (1-4) Course may be repeated for credit. Variable. Prerequisites: Consent of instructor. Special topics in Hebrew. Topics vary and are announced at the beginning of each semester.

301A-301B. Teaching Hebrew in College. (3;3) New course. Must be taken on a satisfactory/un satisfactory basis. One hour of lecture per week plus participation in demonstration classes and colloquia. Prerequisites: Graduate standing. The methodology of teaching Hebrew as a foreign language at the college level. Lectures on constructive analysis of English and Hebrew, classroom strategies, and the development of instructional materials. Required of all new graduate student instructors in Hebrew.

Persian and Iranian

Persian

Lower Division Courses

1A-1B. Elementary Modern Persian. (5;5) Five 1-hour meetings per week.

15A-15B. Conversational Persian. (2;2) Two 1-hour meetings per week. Prerequisites: Concurrent enrollment in elementary Persian or consent of instructor. Practice of spoken Persian as a supplement to elementary Persian.

Upper Division Courses

100A-100B. Intermediate Modern Persian. (5;5) Five 1-hour meetings per week. Prerequisites: 1A-1B or equivalent. Sequence begins fall.

101A-101B. Selected Readings In Persian Literature. (3;3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100A-100B or equivalent. Readings in both prose and poetry, drawn chiefly from modern Persian literature, designed to increase reading skills and vocabulary and to provide a transition to the study of more difficult texts.

102A-102B. Readings In Classical Persian Prose. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or equivalent. Systematic study of representative selections from all periods of classical Persian literature, with attention to the historical and intellectual context.

103A-103B. Classical Persian Poetry. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or equivalent. Systematic study of poems belonging to all genres of classical Persian poetry, with consideration of questions of prosody, rhetoric, and style.

104. Contemporary Persian Literature. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or consent of instructor. Selected readings from prose and poetry of the past two decades with particular attention to the socio-political context of the works in question.

105A-105B. Advanced Persian Grammar. (4;4) Course may be repeated for credit. Four 1-hour meetings per week. Prerequisites: 100A-100B. Reading and discussion of texts, graded according to difficulty and period.

H195. Senior Honors. (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

198. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog.

Graduate Courses

200A-200B. Studies in Comparative Semitics. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 100A-100B or equivalent. Introduction to comparative Semitic linguistics. Late in the course, concentration on the evolution of one particular Semitic language. Sequence begins fall.

205A-205B. Ugaritic. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 100A-100B or equivalent. Ugarit language and literature with stress on comparative morphology and lexicography. Sequence begins fall.

210A-210B. The Canaanite Dialects. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Advanced status in Hebrew; 210A is prerequisite to B. The Canaanite Dialects. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Consent of instructor; background in German or French recommended, but not required. Texts from the Vedaldid and the Yashiv; Acharnean inscriptions.

Semitics

Upper Division Courses

110A-110B. Middle Persian. (3;3) Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: Persian 100A-100B or equivalent; background in German or French recommended, but not required. Texts from the Vendidad and the Yasht; Achaemenid inscriptions.

Graduate Courses

201A-201B. Iranain Philology. (3;3) Course may be repeated for credit when subject matter varies. Three hours of class per week. Prerequisites: 110A-110B-110C, 111A-111B-111C, or consent of instructor. Reading of texts in Avestan, western Middle Iranian, and Soghdian, taken from Zoroastrian, Manichaean, and Buddhist texts.

Pre-Islamic Iranian Studies

Upper Division Courses

110A-110B. Old Iranian. (3;3) Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: Consent of instructor; background in German and French recommended, but not required. Texts from the Vedaldiad and the Yashtis; Achaemenid inscriptions.
Turkish

Lower Division Courses

1A-1B. Elementary Modern Turkish, (5,5) Five 1-hour meetings per week. Sequence begins fall.

1A-1B. Conversational Turkish, (2,2) Course may be repeated for credit. Must be taken on a passed/not-passed basis. Two 1-hour meetings per week. Prerequisites: 1A-1B. Practice of spoken Turkish as a supplement to intermediate modern Turkish.

Upper Division Courses

100A-100B. Intermediate Modern Turkish, (5,5) Five 1-hour meetings per week. Prerequisites: 1A-1B or equivalent. Sequence begins fall.

101A-101B. Readings in Modern Turkish, (3,3) Course may be repeated for credit. Three 1-hour meetings per week. Prerequisites: 100A-100B or consent of instructor. Selected topics from modern Turkish literary works.

102A-102B. Ottoman Turkish Texts, (3,3) Course may be repeated for credit. Three 1-hour meetings per week. Prerequisites: 1A-1B or consent of instructor. Study of Turkish literary and historical texts in Arabic script, from the 13th to the 20th century.

H185. Senior Honors, (2-4) Must be taken on a passed/not passed basis. Variable. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

196. Directed Group Study for Upper Division Students, (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Inclusion in areas not covered by regularly scheduled courses.

199. Supervised Independent Study and Research, (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog.

Graduate Courses

200A-200B. Advanced Turkish, (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 12 units of upper division work in Turkish. Different sections offering a variety of texts from all periods of the literature.

298. Seminar, (1-4) Course may be repeated for credit. Variable. Prerequisites: Consent of instructor. Special topics in Turkish. Topics vary and are announced at the beginning of each semester.

Interdepartmental Studies Courses

Graduate Courses

IDS 255A-255B. Eastern Frontiers of the Classical World, (4,4) Course may be repeated for credit. One 3-hour seminar per week. The course is intended to provide an archaeological perspective on the eastern frontiers of the classical world: frontiers which came to extend to Afghanistan and beyond. 255A will deal with prehistoric developments in this easterly area which eventually became a part of the classical world. 255B will explore the interactions of the classical world with the indigenous cultures of Central Asia. Sponsoring departments: Near Eastern Studies and South and Southeast Asian Studies.

Neurobiology

(College of Letters and Science)

Office: 275 Cory Hall, 642-3525
Chair: Frank S. Werblin, Ph.D.

Professors:

David R. Bentley, Ph.D.
Beth Bursico, Ph.D.
Russell De Valois, Ph.D.
Dolph D. Freeman, Ph.D.
Walter J. Freeman, M.D.
Corey S. Goodman, Ph.D.
Edward L. Keller, Ph.D.
Harold Lacer, Ph.D.
Edwin R. Lewis, Ph.D.
Joseph L. Martinez, Ph.D.
George F. Oster, Ph.D.
W. Geoffrey Olsen, Ph.D.
S. M. M. Rubin, Ph.D.
Richard A. Steinhardt, Ph.D.
Gunter S. Stent, Ph.D.
Roger Y. Tsien, Ph.D.
Frank S. Werblin, Ph.D.
Gerald Westheimer, Ph.D.
Robert S. Zucker, Ph.D.

Associate Professors:

S. Marc Breedlove, Ph.D.
Karen De Valois, Ph.D.
John P. Miller, Ph.D.
Richard C. Van Sluyters, O.D., Ph.D.
Jeffery A. Winer, Ph.D.

Assistant Professors:

Hsiao-Ping H. Moore, Ph.D.
Jami C. Weinberg, Ph.D.
David A. Weisblat, Ph.D.

Graduate Program in Neurobiology

Group Major in Neurobiology

Group Major Office, Division of Special Programs, 301 Campbell Hall, 642-2628

Head Advisers: Jelfrey Winer (Department of Physiology-Anatomy, 4523 Life Sciences Building, 642-8227) (students N-Z); Harold Lacer, (Department of Biophysics and Medical Physics, 108A Donner Laboratory, 643-8675) (students A-M).

The group major program is administered through the Division of Special Programs, to which students are referred for administrative matters. Declared majors fill their Schedule Request Forms there after consultation with the appropriate adviser.

The neurobiology group major is intended for students seriously committed to the study of the nervous system. To understand what is known about the function of the nervous system and to prepare for future advances in this area, a sound background is required in the basic sciences (physics, chemistry, mathematics), together with more selective knowledge in anatomy, biochemistry, physiology, psychology, molecular biology, and zoology. Courses in electrical engineering, computer sciences, linguistics, or cognate subjects are also desirable as they address analogous problems.

The group major may lead to graduate study in neurobiology and might be appropriate for students entering the medical or health sciences and who are already interested in later specialization in neurology, neuropathology, neurosurgery, ophthalmology, optometry, psychiatry, pharmacology, or mental health. The departmental majors in physiology, zoology, electrical engineering, and psychology can also prepare students for graduate work in neurobiology and may lead to a greater range of career choices.

Lower Division Courses. Students are strongly advised to pursue physics, chemistry, and mathematics to the highest level they can achieve in their freshman and sophomore years (Mathematics 51, Physics 7C, Chemistry 130B, for example).

*Not offered 1988-89
*On leave, spring
*On leave, fall

The following or equivalent courses at other institutions are minimum requirements for entry to the major: Biology 1A-1B (4,4); Chemistry 1A-1B (4,4); 8A-8B (4,3); Mathematics 1A-1B (4,4); Physics 8A-8B (4,4).

Additional recommended courses: Computer Science 7 (3); EECS 40 (3); Mathematics 50A-50B, 51 (4,4,3); Physics 7A-7B-7C (4,4,4); Psychology 1 (3); Psychology 1 (3); Statistics 5 (3) or Statistics 2 (4) or Statistics 20 (5).

Upper Division Courses. A minimum of 25 units, including two laboratory courses in different areas must be completed. Students must complete at least one course in each of the following categories, including two laboratories:

Behavior. Psychology 115 (3) or Zoology 135 (3), and Zoology 135L (3) or IDS 122 (3); Psychology 116 (3).

Biochemistry. Biochemistry 100A-100B (4,4) and Biochemistry 101L (5) or 102 (4) and 102L (4).

Cell Biology. Physiology 100 (4) or Zoology 104 (3).

Neuroanatomy. Anatomy 110 (3) or Anatomy 203 (4).

Neurophysiology. Physiology 101 (5), or IDS 112 (3); or Zoology 121 (3); or IDS 111 (3).

Additional courses: Anatomy 154 (2); Chemistry 130A-130B (3,3); Computer Science 8 (3); EECS 100 (4) or EECS 104 (2), 140 (4), 146 (3), 146AL (4,4), 145B (4), 145L (2); Entomology 103 (2), 105L (2); Genetics 102 (3) or 100A-100B (4,3); IDS 113 (3); Linguistics 160 (3); Molecular Biology 100B (4,4); Physiological Optics 132B (5); Physiology 101L (1,5), 123 (3), 150 (2), 159 (3); Psychology 110 (4), 111 (3), 111L (2), 112 (3), 112L (2), 114 (3), 114L (2); BEHS 130A-130B (4,4); Statistics 131A-131B (4,4); Zoology 105 (5), 120 (3), 124 (5).

Honor Program. The honors program consists of the preparation of a written thesis on a topic in neurobiology. Ordinarily the thesis consists of a report on the results of independent study and research conducted under the supervision of a faculty sponsor.

At the end of the junior year or the beginning of the senior year, students may submit a request to a major adviser to enroll in the honors program. Requirements for admission are a grade-point average of 3.3 or higher in all courses undertaken at the University, a grade-point average of 3.3 or higher in courses completed in the major, the recommendation of a major adviser, and the approval of a faculty member to serve as a sponsor.

Students must enroll in at least 4 units of a 199 course in a cognate department to prepare a thesis, but units for such courses will not count toward the 25 upper-division units required in the major. The thesis must be presented to the faculty sponsor before the ninth week of the semester in which the student expects to graduate, and the sponsor informs the major adviser whether or not the student has successfully completed the honors program. Then, if the student has also satisfied the grade-point requirement, he or she will be recommended to the dean for a degree with honors.

Graduate Program in Neurobiology

Office: 275 Cory Hall, 642-3525
Chair: Frank S. Werblin
Graduate Adviser: David Bentley.

This program is administered by the Graduate Group in Neurobiology and offers graduate education leading to the Ph.D. degree. Applicants should have a bachelor's degree in science and should have satisfied the requirements for the undergraduate Group major. The student must have successfully completed the honors program. Then, if the student has also satisfied the grade-point requirement, he or she will be recommended to the dean for a degree with honors.

*On leave, summer
*Recalled to active service
*Recipient of Distinguished Teaching Award
perience equivalent to a minimum of one semester of half-time teaching as a graduate student instructor.

Inquiries concerning admission, financial aid, and degree requirements may be addressed to the group chair, Frank S. Werblin, Department of Zoology.

Upper Division Course

IDS 111. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. Basic principles of neurobiology, including membrane potenti-


IDS 112. Mammalian Neurobiology. (3) Two 1-hour lectures per week, each followed by a 1/2-hour discussion section. Prerequisites: Biology 1A-1B or consent of instructor. Properties of neurons and neural systems in terms of their function in relation to reflex and directed behavior. Sponsoring departments: Zoology and Physiology-Anatomy. (SP) W. Freeman

IDS 113. Developmental Neurobiology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Psych 110 or Zoology 112 or consent of instructor. A seminar concerning the ontogeny of the nervous system in both vertebrates and invertebrates, including cell lineage analysis, directed neurite outgrowth, axon regeneration, death of cells during development, and the influence of hormones. Their role and function in these phenomena will be discussed in both evolutionary and behavioral contexts. Sponsoring departments: Zoology and Physiology. (SP) Bentley, Bredlove, Weeks, Weisblat

Graduate Courses

IDS 200A. Cellular Neurobiology. (3) Two 1½ hour lectures per week. Prerequisites: Chemistry 15B, Mathemat-

ics 1B, Physiol, and an introductory neurobiology course. Physio-chemical basis of membrane potentials, electrotonus, action potential generation and propagation, synaptic transmission, sensory receptor function, and volume conductor potentials. Sponsoring departments: Physiology-Anatomy, Biological Chemistry, and EEGS. (F) Leclar, Lewis, Owen, Zucker

IDS 200B. Integrative Neurobiology. (3) Two 1½ hour lectures and one 1-hour recitation per week. Prereq-

uities: IDS 111 or Zoology 121. In-depth consideration of current research questions concerning the organization of the nervous system, and of the behavior mediated by these systems. When appropriate these questions are illustrated with examples drawn from both the vertebrate and invertebrate literature. Circuit, network, system or cellular analogies and analyses will be emphasized where these approaches lend clarity. Sensormotor integration is discussed in small systems, or neurons to more complex ensembles, including mammalian cortex and cerebellum. Sponsoring departments: Physiology-Anatomy, EEGS, and Zoology. (SP) Miller, Keller, Werblin

IDS 200L. Neurobiology Laboratory. (5) Two 6-hour laboratories plus one 3-hour demonstration per week. Prerequisites: IDS 200A-200B. IDS 200A may be taken concurrently. Instructions to provide the graduate and advanced undergraduate students with a working knowledge of current anatomical, physiological and biophysical techniques in neurobiology through demonstrations, exercises, and individual research problems. Topics include synaptic transmission, excitable membrane, sensory reception, and circuits of neurons generating behavior. Sponsoring departments: Physiology-Anatomy, Zoology, and Biophysics. (F) *Miller, Werblin, Zabriskie

IDS 201. Research Topics in Neurobiology. (2) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture per week. Prerequisites: Consent of instructor. Neurobiology faculty will present current research topics in seminar form. Emphasis on design and rationale of the work as well as the experimental results. Sponsoring departments: EEGS and Zoology. (SP) Werblin, Bentley

IDS 202. Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring depart-

ments: Zoology, and Entomology. (F,SP) Miller, Weeks, Werblin

IDS 203. Developmental Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Discussion of research papers and original research reports on current problems in developmental neurobiology, including cell lineage, axon pathfinding, synaptic connectivity, and competition. Sponsoring departments: Zoology and Psychology. (F) Bentley, Weisblat

IDS 205. Development Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. A seminar devoted to the analysis of major problems in animal and plant embryology-cell type determination, pattern formation, cell and tissue interactions and mechanisms of morphogenesis with emphasis on regulations and integration of developmental events at the cellular, molecular and tissue levels of organization. Sponsoring departments: Molecular Biology and Zoology. (SP) Bentley, Schrock, Gerhardt, Weisblat

Related Courses in Other Departments

Nuclear Engineering (College of Engineering)

Department Office: 4513 Etcherry Hall, 642-6100
Chair: T. Kenneth Fowler, Ph.D.

Professors:
Paul L. Chambré, Ph.D. University of California. Numerical and analytical methods
T. Kenneth Fowler, Ph.D. University of Wisconsin at Madison. Applied physics plasma and fusion
Lawrence M. Grossman, Ph.D. University of California. Radiation physics
Selig N. Kaplow, Ph.D. University of California. Nuclear instrumentation
Donald R. Goring, Sc.D. Massachusetts Institute of Technology. Nuclear materials
Thomas H. Pierson, Ph.D. Massachusetts Institute of Technology. Nuclear safety, waste management
Stanley G. Prussin, Ph.D. University of Michigan. Fission products
Virgil E. Schroek, M.S., M.E. University of California at Berkeley. Nuclear reactor safety, reactor physics and reactor safety
Lawrence Ruby, Ph.D. (Emeritus)

Associate Professor:
Edward C. Morse, Ph.D. University of Illinois. Applied technology. Nuclear safety, waste management

Robert V. Pyle, Ph.D. (In Residence) (Emeritus)

Lecturers:
Tek H. Lim, Ph.D.
George Rett, M.D.
Roger W. Wallace, Ph.D.

Professor:
Nuclear engineering is concerned with the applications of nuclear reactions, including the design, analysis, and operation of nuclear reactors and their nuclear fuel cycles. The principles taught in the nuclear engineering courses deal with the physical principles of nuclear reactions, their impact on radiation with matter, the behavior of neutrons in reactor media, the thermal and hydrodynamic principles of heat extraction, the properties of nuclear materials, and the models and processes in nuclear reactors: reactor design, and thermonuclear fusion. These subjects are taught in courses at the undergraduate and graduate levels. Other courses include radiation protection, environmental effects, and nuclear safety.

Undergraduates can major in nuclear engineering or join in nuclear engineering and in other fields of engineering through the undergraduate double major programs. Graduate programs leading to the master's and doctoral degrees involve advanced course work in nuclear engineering and in allied fields and direct participation in research under supervision of the nuclear engineering faculty.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:
Lower Division. Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B-7C; En-

gineering 7, 45; Electrical Engineering and Computer Science 120. Introduction to Electronics (may also be satisfied by ECECS 40 plus ECECS 43). Electives.

Upper Division. Required: Engineering 117; Me-

chanical Engineering 105; Nuclear Engineering 101, 104A-104B, 120, 150, 160, 161; Electives.

For details on double major degree requirements, please consult the Announcement of the College of Engineering.

Upper Division Courses

101. Nuclear Reactions and Radiation. (4) Four 1-

hour lectures per week. Prerequisites: Physics 7C. En-
gineers and kinetics of nuclear reactions and radioactive decay, fission, fission, and reactions of the energy neu-

trons; properties of the fission products and the actinides; nuclear models and transition probabilities; interaction of radiation with matter. (F)

104A-104B. Nuclear Engineering Laboratory. (3,3) New course. One hour of lecture and four hours of lab per week. Prerequisites: NE 101; NE 150 recommended. Nuclear instrumentation, radiation detection, interactions of radiation with matter, reactor reactor operation, reactor safety, reactor material experiments, ther-

modynamics, and fusion plasmas. Analysis of data and formal report writing are emphasized. (F,SP) Lim, Schrock

120. Nuclear Fuel Materials. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Engineering 45 and an upper division course in ther-

modynamics. Thermodynamics of nuclear materials, especially uranium dioxide; crystal structure, point defects and dislocations in solids; cavities in solids; pores and gas bubbles; grain boundaries; fuel fabrication; thermal gra-
dient effects; irradiation effects: densification, fission product swelling and release. (F,SP) Kaplan

124. Nuclear Chemical Engineering. (3) Three 1-hour lectures per week. Prerequisites: Upper division course in thermodynamics. Uranium demand and availability; fuel cycles for various reactor types; uranium ore, milling, feed material preparation; fuel element fabrication; ura-
nium enrichment by gaseous diffusion and by the gas centrifuge; ideal cascades and enrichment costs; fuel reprocessing by solvent extraction, radioactive waste management. (SP)

*Electives must include (a) 18 units of humanities and social studies of which 6 units must be upper division and 4 must be English 1A. (b) At least 11 units in upper division NE courses.

*Students following this emphasis program will also satisfy require-

ments for the B.S. degree in Mechanical Engineering.
Nuclear Engineering / 277

150. Introduction to Nuclear Reactor Theory. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisites: 101; Mathematics 50B. Neutron interactions, nuclear fission, and chain reaction systems in thermal and fast nuclear reactors. Diffusion and slowing down of neutrons. Critically calculated. Nuclear reactor dynamics and reactivity feedback. Fuel cycles and fuel management. Production of radionuclides in nuclear reactors. (SP)

Chambé

160. Thermo-Fluid Processes in Nuclear Power. (4) Four hours of lecture per week. Prerequisites: Mechanical Engineering 105. Fundamentals of heat and momentum transport with application to nuclear power systems. (SP)

161. Nuclear Power Engineering. (3) Two 1 1/2-hour lectures per week. Prerequisites: 150 and junior level courses in fluid mechanics and heat transfer. Engineering analysis in the design of nuclear fission power reactors. Thermal and structural behavior of reactor components. Analysis of operational and accidental transient sequences. Safety evaluation. Engineered safety systems. (F) Grossman

162. Radiation Protection and Control. (3) Three hours lecture per week. Prerequisites: 101. Passage of radiation through matter, dosimetry units and measurement, effects of radiation on man, radiation-exposure regulations, calculation of radiation exposure and dose, sources of radiation and radioactivity, environmental dispersion, biological pathways, radiation transport in shielding design concept. (SP) Kaplan, Prussin

167. Reliability and Risk Assessment in Nuclear Systems. (3) Three hours of lecture per week. Elements of probability theory; discrete and continuous distributions; lifetime models; sampling and confidence limits; Boolean algebra; event trees and fault trees for nuclear systems. (F)

170. Nuclear Engineering Design. (3) New course. Two hours of lecture and one hour of discussion per week. Prerequisites: NE150, 160. Design synthesis of neutrons, thermyocritical stresses analysis, radiation protection, control, and economics in problems relating to nuclear power systems. (SP)

180. Introduction to Controlled Fusion. (3) Three hours of lecture per week. Prerequisites: Physics 7C. Introduction to energy production by controlled thermonuclear reactions. Nuclear fusion reactions, energy balances for fusion systems, survey of plasma physics; neutral beam injection; RF heating methods; vacuum systems; tritium handling. (F) Morse, Fowler

185. Group Study for Advanced Undergraduates. (1-8) Course may be repeated for credit. Must be taken on a pass/not pass basis. Various prerequisites. Consent of instructor and major adviser. Supervised independent study. Please see pages 81 and 82 of this catalog for description and prerequisites. (F,SP)

Staff

Graduate Courses

201. Nuclear Reactions and Interactions of Radiation with Matter. (4) Four hours of lecture per week. Pre- requisites: consent of instructor. Interaction of gamma rays, neutrons, and charged particles with matter; nuclear structure and radioactive decay; cross sections and energetics of nuclear reactions; nuclear fission and the fission products; fission and fusion reactions as energy sources. (F,SP)

220. Irradiation Effects on Structural Metals. (4) Two 2-hour lectures per week. Prerequisites: 120 or consent of instructor. Radiation damage in metals; radiation effects on microstructure and mechanical properties; void swelling, irradiation creep and helix embrittlement; mechanical analysis of structures under irradiation; spattering and hydrogen recycling in fusion reactors. (SP)

Olander

221. Corrosion in Nuclear Power Systems. (3) New course. Two 1 1/2-hour lectures per week. Prerequisites:

120, 220; (MSE 112 recommended) or consent of instructor. Structural metals in nuclear power plants; properties of proton-reaction induced corrosion of reactor components; structural integrity of reactor components under combined mechanical loading, neutron irradiation, and chemical environment; behavior of reactor materials under accident conditions. (SP)

Olander

224. Process Technology in the Nuclear Fuel Cycle. (4) Four hours of lecture per week. Prerequisites: Upper division course in thermodynamics. Analysis of the principle of the ex-reactor operations of the nuclear fuel cycle, including alternative fuel cycle recovery and separation of uranium and other special feed materials, isotope separation principles and application, fuel reprocessing, control of radioactive effluents, radioactive waste management and instellar decay. (F) Pighard

225. Nuclear Fuel Cycles. (3) Three hours of lecture per week. Prerequisites: 150. Analysis of fuel cycles in current and future nuclear power reactors, including converters and breeders. Reactivity lifetime and fuel management; economic analysis and optimization; uranium utilization; requirements for enrichment, reprocessing, waste management; radionuclide migration in geologic media; long-term performance of geologic repositories. (SP) Grossman

250. Nuclear Reactor Theory. (4) Four 1-hour lectures per week. Prerequisites: 150; Engineering 117 recommended. Fission characteristics; neutron chain reactions, neutron transport and diffusion theory; reactor kinetics; group theory; nuclear reactor design, effect of poisons and fuel depletion. (SP) Grossman


Chambé, Grossman

257. Dynamics of Nuclear Systems. (3) Three hours lecture per week. Prerequisites: 250; Mathematics 120A-120B. The time dependent neutron balance and reactivity effects in nuclear reactor dynamics. Response of reactors to system to time-varying sources and reactivity changes; reactor parameters from noise experiments; reactivity feedback; stability analysis; space-time reactor dynamics; optimal control. (F) Grossman

260. Thermal Aspects of Nuclear Reactors. (4) Four hours of lecture per week. Prerequisites: 160. Fluid dynamics and heat transfer; thermal and hydraulic analysis of nuclear reactor systems; phase change and boiling; compressible flow; stress analysis; energy conversion methods. (F)

Schock

265. Design Analysis of Nuclear Reactors. (3) Three hours of lecture per week. Prerequisites: 150 and 161. Principles and techniques of economic analysis to determine capital and operating costs; fuel management and fuel cycle optimization; thermal limits on reactor performance, thermal converters, and fast breeders; control and transient problems; reactor safety and fire control; radioactive decay from reactors and fuel processing plants. (F)

Staff

266. Two Phase Flow and Heat Transfer. (3) Three 1-hour lectures per week. Prerequisites: 160; Mechanical Engineering 105. Study of the hydrodynamics and heat transfer of two-phase flow and applications in nuclear power and propulsion systems. Emphasis is on analysis of the single and two-component gas liquid systems. Aspects of gas-solid, and liquid-solid systems are also treated. (SP)

Schock


Staff

280. Fusion Reactor Engineering. (3) Three hours of lecture per week. Prerequisites: 120 and 180. Engineering and design of fusion systems. Introduction to controlled thermonuclear fusion as an energy economy, from the standpoint of the physics and technology involved. Case studies of fusion reactor design. Engineering principles of support technology for fusion systems. (SP) Morse, Fowler

290A. Economics of Uranium Enrichment and Deuteron Reactor Production. (4) Four hours of lecture per week. Prerequisites: Undergraduate course in thermodynamics. Engineering economics as they apply to nuclear facilities. Processes of making engineering decisions will be demonstrated using case studies, actual costs and present work methods. Various nuclear power reactor concepts, other major components of nuclear power plants and their engineering aspects will be covered. Uranium and heavy water energy resources will be assessed and their engineering economics assessed. (F) Retzlaff

295. Nuclear Engineering Colloquium. (0) Course may be repeated. Must be taken on a satisfactory/unsatisfactory basis. One 1 1/2-hour lecture per week. A series of weekly lectures on various subjects through specialized seminars on topics to be selected each year, and in each semester thereof, including participation by faculty, visiting experts, and students in group analysis of research problems of new research areas, and of science and technology. (F,SP)

Staff

299. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. In-depth study of nuclear reactor concept. (F,SP)

601. Individual Study for Master's Candidates. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for master's degree. Individual study for the comprehensive or language requirements in consultation with the field advisor. May not be used for unit residence requirements for the doctoral degree. (F,SP)

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for doctoral degree. Individual study in consultation with the major field advisor. To provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit residence requirements for the doctoral degree. (F,SP)

Professional Courses

301. Graduate Student Instructor Training. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One meeting weekly with a faculty member to discuss effective teaching methods, including selection of texts; clarity of oral delivery; use of visual aids; devising exams and problem sets. Students will practice teaching by conducting scheduled discussion sections. (F,SP)

Interdepartmental Studies Courses

Upper Division Courses

IDS 145. Chemical Methods in Nuclear Technology. (3) Three 1 1/2-hour lectures and one 4 1/2-hour laboratory per week. Prerequisites: Nuclear Engineering 101 or Chemistry 143. Experimental illustrations of the interrelation between chemical and nuclear science and technology; fission process, chemistry of fission frag-

*On leave, spring

**Recipient of Distinguished Teaching Award
mints, chemical effects of nuclear transformations; application of radioactivity to study of chemical problems; neutron activation analysis. Sponsoring departments: Chemistry and Nuclear Engineering. (SP)

Nutrition
(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 146 Morgan Hall, 642-2879
Chair: Nancy K. Amy, Ph.D.

Professors:
Bruce N. Ames, Ph.D. (Biochemistry)
Leonard F. Biederman, Ph.D. (Nutritional Sciences)
Doris Howes Callaway, Ph.D. (Nutritional Sciences)
Jane C. Cohen, Ph.D. (Human Nutrition)
Janet C. King, Ph.D. (Nutritional Sciences)
Norman Kretchmer, M.D. (Nutritional Sciences)
Sheilon Margen, Ph.D. (Public Health, SAHS)
John B. Nislan, Ph.D. (Biochemistry)
Alexander V. Nichols, Ph.D. (Biophysics and Medical Physics)
Leiter Packer, Ph.D. (Physiology/Anatomy)
Z.I. Sabory, Ph.D. (Public Health, SAHS)
George Sensabaugh, Ph.D. (Public Health, BHS)
Barry Shane, Ph.D. (Nutritional Sciences)
Harriett H. Andrea, Ph.D. (Physiology/Anatomy)
Paola Timas, Ph.D. (Physiology/Anatomy)
Fernando E. Viteri, M.D., D.Sc. (Nutritional Sciences)
Mary Ann Williams, Ph.D. (Nutritional Sciences)
Daniel I. Arnon, Ph.D. (Nutritional Sciences)
Gordon R. Brown, Ph.D. (Nutritional Sciences)
Thomas H. Jukes, Ph.D. (Nutritional Sciences)
Sylvia Lane, Ph.D. (Nutritional Sciences)
Angela C. Little, Ph.D. (Nutritional Sciences)
E.R. Robert Stokstad, Ph.D. (Nutritional Sciences)

Associate Professors:
George W. Chang, Ph.D. (Nutritional Sciences)
Bentol D. H. Mann, Ph.D. (Nutritional Sciences)
Sharon E. Fleming, Ph.D. (Nutritional Sciences)
Susan M. Oase, Ph.D. (Nutritional Sciences)

Professor:
Sharon E. Fleming, Ph.D. University of Saskatchewan.

Director, Clinical Dietetics Program:
Janet C. King, Ph.D. University of California at Berkeley.

Graduate Advisers: Sharon Fleming, Nancy K. Amy, and Barry Shane.

Graduate study is supervised by an Interdepartmental group representing the various departments at Berkeley and other institutions in nutrition: Nutritional Sciences, Biochemistry, Physiology/Anatomy, Public Health, Agricultural and Resource Economics, and Medical Physics. Programs are available at both the M.S. and Ph.D. levels. For admission the student should have a bachelor's degree in one of the sciences on which nutrition is based. An undergraduate major or its equivalent in any of the nutritional sciences curricula or related fields, such as biochemistry, chemistry, biological sciences, physiology, will provide a strong background.

Graduate study in nutrition offers opportunities to study a range of problems encompassing human, comparative, and cellular nutrition. Fields of emphasis include: biochemistry, physiological, and genetic aspects of nutrition; experimental nutrition; human nutrition; international nutrition; physiological phenomena; and therapeutic nutrition.

Nutritional Sciences
(College of Natural Resources)

Department Office: 119 Morgan Hall, 642-6490
Chair: Norman Kretchmer, Ph.D.

Professors:
Leonard F. Biederman, Ph.D., University of California at Los Angeles. Food toxicology, chemical carcinogenesis.
Doris Howes Callaway, Ph.D., University of Chicago. Human requirements and function.
Barry Shane, Ph.D., University of London. Regulation of vitamin metabolism.
Mary Ann Williams, Ph.D., University of California at Berkeley. Lipids, polyunsaturated fatty acids.
George M. Briggs, Ph.D. (Emeritus)
Bessia B. Cook (Bessie Cook Jeffers), Ph.D. (Emeritus)
Thomas H. Jukes, Ph.D. (Emeritus)
Angela C. Little, Ph.D. (Emeritus)
E.R. Robert Stokstad, Ph.D. (Emeritus)

Associate Professors:
Bentol D. H. Mann, Ph.D. (Nutritional Sciences)
Thomas H. Jukes, Ph.D. (Nutritional Sciences)
Sylvia Lane, Ph.D. (Nutritional Sciences)
Angela C. Little, Ph.D. (Nutritional Sciences)
E.L.J. Robert Stokstad, Ph.D. (Emeritus)

Assistant Professors:
Nancy K. Amy, Ph.D., University of Virginia. Regulation of trace element metabolism.
Gregory W. Aponte, Ph.D., University of California at Davis. Gastrointestinal peptides and nutrient assimilation.
Marc Heilstein, M.D., Ph.D., Massachusetts Institute of Technology. Hepatic metabolic regulation, nutrition and inflammation.

Lecturers:
Pat Booth, M.S., R.D.
Mary Anne Burkman, M.P.H., R.D.
Linda Chandok, M.S., R.D.
Jonas Richmond, Ph.D.
Nellie True, M.S., R.D.
Judith Tumlund, M.D. (Vitamins) (Visiting)

Director, Clinical Dietetics Program:
Leslie Wade, Ph.D., R.D., University of California at Berkeley. Diet and renal disease.

Education Goals and Major Requirements

The Department of Nutritional Sciences offers two undergraduate majors leading to the B.S. degree: nutrition and food science and nutrition and clinical dietetics. The major in nutrition and food science combines a strong foundation in natural sciences with advanced course work in nutrition, biochemical and physiological study of nutrient utilization, and food science, the study of properties and processing of food materials. Graduates often find employment in research laboratories, or the food industry. Others pursue graduate studies in the biological or chemical sciences or enter professional programs in the health sciences. Through careful selection of electives, a nutrition and food science major may satisfy the academic course work required for eligibility for an Accredited American Dietetic Association internship. Courses that fulfill the lower division prerequisites for junior standing include: Chemistry 1A-1B, 8A-8B; English 1A-1B, or equivalent: Mathematics 16A; Statistics 2 or 20; Physiology 1, 1L; Plant Pathology 23; and Nutritional Sciences 10.

The major in nutrition and clinical dietetics is reserved for undergraduates who are admitted to the Coordinated Program in Dietetics offered by the department. This is a two-year professional program of academic and nutrition and dietetics that is accredited by the American Dietetic Association and meets the requirements for becoming a registered dietitian. The academic course work includes fundamental preparation in the sciences and social sciences and advanced courses in nutrition, food science, and management. The professional courses in clinical dietetics combine academic course work with supervised clinical experience. Students are eligible to write the American Dietetic Association registration examination immediately upon graduation. Graduates find employment in health care, government, industry, community agencies, educational institutions, and research laboratories. Many graduates pursue further professional or graduate study in nutrition, health sciences, or related fields.

The graduate courses offered by the department are designed primarily for support of the M.S. and Ph.D. in nutrition. The courses include advanced study of research techniques, nutrient functions, food and nutrition policy issues and the latest developments in nutritional sciences. Graduates find employment in government, industry, academic institutions, medical research, clinical nutrition, and research and extension agencies. Many seek advanced professional medical degrees.

Major requirements appear in the Announcement of the College of Natural Resources.

For further information please contact the Student Affairs Officer, 146 Morgan Hall, 642-2879.

Lower Division Courses

10. Introduction to Human Nutrition. (3) Three 1-hour lectures and one 2-hour discussion per week. Overview of digestion and metabolism of nutrients. Discussion of foods as a source of nutrients and of the evidence for the effects of nutrition. Emphasis on issues of current interest and on worldwide problems of food and nutrition. Students are required to record their own diet, calculate its composition and evaluate it. (F,SP)

Kretchmer, Carpenter

Upper Division Courses

100. Human Nutrition and Metabolism. (5) Three 1-hour lectures and one 2-hour discussion/demonstration per week. Prerequisites: 11, Physiology 1, and Biochemistry 1 and 2. Food chemistry. Nutrient function and metabolism, human nutrient requirements throughout the life cycle, nutritional balance and assessment, and evaluation of the quality criteria of foods and the criteria for standards and legal requirements. (F) King, Oace

104. Human Food Practices. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 11 and 109. Principles of Food Processing and Preservation. (SP) Kretchmer, Carpenter

106L. Introductory Food Science Laboratory. (2) One hour of lecture and discussion, and three 6-hour lab periods per week. Prerequisites: 106 (may be taken concurrently). Experimental study of the principles of food preparation. Evaluation of the sensory and quality aspects of food. (F)

108. Food Chemistry Laboratory. (4) One hour of lecture, one hour of discussion and two 3-hour lab periods per week. Prerequisites: 106, Biochemistry 102L, and a course in statistics. Prerequisites: methods, and techniques for qualitative analysis of food components by physical, chemical and biological assays. Effects of processing on the nutritional and functional properties of food components. (SP) de Lumen, Fleming

109. Principles of Food Processing and Preservation. (2) Two hours of lecture per week. Prerequisites: 106. The chemical, physical, engineering, and nutritional aspects of food processing and preservation.

110. Food Toxicology. (2) Two hours of lecture per week. Prerequisites: 106 or consent of instructor. Principles and problems in evaluating the safety of foods.
128. Clinical Nutrition II. (5) Two 2-hour lecture/ discussion per week. Prerequisites: 181, 161, and consent of instructor. Intended primarily for students in clinical dietetics. Methods of nutrition care planning and evaluation for patients requiring modified diets. Assessment of nutritional status and major diseases; emphasis on nutrition and rehabilitation; emphasis on dietary therapy, nutrition education, and selected clinical disorders. (F) Staff

190. Introduction to Research in Nutritional Sciences. (1) Course may be repeated for credit. One hour of lecture/discussion per week. Prerequisites: 100. Oral and written reports by students on topics selected from the current research literature in food science and nutrition. (F,SP)

180. Introduction to Clinical Dietetics. (1) Must be taken on a passed/not passed basis. One 1-hour seminar per week. Students attend at weekly clinical dietetic seminar. (F) Staff

181. Clinical Nutrition I. (4) Two hours of lecture and eight hours of clinical laboratory, field work and discussion per week. Prerequisites: 100 and maintenance of a 2.5 GPA in required major courses and consent of instructor. Intended primarily for students in clinical dietetics. Individual counseling and group teaching methods; assessment of nutritional status; medical terminology. Nutrition care planning and evaluation through life cycle and for patients requiring moderate diets, obesity, endocrine, cardiovascular. (SP) Hare, C Adjusted

202. Advanced Human Nutrition. (4) Three 1 1/2-hour review lectures and one 2-hour advanced lecture per week. Prerequisites: 11, Biochemistry 102, and Physiology 1. Intended primarily for first semester graduate students in nutrition. Review of nutrient metabolism and function, human nutrient requirements, nutritional balances and nutritional assessment. Evaluation of research data relevant to controversial nutrient requirements. Evaluation of research methodologies relevant to nutritional assessment. (F) Staff

290. Advanced Seminars in Nutritional Sciences. (1-2) Course may be repeated for credit. One hour of lecture/discussion per week per unit. Prerequisites: 200. Analysis of current research and the basis for current nutritional therapies in common human disease states. Critical evaluation of research pertaining to the nutrition therapies currently employed in clinical practice. Use of recent research papers will be emphasized. (F) Staff

280. Topics in Human Nutrition. (2) Two hours of lecture per week. Prerequisites: 200. Analysis of current research and areas of interest and controversy in human nutrition. (F)

270. Topics in Clinical Nutrition. (2) Two hours of lecture per week. Prerequisites: 200 and 161 consent of instructor. Special topics in clinical nutrition. Specific topics may vary from year to year and may include: pathogenic mechanisms in foodborne illness, physiology of the gastrointestinal tract and selected diseases. Chang

210. Topics in Clinical Nutrition. (2) Two hours of lecture per week. Prerequisites: 200 and 161 consent of instructor. Special topics in clinical nutrition. Specific topics may vary from year to year and may include: pathogenic mechanisms in foodborne illness, physiology of the gastrointestinal tract and selected diseases. Chang

213. Special Topics in Food Microbiology. (2) Course may be repeated for credit. One hour of lecture/session per week. Prerequisites: Consent of instructor. Critical analysis of pertinent literature on selected topics in food microbiology. Specific topics may vary from year to year and may include: pathogenic mechanisms in foodborne illness, physiology of the gastrointestinal tract and selected diseases. Chang

*133L Food Microbiology Laboratory. (2) Four hours of laboratory and one hour of lecture/discussion per week. Prerequisites: 113 (may be taken concurrently). Laboratory experiments with the microorganisms involved in food fermentations and food spoilage. The action of these microorganisms on foods. Thermal processing. Foodborne bacteria and the intestinal microflora. (SP) Chang

100. Experimental Nutrition. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100. Experimental basis for present concepts in the sciences of nutrition, with applications of changes in nutritional profiles for cancer and on cellular metabolism. (SP) Williams

161. Therapeutic Nutrition. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: 100. Biochemical, physiological, medical, and nutritional bases for therapeutic treatment of human conditions and diseases by dietary means. (SP) Staff

161L Therapeutic Nutrition Laboratory. (4) Four hours of laboratory with demonstration and discussion per week. Prerequisites: 161 (may be taken concurrently). Dietary methods of therapeutic treatment and evaluation of various human conditions and diseases. (SP) Burke

165. Research Dietetics. (1) One 1-hour lecture/discussion per week. Prerequisites: 100. Types and design of research diets. Quality control. Tools of the research dietitian including computer programs, food composition tables and computerized data bases. Roles of the team members who conduct human nutrition research. Ethics of human nutrition research. (F) Staff

170. Experimental Nutrition Laboratory. (4) One hour of lecture, one hour of discussion and two 3-hour laboratories per week. Prerequisites: 100, Biochemistry 102L, and a course in statistics. Basic principles and techniques used in human and animal nutrition research. Students design, execute, and analyze experiments. (F)

192. Carbohydrate and Lipid Metabolism. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 100. Nutritional and hormonal effects of carbohydrate and lipid metabolism and metabolic abnormalities. (F) Staff

204. Protein and Energy Metabolism. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 200, Biochemistry 102L, and a course in statistics. Analysis of nutritional intake; basic nutritional principles; analysis of nutrition research; modern instrumentation and experimental techniques in nutrition research laboratories. (F) Staff

201. Seminar in Nutrition. (1) One hour of lecture/discussion per week. Prerequisites: 100 or permission of instructor. Major topics covered primarily for first year graduate students in food science and nutrition. Oral and written individual and group reports by students on topics selected from the current research literature: major emphasis on active research areas in the department. (F) Staff

292. Graduate Research Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar/colloquium per week. Prerequisites: Graduate standing. Presentations by graduate students of research proposals and results of their research. Participation in discussion and evaluation of others' presentations is required. (F,SP) Staff

291. Research in Food and Nutrition. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Graduate standing. (F,SP) Staff

282. Directed Group Studies. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of study per week per unit. Prerequisites: 200. (F,SP) Staff

802. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of study per week per unit. Prerequisites: Graduate standing and consent of instructor. Individual study in consultation with the major field adviser intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the doctoral degree. (F,SP) Staff

200. Vitamin and Mineral Metabolism. (2) Two hours of lecture per week. Prerequisites: 11, Biochemistry 102, and Physiology 1. Intended primarily for first semester graduate students in nutrition. Review of nutrient metabolism and function, human nutrient requirements, nutritional balances and nutritional assessment. Evaluation of research data relevant to controversial nutrient requirements. Evaluation of research methodologies relevant to nutritional assessment. (F) Staff

203. Mineral and Vitamin Metabolism. (2) Two hours of lecture per week. Prerequisites: 200. Advanced vitamin and mineral nutrition; emphasis on function, homeostatic control, and dietary need. (F) Amy, Shane

205. Protein and Energy Metabolism. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 200, Biochemistry 102L, and a course in statistics. Analysis of nutritional intake; basic nutritional principles; analysis of nutrition research; modern instrumentation and experimental techniques in nutrition research laboratories. (F) Staff

201. Seminar in Nutrition. (1) One hour of lecture/discussion per week. Prerequisites: 100 or permission of instructor. Major topics covered primarily for first year graduate students in food science and nutrition. Oral and written individual and group reports by students on topics selected from the current research literature: major emphasis on active research areas in the department. (F) Staff

200. Advanced Human Nutrition. (4) Three 1 1/2-hour review lectures and one 2-hour advanced lecture per week. Prerequisites: 11, Biochemistry 102, and Physiology 1. Intended primarily for first semester graduate students in nutrition. Review of nutrient metabolism and function, human nutrient requirements, nutritional balances and nutritional assessment. Evaluation of research data relevant to controversial nutrient requirements. Evaluation of research methodologies relevant to nutritional assessment. (F) Staff

292. Graduate Research Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Graduate standing. Presentations by graduate students of research proposals and results of their research. Participation in discussion and evaluation of others' presentations is required. (F,SP) Staff

282. Directed Group Studies. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of study per week per unit. Prerequisites: 200. (F,SP) Staff

802. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of study per week per unit. Prerequisites: Graduate standing and consent of instructor. Individual study in consultation with the major field adviser intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the doctoral degree. (F,SP) Staff

Professional Courses

301. Professional Preparation: Teaching in Nutritional Sciences. (1) One hour of lecture/discussion per week. Prerequisites: Consent of instructor. Teaching methods in nutrition and food science at the university level; course content, planning, and evaluation; preparation of instructional units. (F) Staff

302. Professional Preparation: Supervised Teaching Experience in Nutritional Sciences. (1-4) Course may be repeated for credit. Three hours of supervised teaching experience per week per unit. Prerequisites: 301 (may be taken concurrently) and consent of instructor. Practical teaching experience of food science at the university level: planning, presentation, and evaluation of instructional units. (F,SP) Staff

410. Dietetic Counseling. (2) Must be taken on a passed/not passed basis. Prerequisites: 182 (may be taken concurrently) and a 2.5 GPA in required major

*1 Not offered 1988-89
*2 On leave, spring
Recipient of Distinguished Teaching Award

2On leave, spring
Recipients of Distinguished Teaching Award

2On leave, spring
courses and consent of instructor. Minimum of 80 hours of clinical field work during the semester; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve desired competency. Supervised practice of dietetics in an outpatient setting with progressively greater responsibility to entry level practitioner competency. Preparation, supervision, and evaluation of dietetics in nutrition education and specified audience. (F.S.P.) Chandoke

402. Hospital Dietetics. (5) Must be taken on a passed/not passed basis. Prerequisites: 182; 2.5 GPA in required major courses and consent of instructor. Minimum of 40 hours of clinical field work per week; one hour discussion per week. Planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in sub specialty units (e.g. burn units, dialysis units). (SP) Burkman

408. Field Study in Clinical Specialties. (2) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. Minimum of 80 hours of clinical field work; one hour of discussion per week. Prerequisites: 182; 2.5 GPA in required major courses; consent of instructor. Minimum of 40 hours of clinical field work per week; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in subspecialty units (e.g. burn units, dialysis units). (SP) Burkman

492C, Advanced Field Studies in Research Dietetics. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 2.5 GPA in required major courses; consent of instructor. Minimum of 40 hours of clinical field work per unit; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in research dietetics setting. Students will gain practical experience in the techniques, problems, and implications of human metabolic research including ethics, experimental and diet design, quality control and subject investigator interactions. (F.S.P.)

492D. Advanced Field Studies in Private Practice. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 2.5 GPA in required major courses; consent of instructor. Minimum of 40 hours clinical field work per unit; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in a private practice setting. The student will gain knowledge and practical skills in the business of nutrition consulting. Will participate in processes involved in starting a business and daily activities associated with maintaining that business (marketing, accounting, etc.). (F.S.P.)

492E. Advanced Field Studies In Community Dietetics. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 2.5 GPA in required major courses; consent of instructor. Minimum of 40 hours of clinical field work per unit; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in a community dietetics setting. The students will gain practical experience in the duties of a dietitian in community programs and agencies. As appropriate, the student will be involved in delivery of nutrition services, administrative duties, program planning and evaluation, development of resources, funding schemes, etc. (F.S.P.)

497. Field Study In Clinical Dietetics. (1-5) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 161 and a 2.5 GPA in required major courses and consent of instructor. Minimum of 40 hours of clinical field work per semester or unit; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in specialized clinical settings. (F.S.P.)

Interdepartmental Studies Courses

Upper Division Courses

IDS 191A. Introduction to Laboratory Animal Science and Resources. (2) Must be taken on a passed/not passed basis. One 1½-hour lecture and one 1½-hour laboratory per week. Prerequisites: Biology 1A-1B or equivalent, upper division standing. For students working with laboratory animals. Lectures on basic animal science, including animal research models; principles of anaesthesia, surgery, and sanitation; animal welfare regulations and practices of humane care and breeding; animal genetics and diseases. Laboratory applications of lecture material. Sponsoring departments: Entomology and Nutritional Sciences.

Graduate Courses

IDS 290. International Food and Nutrition Policies. (3) New course. May be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. Interdisciplinary course surveying the world food situation emphasizing the links between food production, food consumption and nutrition: the effect of income and prices on food demand, and socioeconomics factors affecting food consumption within and among households. The various nutritional problems plaguing developing countries (including famine); intervention measures, such as food aid, feeding programs, pol iric nutrition and education, and methods of program evaluation are reviewed. Sponsoring departments: International Relations and Resource, Economics, Nutritional Sciences, Social and Administrative Health Sciences (School of Public Health). (SP)

Lore, Robinson, Viet, Sabry

Optometry

Office: 350 Minor Hall, 642-3414

Associate Professor:

Ann proposals, O.D., Ph.D. Vision; assessment of retinal function

Ian Bailey, O.D., M.S. Low vision; clinical optics; clinical assessment of visual performance

Theodore Cohen, Ph.D. Psychophysics of vision; visual neurophysiology; low dose effects of ocular toxic agents

Russel L. DeValois, Ph.D. Visual neurophysiology; color Vision

Jay M. Enoch, O.D., Ph.D. Retinal receptor optics and neurophysiology; quantitative layer-by-layer perimetry; visual correction of Infants and the elderly

Robert D. Freeman, O.D., Ph.D. Neurophysiology and psychophysics of visual development and plasticity

Stanley A. Klein, O.D., Ph.D. Neuroophthalmology; psychophysics of visual development

Associate Professors:

Matthew K. Chan, O.D., M.S. Corneal resonance; ocular lateral geniculate; diseases

William E. Ellis, O.D., M.S. Corneal neurophysiology; psychophysics of visual diagnosis

Steven Ellis, O.D. Corneal neurophysiology; psychophysics of visual diagnosis

Burkman, Ph.D. Optometry; visual neurophysiology; development and plasticity; visual-evoked potentials

Sharon A. Miller, Ph.D. Membrane: transport and biochemistry

Kathleen A. Pole, O.D., M.S. Corneal photobiology; contact lenses; ocular effects of topical medications

Clifton M. Schor, O.D., Ph.D. Binocular vision: human development, ocular motility, strabismus, and amblyopia

Lawrence Stark, M.D. Control of eye movements, accommodation and the pupic bioengineering of movement and computer vision

Irving Witt, O.D. (Emeritus) Material and energy transport in the eye; contact lens technology related to physiology of the eye

Meredith W. Morgan, O.D., Ph.D. Ocular optics and binocular vision

Senior Lecturers:

Karen S. Ban, O.D. (Emeritus) visual psychophysics and basic aspects of human corneal and binocular vision

Jack R. Hobson, B.S. (Emeritus)

Lecturers:


Clinical Professors:

Roy H. Brandwein, O.D. Robert W. Leiter, O.D. Edwin B. Mehr, O.D.

Associates:

Harvey Arnold, O.D. Janis V. Gong, O.D. Craig H. Hsieh, O.D., M.P.H.

Richard D. Jones, O.D. Kenton E. Kent, O.D., Ph.D. Daniel L. Sanders, O.D.

Albert L. Scalel, O.D., M.S. James E. Shedy, O.D., Ph.D. Eugene Y. Tsujimoto, O.D.


Assistant Clinical Professors:

Clark M. Abrams, O.D. Everett Al, M.D. David M. Ams, O.D. Stephanie N. Babu, O.D.

Charles H. Bailey, O.D. Frank G. Bealestrony, O.D., M.S. William C. Barrett, O.D.

Royal Black, O.D. Christine Bircher, O.D. Dennis Burger, O.D. Roy E. Bert, O.D.

Matthew K. Chan, O.D. Steven E. Chur, O.D. David R. Demartini, M.D.


Robert E. Carty, O.D. William Ellis, M.D. William G. Eng, O.D.

David M. Amos, O.D. Bernard H. Fischel, O.D. Leslie E. Fisk, M.D.

Michael A. Gladstone, O.D. Gregory L. Goodrich, O.D.
### Optometry

#### Upper Division Courses

**100A. Introduction to Optometry.** (Must be taken on a passed/not passed basis. Two 1-hour lectures, two 2-hour laboratory sessions per week. Prerequisites: 100A.)

**100B. Introduction to Optometry.** (Must be taken on a passed/not passed basis. One hour of lecture and two 2-hour laboratory sessions per week. Prerequisites: 100A.)

**114A. Ophthalmic Optics.** (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: Physiological Optics 110 and 111. Geometric optics of thick and thin spherocylindrical ophthalmic lenses, including prism, addition of prism, and crossed cylinders, differential prism, and magnification. Theory of the lensometer and the lens gauge. Laboratory exercises in lens measurement, layout, edging, and mounting. (F) Enoch

**114B. Ophthalmic Optics.** (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 114A. Ophthalmic lens materials, lens aberrations and their control, absorptive lenses, reflective coatings, safety aspects, multifocal lenses. Laboratory exercises in the determination of specifications to a prescribed lens alignment and verification of optics, spectrophotometry, tempering, standards testing. Consideration in the design of ophthalmic lenses and frames according to the refractive, physiological, and psychological requirements of the individual patient, safety, and appearance. (SP) Sheedy

**126. Ametropia and Emmetropia.** (1) One hour of lecture per week. Prerequisites: Physiological Optics 110. Diagnostic status of the eye, the nature, etiology, incidence, course, and development of ametropia and emmetropia. Consideration of methods to control refractive error. (SP) Carter

**127A. Clinical Examination of the Visual System.** (4) Two 1-hour lectures, two 2-hour laboratories plus two hours of clinic per week. Prerequisites: 100A and Physiological Optics 110. Diagnostic elements of the optometric examination. Theory and techniques of examination procedure. Interpretations of symptoms and signs related to the sensory, motor, and optical components of the visual system. (F) Harris, Chan

**127B. Clinical Examination of the Visual System.** (3) Three 1-hour lectures, two 2-hour laboratories, and two hours of clinic per week. Prerequisites: 127A. Consideration of diagnostic elements of the optometric examination; theory and techniques of examination procedures. Interpretation of symptoms and signs related to anomalies of the sensory, motor, and optical components of the visual system. Graphical and normative analysis of examination data, including fixation disparity and symptomology. Diagnosis, management, and prognosis of visual anomalies. (SP) Grisheim, Chan

**130. Basis and Recognition of Systemic Diseases.** (3) Three 1-hour lectures per week. Prerequisites: Physiological Optics 101. Basic pathological processes in human development, senescence, and disease underlying physiology and histology. Basic techniques of physical examination and interpretation of common symptoms and signs relating to major disease processes. (F) Jarmion

**131. Ocular Manifestations of Systemic Diseases.** (2) Two 1-hour lectures per week. Prerequisites: 130 and 140. Disease processes and system disorders with emphasis on ocular implications and manifestations. Observation of patients, emphasizing systemic disease processes. (SP) L. Fujikawa, Al, Ripkin

**133. Anomalies of Binocular Vision.** (4) Three 1-hour lectures and one 2-hour lab per week. Prerequisites: 130. Heterophoria, strabismus, and amblyopia. Detection, measurement, classification, etiology, symptomology, and diagnosis of latent and manifest disorders of binocular fixation, both comitant and non-comitant; orthoptics and visual training. Clinical aspects of aniseikonia; clinical observations. (SP) Haegert-Pontney

**134. Treatment of Binocular Anomalies.** (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 133. Analysis of problems of binocular vision and assessment of the prognosis for their treatment. Rationale and methods for using lenses, prisms, occlusion, orthoptics, pleasiosis, drugs, and surgery. Design of treatment programs and practice in their implementation. (F) Grisham

**135. Instrumentation of Ocular Disease Detection.** (2) One hour of lecture and one 2-hour lab per week. Prerequisites: 140. Clinical examination procedures for the detection of ocular diseases, including direct and indirect ophthalmoscopy, biomicroscopy, fundus microscopy, gonioscopy, tonometry, and perimetry. (SP) Wiley

**136A. Basis, Recognition, and Management of Ocular Disease.** (4) Four 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 136B. Ophthalmology, clinical manifestations, and management of ocular disease. Clinical demonstration of ocular disease. Emphasis on symptomatology, signs, and management of ocular disease. Clinical demonstration of ocular disease. (F) Carter, Walker

**136B. Basis, Recognition, and Management of Ocular Disease.** (4) Four 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 136A. Determination of 136A. (SP) Enoch, Walker, Barber

**140. Pharmacology.** (4) Three 1-hour lectures and one 2-hour lab per week. Prerequisites: Physiol. Optics 101. Basic principles of drug action. Pharmacodynamics, mechanisms of action, toxicity, emphasis on therapeutic agents used in optometry and the side effects of drugs, especially as they relate to the eye and vision. Actions, uses, contraindications of ophthalmic preparations, with emphasis on diagnostic drugs used in clinical practice. (F) Poise, Staff

**158A. Low Vision.** (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 127B. Optical principles of low vision aids. Epidemiology, etiology, signs, and symptoms of low vision. Basic ophthalmic examination and treatment of the low vision patient, interdisciplinary rehabilitation resources, counseling, and referral. (F) Bailey

**155B. Pediatric Optometry.** (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 127B. The psychology of infants and children. Optometric examination, management, and treatment of pediatric patients. Methods of assessing visual and perceptual functions related to educational development. Review of procedures used by other professionals in the management of children's health and education. (SP) Banks

**161A. Contact Lenses.** (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 114A and Physiological Optics 110. The physiological basis for fitting contact lenses. Emphasis on the design and care of a contact lens on the eye, including lens, fit, and care. Instrumentation used in monitoring the ocular response to contact lenses. Contact lens inspection, care, and handling. (SP) Harris, Mandell, Poise

**161B. Contact Lenses.** (3) Two 1-hour lectures, one 2-hour lab and one hour of discussion per week. Prerequisites: 161A. Contact lenses. Further development in the field of contact lenses. (F) Mandell

**161C. Contact Lenses.** (1) Must be taken on a passed/not passed basis. One 1-hour seminar per week. Prerequisites: 161B. Advanced techniques in fitting contact lenses. Recent developments in the field of contact lenses. (F) Mandell

**185A. Practice of Optometry.** (4) Two 2-hour lectures per week. Prerequisites: 127B. Laws governing the practice of optometry. The establishment, management, economics of an optometric practice. Professional organizations and associations; options and methods for delivery of optometric services. (SP) Thal

**185B. Practice of Optometry.** (1) Must be taken on a passed/not passed basis. One 1-hour lecture per week. Prerequisites: 185A. A course designed to specifically relate those concepts taught in 185A to the handling of patients and treatment of patients or patients. Topics on health care delivery, professional and personal economic planning, and field work designed to acquaint students with methods and settings for delivery of optometric care. (SP) Thal

**190A-190B. Optometry Research Project.** (1) Credit and grade to be awarded upon completion of the sequence. One 1-hour lecture and one hour discussion per week. Prerequisites: 127B. Elements of a research project on a passed/not passed basis. One 3-hour seminar per week. Prerequisites: 190B. On leave of absence. Recipient of Distinguished Teaching Award
of the problems, examination techniques and prescription design considerations for aphatic patients and aging patients with low vision. (S)

483A-483B. Special Clinics. (6-8) Credit and grade to be awarded upon completion of sequence. Must be taken on a passed/not passed basis. Fifteen to 20 hours of clinic per week. Prerequisites: 483B. Examination, diagnosis, prognosis, treatment, and/or management of patients in specialty clinics; ocular disease, vision screening, vision functions, neuro-ophthalmology, visually-evoked responses, ophthalmic optics, and contact lenses. (F,S,P) Sequence begins in fall. Brandreth, Staff

486A-486B. Clinical Colloquia. (2.2) Credit and grade to be awarded upon completion of sequence. Must be taken on a passed/not passed basis. Ten to 15 hours of discussion per week. Prerequisites: Optometry 453B. Presentation of clinical cases demonstrating basic and advanced principles of optometric care, including diagnosis, treatment, prognosis, and patient management. (F,S,P) Sequence begins in fall. Bailey, Carter, Staff

490. Advanced Summer Clinic. (4) Must be taken on a passed/not passed basis. Twenty hours of clinic per week. Prerequisites: 483B. Optometric examination of patient in the clinic performed independently by student optometrists and clinicians (interns) under supervision of the clinic staff. (S)

499. Supervised Independent Study. (1-4) Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Independent study. (F,S,P) Staff

Physiological Optics

Upper Division Courses

101. Anatomy of the Visual System. (5) Two 1½-hour lectures and one hour of discussion per week and one 3-hour lab every other week. Prerequisites: Anatomy 108-108B, or equivalent or consent of instructor. Gross and microscopic anatomy, histology of the eye, visual evoked responses, ophthalmic optics, and contact lenses. (F) Klein, Dalven, Miller

110. Optics. (5) Three 1-hour lectures, one 2-hour laboratory and one hour discussion per week. Geometric methods applied to the optics of mirrors, lenses, and prisms. Principles of optical systems. Design of optical instruments. General considerations in optical instrumentation, interference, polarization of light, and their applications. (F) Klein, Dalven, Miller

125. Vegetative Functions of the Eye. (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 101. Consideration of vegetative functions, which include formation and drainage of aqueous humor; Intra-ocular pressure, intraocular pressure measurement; color specification, visual basis of color metrics. (F) Marg, Miller

129. Ocular Motility. (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 101. Motor mechanisms, control, and stimuli in accommodation, pupil and vergence responses; Interactions of this triad: zone of single clear binocular vision, Kinematics of the eye, ocular motor system, Slit lamp examination; listed Donder's law; kinematics of time-optimal sacadic trajectories; vestibular ocular reflex; fixation, reading, and scarpah eye movement patterns. (SP) Klein, Dalven, Miller

131. Vision: Sensitivities. (2) Two 1-hour lectures, one hour of discussion or 1½-hours of lab per week. Prerequisites: Anatomy and physiology of human retina and peripheral visual pathway, functional role of retinal neurons, photo transduction, lateral interactions, psychophysical methods, area, time, uncertainty, cortical, and adaptation influences on threshold, applications including acuity perimetry and gross potentials. (F) Stark

132. Vision: Central Pathways. (2) One hour of lecture and one 2-hour lab per week. Prerequisites: Vision 1 or permission of instructor. Anatomy and physiology of central visual pathways from lateral geniculate to visual cortex. Psychophysical functions that are identified with various visual pathways. Visual acuity and contrast sensitivity. (F) Freeman

134. Vision: Light and Color. (3) Two 1-hour lectures and one 3-hour lab per week. Prerequisites: Vision 1 and 2 or permission of instructor. Sensory aspects of light and color vision including: effects of visible and near visible radiation on the eye. Photoreceptor spectral response and role in day and night vision. Duplex nature of vision. Light production, specification and measurement; color specification, visual basis of color metrics. Psychophysics and physiology of color discrimination and color mechanisms. Normal and defective color vision. (SP) Adams

160. Binocular Vision and Space Perception. (3) Two 1-hour lectures and one 3-hour lab per week. Prerequisites: 129. Perception of space, direction, and distance. Binocular retinal correspondence, horopters, differential magnification effects, sensory vision, local and global stereopsis, static and dynamic stereopsis, monocular depth cues. (F) Schar

189. Group Studies for Advanced Undergraduates. (1-4) Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Group study. Upper division consent of instructor. (F,S,P) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Supervised independent study. Prerequisites: Upper division status and prior consent of instructor; the student's major advisor and the departmental chair. (F,S,P) Staff

Professional Courses

410. Summer Optometry Clinic. (4) Must be taken on a passed/not passed basis. Twenty hours of clinic per week. Prerequisites: 127B. Lectures, seminars, and clinical practice in the techniques and interpretation of critical data. (S)

453A. Optometry Clinic. (4) Credit and grade to be awarded upon completion of the sequence. Must be taken on a passed/not passed basis. One 1-hour lecture and 10 hours of clinic per week. Prerequisites: 110B, 130, and 133. Introduction to patient care, including examination of patients, prescribing of optometric therapy, management of emergency procedures, vision screening, and field tests. (F)

453B. Optometry Clinic. (3) Credit and grade to be awarded upon completion of sequence. Must be taken on a passed/not passed basis. Ten hours of clinic per week. Prerequisites: 453A. Continuation of 453A. (SP) Brandreth, Staff

454A-454B. Advanced Optometry Clinic. (6.6) Credit and grade to be awarded upon completion of sequence. Must be taken on a passed/not passed basis. Eighteen hours of clinic per week. Prerequisites: 453B. Examination of patients. Diagnosis, prognosis, treatment, patient management, and follow-up care. (F,S) Sequence begins in fall. (SP) Staff

456A-456B. Geriatric Optometry. (2.2) Must be taken on a passed/not passed basis. Four 1-hour lectures per week for two 8-week summer sessions. Prerequisites: 456B. Modern concepts pertaining to the physical, physiological, and visual aspects of the aging patient. Fundamental concepts of nutrition for the aging patient will be stressed: case history, test techniques, prescription consideration, after care and management. Discussion
Graduate standing or permission of instructor. Analysis of eye movement and sensory visual systems from a control and systems approach is made available to non-engineers, using computer simulation techniques. Basic concepts in radiometry, photometry, and colorimetry. Video and oscilloscope stimulus generation and calibration. Basic concepts in psychophysical and biophysical methodology, signal detection, computer techniques in the study of retinal and choroidal disorders, and Various degrees of visual impairment; study of aqueous humor and the relation of intraocular pressure to the physical and geometric optics, dioptrics of the eye, instrument optics, biochemistry and vegetative physiology of the eye, anatomy of the eye and orbit, eye movement, accommodation, and pupil function and receptor physiology. (F) Staff

216A. Visual Sciences A. (3) Course may be repeated for credit with consent of instructor. Two 1½-hour lectures per week. Prerequisites: Consent of instructor. The course will cover both the classical and modern approach to retinal disorders; include physical and geometric optics, dioptrics of the eye, instrument optics, biochemistry and vegetative physiology of the eye, anatomy of the eye and orbit, eye movement, accommodation, and pupil function and receptor physiology. (F) Staff

218. Spatial Aspects of Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 132A or consent of instructor. Selected topics from spatial vision: visual direction, egocentric and oculocentric localization. Pattern vision, identification and memory, spatial frequency models, local and global frequency analysis, form perception, visual development, temporal aspects of vision (movement and flicker), and binocular vision. (F) Adams, Staff

21A. Color Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: Consent of instructor. The course will cover both the classical and modern approach to color vision: topics will include the role of color in art and photography, color vision and computer techniques. Topics will cover the recording and computer techniques in physiological optics. (F,SP) Adams, Staff

21B. Binocular Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: Consent of instructor. Selected topics from stereopsis and binocular depth perception. Development of binocular vision, binocular interaction, binocular single vision, binocular space perception, and depth cues of binocular vision. (F) Schor

222. Application of Vision Psychophysics to Clinical Disorders. (3) Course may be repeated for credit with consent of instructor. Two hours of lecture and two hours of laboratory or discussion per week. Prerequisites: Consent of instructor. Selected topics from stereopsis and binocular depth perception. Development of binocular vision, binocular interaction, binocular single vision, binocular space perception, and depth cues of binocular vision. (F) Schor

230. Neurophysiology of Visual Development. (2) Two hours of seminar per week. Prerequisites: Consent of instructor. Single-unit studies of developing mammalian visual systems. Review of the effects of normal and altered visual experience, including monocular or binocular deprivation, strabismus, astigmatism, and anisometropia. Evaluation of other environmental contributions to the development of the visual system. (F) Van Sluyters

250. Vegetative Physiology of the Eye. (3) Four hours of lecture per week. Prerequisites: Graduate standing and a course in calculus. Detailed analysis of the vegetative functions of the eye, Mass and heat transfer in the cornea, sclera, lens, and vitreous body. The formation of aqueous humor and the relation of intraocular pressure to the rates of formation and drainage. (SP) Polese, Miller

298. Group Studies, Seminars, or Group Research. (1-6) One to four hours of lecture per week. Group studies of selected topics. Advancement of subjects through special seminars on topics to be selected each year, informal groups studying special topics in consultation with the adviser in physiological optics. (F,SP) Staff

299. Research in Physiological Optics. (1-12) Varied. Prerequisites: Consent of instructor. (F,SP) Staff

601. Individual Study for Master's Students. (1-6) Units may not be used to meet either unit or residence requirements for the master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study for the comprehensive requirements in consultation with the adviser in physiological optics. (F,SP) Adams, Staff

602. Individual Study for Doctoral Students. (1-6) May not be used for unit or residence requirements. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study in consultation with the adviser in physiological optics, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. (F,SP) Adams, Staff

Professional Courses

401. Applications of Electronics and Computers. (2) Two hours of lecture and two hours of laboratory per week. Prerequisites: Graduate standing in physiological optics, optometry student status, or consent of instructor. The study of vision requires the application of electronic and computer techniques. Topics will cover the recording of bio-electric phenomena, and transducers, signal averaging, and other computer processing and displays, and computer interactive systems used in physiological optics and optometry. (F,SP) Cohn

Intermediate Studies Courses

Upper Division Courses

IDS114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) One 2-hour lecture per week in the evening. Prerequisites: Upper division biology and chemistry. This interdisciplinary course will single out specific topics in aging of great current interest (e.g. Alzheimer's disease; spring, strategies for intervention) and present lectures on all aspects of each topic (biomedical, health, socioeconomic, legal, and ethical). Invited speakers with special expertise in these areas will participate. Credit for the course will be based on a term paper. Sponsoring departments: Gerontology, Psychology-Neurology-Anatomy, Public Health, Social Welfare. (F,SP) Timiras, Minkler

Related Courses in Other Departments

Psychology 210A. Proseminar: Sensory Processing. (3) Psychology 210D. Proseminar: Perception. (3)
Upper Division. A total of 28 upper division units to be met in the following way: Chinese 100A-100B (5-5); one 3-unit course in Chinese linguistics (161, 163, 165); one 3-unit course in modern Chinese language or literature (102A-102D, 154, 156, 158); two 3-unit courses in classical Chinese (140, 145, 146, 150, 151, 153, 155, 157). The remaining six units to be chosen from the program courses not already taken or one of the above plus one upper-division lecture course (Oriental Languages 116, 121, 131A and 131B).

Emphasis on Japanese

Lower Division. Oriental Languages—Japanese 1A-1B (5-5); Japanese 10A-10B (5-5); Linguistics 6 (3). Linguistics 5 may be taken on a pass/no pass basis.

Upper Division. Japanese 100A-100B (5-5); Japanese 123 (3); Japanese 124 (3) and Japanese 125 (3) or Japanese 126 (3) or Japanese 127 (3) or Japanese 128 (3) or Japanese 129 (3); Japanese 165 (3); Oriental Languages 133A-133B (3-5).

Lower and Upper Division. In consultation with the adviser, nine units of Japanese courses in addition to those prescribed above to make a total of 57 units.

Emphasis on Alatia Languages

Lower Division. Korean 1A-1B (5-5) and Korean 10A-10B (5-5); or Japanese 1A-1B (5-5) and Japanese 10A-10B (5-5); or Near Eastern Studies, Turkeic 101A-101B (5-5). Any other courses prerequisites may be taken on a pass/no pass basis.

Upper Division. Altic 144A-144B (3-3), Altic 154A-154B (3-3) and other relevant courses designated by the adviser (e.g., Altic 177A-177B (3-3), Korean 100A-100B (5-5), Turkish 100A-100B (5-5), Turkish 101A-101B (5-5) and Near Eastern Studies 170A-170B (3-3)) to make a total of 57 lower and upper division units.

Honors Program

An undergraduate student who has completed 9 units of upper division language courses in the department, and who has a grade-point average of 3.3 in those courses and an overall average of 3.0 may apply to the department chair for admission to the honors program. If accepted, the student will enroll in H195 for two consecutive semesters leading to the completion of an honors thesis, which must be submitted at least two weeks before the end of the semester in which the student expects to graduate. While enrolled in H195, the student will undertake advanced study under the guidance of appropriate members of the staff. Upon satisfactory completion of the program, a faculty committee will determine the degree of honors to be awarded (Honors, High Honors, Highest Honors), taking into consideration both the quality of the thesis and overall performance in the department. Honors will not be granted to a student who does not achieve a minimum cumulative grade-point average of 3.3 in all undergraduate work in the University.

Graduate Programs

M.A. and Ph.D. programs are offered in Chinese Language and Literature, in Classical Chinese, and in Japanese Language and Literature. The M.A. degree is offered in Altic Language and Literature, with emphasis on Mongolian. Information concerning graduate degree requirements may be obtained from the department office.

Prospective graduate students are urged to acquire an active command of their language of emphasis as early as possible. Toward this end, a period of study at the Inter-University Program for Chinese Language Studies in Taipei, Taiwan, or at the Inter-University Center for Japanese Language Studies in Tokyo, Japan, both institutions co-sponsored by the University of California at Berkeley, is strongly recommended.

Chinese

Instructor approval is required for enrollment in language courses.

The college is planning to implement the following policy beginning fall semester 1990:

Duplication of credit: Students first admitted to the College of Letters and Science in fall semester 1990 and thereafter will not be allowed baccalaureate credit (unit credit) for Letters and Science courses in lower division foreign language that duplicate courses completed previously in high school or at another collegiate institution. (Students will, however, be allowed study list credit in the semester in which they take a course that duplicates such work.) High school equivalencies are evaluated as follows: the first two years of high school foreign language are considered equivalent to one semester in college; each successive year in high school is equivalent to an additional semester in college. College-level equivalencies are determined on a course-by-course basis.

Lower Division Courses

1A-1B. Elementary Chinese, (5,5) Five 1-hour meetings plus two hours in language laboratory per week. Prerequisites: A is prerequisite to B. (F,SP) Cheung

2A-2B. Introduction to Classical Chinese, (3,3) Three 1-hour meetings per week. Prerequisites: A is prerequisite to B. Characters, radicals, grammar; easy readings in pre-Han, Han, Six dynasties, and T'ang literature. (F,SP)

10A-10B. Intermediate Chinese, (5,5) Five 1-hour meetings plus one hour in language laboratory per week. Prerequisites: 1B, 10A is prerequisite to 10B. (F,SP)

Upper Division Courses

100A-100B. Advanced Chinese, (5,5) Five 1-hour meetings per week. Prerequisites: 10. A is prerequisite to B. Reading and discussion, in Chinese, of modern Chinese texts, literary, political and general, in a variety of styles. Assignments to develop oral and writing skills. (F,SP) Birch, Staff

101. Readings in Modern Chinese, (3) Must be taken on a pass/no pass basis. Three 1-hour meetings per week. Prerequisites: 100B. Reading of current political and similar materials and discussion, in Chinese, of contents. Staff

102. Survey of Chinese Literature, (3) Three 1-hour meetings per week. Prerequisites: 100B, 102A, 102B, 102C, and 102D do not have to be taken in sequence. A fourth-year level course designed to develop the student's reading ability of modern Chinese written on the development of Chinese literature. Class conducted in Chinese.

102A. Pre-Han, (3)

102B. Wei-Jin Through Tang, (3)

102C. Song-Yuan, (3) (F)

102D. Ming-Qing, (3) (SP) Staff

109. Chinese Bibliography, (3) Three 1-hour lectures per week. Prerequisites: Two upper division courses in classical Chinese. (SP) Staff

140A-140B. Readings in Chinese Buddhist Texts, (3,3) Two 1-½-hour readings/lectures per week. Prereq-
Korean

Instructor approved is required for enrollment in language courses.

See the note under Chinese for an explanation of the policy regarding duplication of credit for language courses.

Lower Division Courses

1A-1B. Elementary Korean. (5,5) Five 1-hour meetings plus one hour of language laboratory per week. Prerequisites: A is prerequisite to B. (F,SP) You, Richards

Upper Division Courses

10A-10B. Intermediate Korean. (5,5) Five 1-hour meetings per week. Prerequisites: 10A; A is prerequisite to B. (F,SP) You, Richards

Avaric

Instructor approval is required for enrollment in language courses.

Upper Division Courses

144A-144B. Introduction to Mongolian. (3,3) Three 1-hour meetings per week. An introduction to the official language of the Mongolian People's Republic (Khotan). Graded readings in literary and expository texts. (F,SP) Bosson

154A-154B. Intermediate Mongolian. (3,3) Three 1-hour meetings per week. Continued reading and exercises in Khotka, together with an introduction to the orthography and grammar of literary Mongolian in vertical script. Selected prose texts from the 17th century to the present in both Cyrillic script and vertical script. (SP) Bosson

177A-177B. Manchu. (3,3) Three 1-hour meetings per week. Prerequisites: Junior standing. An introduction to literary Manchu; selected prose texts. (SP, F,SP) Bosson

Tibetan

Instructor approval is required for enrollment in language courses.

Lower Division Courses

1A-1B. Elementary Spoken Tibetan. (5,5) Five 1-hour meetings per week. An introduction to standard Central Tibetan (Lhasa dialect). (F,SP) Chenosh

Upper Division Courses

100A-100B. Intermediate Spoken Tibetan. (3,3) Three 1-hour meetings per week. Prerequisites: 1B and 164B or consent of instructor. Reading exercises with practice in comprehension and oral storytelling. Translation of texts from phonetic transcription into written Tibetan. Practice in original composition. Class discussion of grammar as appropriate. (F,SP) Bosch

164A-154B. Elementary Literary Tibetan. (3,3) Three 1-hour meetings per week. Prerequisites: 100A or 164B or consent of instructor. Reading and writing exercises in standard literary Tibetan; graded readings in Tibetan prose from literary and historical sources. (SP) Bosch

165A-155B. Elementary Modern Literary Tibetan. (3,3) New course. Two 1-hour lectures per week. Prerequisites: 1B or 164B or consent of instructor. Reading and writing exercises in selected texts from modern Tibetan literature. (SP, F,SP) Bosch

167. Tibetan Linguistics. (3) Two 1-hour meetings per week. Prerequisites: Linguistics 5 or 100. This course
Graduate Courses

201. Japanese Bibliography. (3) Three 1-hour meetings per week. Prerequisites: Japanese 100A-100B. Japanese reference works for literature and history.

205. Seminar In Early Chinese Fiction. (3) Course may be repeated for credit with consent of instructor. One 3-hour seminar per week. Studies in the historical development of Chinese fiction and a critical analysis of some early fictional writings. (SP) Cheung

269. Seminar In Classical Japanese Poetry. One 3-hour seminar per week. Prerequisites: Japanese 124, 126, 127, 128, 142 or 146.

275. Historical Documents. (3) Two 1½-hour meetings per week. Prerequisites: Consent of instructor. The course concentrates on the late Namboku-cho through the Five Dynasties period. Topics vary from semester to semester and have included poetry, biography, historiography and external relations. (F) Jamison

298. Directed Study For Graduate Students. (1-6) Course may be repeated for credit. Special tutorial of seminar on selected topics not covered by available courses or seminars. (F,SP)

299. Thesis Preparation and Related Research. (4-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Consent of the supervisor and graduate advisor. (F,SP)

601. Individual Study For Master's Students (1-8) Course may be repeated for credit up to a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of graduate advisor. Individual study for the comprehensive or language requirements in consultation with the graduate advisor. Units may be used to meet either one or residence requirements for a master's degree. (F,SP)

602. Individual Study For Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor, intended to provide an advanced level of training for those seeking examination for various examination requirements of candidates for the Ph.D. May not be used for unit or residence requirements for the Ph.D. degree. (F,SP)

Interdepartmental Studies Courses

Undergraduate Courses

IDS 167. Introduction to Chinese Philosophy. (4) New course. Two 1½-hour lectures and one hour of discussion section per week. A survey of the history of Chinese philosophy from late Chou times through the Ch'ing dynasty. Treated in some depth are a number of major Chinese thinkers including Confucius, Mencius, Hui-tzu Tu, Chu Ch'eng, Chu Hsi, Wang Yang-ming, and Tai Chen. One of the major themes presented in the course is the development of Chinese ethical theory and the role of language in moral education. Other subjects covered are Chinese aesthetic, political theory, and metaphysics. (SP) Shun

Paleontology

(College of Letters and Science)

Department Office: 3 Earth Sciences Building, 642-1821 Chair: William A. Clemens, Jr., Ph.D.

Professors:

William B.N. Berry, Ph.D. Yale University, Paleozoic, paleoecology, community paleoecology
William A. Clemens, Jr., Ph.D. University of California at Berkeley, Mammalian paleontology, faunal analysis
Carole S. Hickman, Ph.D. Stanford University, Invertebrate functional morphology
Zach M. Arnold, Ph.D. (Emeritus)
W. Wyatt Durham, Ph.D. (Emeritus)
Joseph T. Gregory, Ph.D. (Emeritus)
Donald E. Sacco, Ph.D. (Emeritus)

Associate Professors:

Wayne L. F., Ph.D. Cornell University, Paleobotany, paleoenvironments of plants
Kevin Pedrani, Ph.D. Yale University, Paleobiology of lower vertebrates

Major Adviser: To be announced.

Graduate Advisers: Mr. Clemens, Ms. Hickman.

Majors in paleontology may select between two major options. The paleobiology option is designed for those students who wish to major in some aspect of the biological sciences and who wish to acquaint themselves with ancient as well as modern life and environments. Majors in the geology/applied option have an opportunity of selecting those courses that will prepare them for employment in the fossil fuels or environmental consulting industries, or they may choose courses that will provide them with a background in marine geosciences.

The Major

All majors in paleontology will take certain lower and upper division science courses that will provide a background for and an appreciation of the principles and practices of paleontology. The student may then elect to complete the major requirements in either the geology or the paleobiology option.

Lower Division. Courses required of all majors in Paleontology: Biology 1A-1B, Chemistry 1A-1B, Mathematics 16A, Paleontology 20, Physics 8A-8B.

It is recommended that all paleontology graduates take geology 50 as an additional lower division course.

The Geology Option: Geology 50; Geology 100A and 100B, Geology 182, and at least seven additional upper division units in appropriate course work to be selected after consultation with the major adviser.

The Paleobiology Option: Genetics 102, Zoology 109, and additional eight Upper Division units. Planning of the upper division units must be done in consultation with the major adviser. The units should include those in at least two courses chosen from Paleontology 103, 112, 115, 120, and 125.

The paleontology major will include 32 required lower division units and 26 required upper division units.

The geology option will prepare students in those areas of sedimentary geology and paleontology that may be useful in applied aspects of geology and paleontology.

The paleobiology option will provide students with a general background in paleontological perspectives to evolutionary biology.

As guides to potential programs, the following should be noted: Programs of students who desire employment in the fossil fuels industries should include the following courses among those needed to satisfy the upper division course requirement: Geology 116, IDS 216 (Pollen Analysis), Paleontology 115.

Students with interests in environmental concerns should include courses from the following in their programs: Energy and Resources 102 and Environmental Sciences 125.

Honors Program. With the consent of the major adviser, students with an overall grade-point average of 3.3 or higher and a grade-point average of 3.3 or higher in the major may apply for admission to the honors program no later than the beginning of the senior year. Students accepted for this program may substitute the research component of the major requirement for up to 8 units of the major requirements, and they must complete a thesis (course H195).

Students who wish to arrange an individual major should confer with the major adviser.

The Museum of Paleontology, research archive for staff and students and for qualified visiting scholars, has large collections of fossil vertebrates, invertebrates, plants, and recent mollusk shells and vertebrate skeletal elements. These are from every continent, principally from the western United States. Facilities are extensive and education in most paleontological fields is offered. Candidates are expected to acquire a broad familiarity with several fields in paleontology as well as with related subjects.

Preparation for Graduate Study

Graduate study, with programs leading to both the M.A. and Ph.D. degrees, is a principal activity of the department. Students may emphasize either the biological or the geological aspects of paleontology. Facilities are extensive and education in most paleontological fields is offered. Candidates are expected to acquire a broad familiarity with several fields in paleontology as well as with related subjects.
outside the department, such as geology, anthropology, zoology, and botany. Ph.D. candidates are required to pass reading examinations in two foreign languages (usually French, German or Russian) before taking the oral qualifying examination. For further details on the requirements for the M.A. and Ph.D. degrees, please contact the graduate assistant for the department.

Lower Division Courses

2A. Topics in Paleontology: The Age of Dinosaurs. (2) More than one course in this series may be taken for credit with consent of instructor. Two hours of lecture per week. Open without prerequisite to all students and designed for those not specializing in paleontology. Evolution, history, and ecology of the dinosaurs and their world, including the earliest mammals and birds. (F) Radian

2B. Topics in Paleontology: Mass Extinctions. (1) More than one course in this series may be taken for credit with consent of instructor. Two hours of discussion per week for 7 1/2 weeks. Open without prerequisite to all students and designed for those not specializing in paleontology. An overview of the evolution of life, plants and animals and their changing relationships through time, lineages of significant groups and mass extinctions. An overview of the earth history and evolution from the point of view of the fossil record. (F) Fry

25. Introduction to the Oceans. (2) Two hours of lecture per week. Prerequisites: To have had one of the following courses at high school level: physics, chemistry or biology. An introduction to the biology, geology, physics, chemistry, and biology of the world oceans. The application of oceanographic sciences to human problems will be explored through special topics such as energy from the sea, marine pollution, food from the sea and climate change. (F)

29. Lower Division Seminars. (1) More than one seminar in this series may be taken for credit with consent of instructor. One hour per week. Seminars will include informal talks on a variety of topics related to paleontology. Participation in seminars will require consent of instructor in order to enroll. (F)

39A. Man’s Earliest Relatives. (1) May be taken on a passed/not passed basis. Small lecture course for freshmen and sophomore students: one hour per week. Discussion of the origin of man and of ancient primates and their relationship to the history of man. Examination and discussion of duplicates of specimens of primates, including early man. Discussion of literature on man’s ancestry. (SP) Fry

39B. Plant Life—Origins and Rise to Prominence—415 Million Years of Record. (1) Prerequisites: Consent of instructor required. The course will include informal lectures on a variety of topics (see syllabus) related to the origin of the land plants and the subsequent evolution of land plants and their environments. The plan is to have available a selection of fossil plant specimens. These will be handed, examined and interpreted by the students. The focus will be on understanding and interpreting the origin and evolution of land plants and plant life on earth. (SP) Fry

39C. Selected Lower Division Seminar Topics. (1) Paleontological topics of general interest. (F,SP) Staff

Upper Division Courses

103. Evolution Above the Species Level. (2) Two hours of lecture per week. Prerequisites: Zoology 109 or consent of instructor. Processes and patterns of evolution outside the realm of population biology: the explanation of diversity through time; rates of speciation, morphologic changes and protein evolution; origins of major groups and adaptations, rates and causes of extinctions; and the determinants of morphology. Special attention will be given to the applicability of paleontological and neontological theory to the fossil record and to the living world. (F) Padian

111. Invertebrate Paleontology. (4) Two hours of lecture and two 3-hour laboratories per week. Paleobiology of Invertebrates. The use of invertebrates in stratigraphy and chronostratigraphy. (F) Berry

112. Paleocology and Functional Morphology. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Consent of the instructor. Paleontological approaches to the interpretation of morphology and functions for studying the functions of fossil invertebrates. Emphasis is placed on the development, morphology, evolution, biogeography of selected groups. Ancient paleoecological theories are re-examined in terms of modern ecological and evolutionary theories with examples from both marine and terrestrial systems. (SP) Hickman

115. Micropaleontology. (4) Two hours of lecture and two 2-hour laboratories per week. Prerequisites: Paleontology 109 and 224. Marine planktonic foraminifera, dinoflagellates, radiolarians, and coccolithophores. The biology, ecology, deposition, preservation, evolution, biostratigraphy, paleoecography, and special research applications of each group will be considered. (SP) Berry

120. Origin and Evolution of Plants. (3) Two 1-hour lectures and one 2-hour laboratories per week. Prerequisites: Knowledge of earth sciences and botany. Advanced study in plants represented in the fossil record. Primarily for students with comprehensive knowledge of earth sciences and/or botany. (F) Fry

121. Floras in Space and Time. (3) Three hours of lecture per week. An overview of changes in the vegetation of the earth with special emphasis on paleo-geography and paleoclimatology. (SP)

125. Vertebrate Paleontology. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: Zoology 109 or Anthropology 1, Biology 1A-1B or 11A-11B or equivalent. Vertebrate paleontology and human evolution. Study of selected lineages, changes in faunal compositions, functional morphology, and extinctions are among the topics considered. (F) Clemens, Radian

126. Morphology of the Vertebrate Skeleton. (2) One hour lecture and one 2-hour laboratory per week. Prerequisites: Zoology 109 or Anthropology 1, Biology 1A-1B or 11A-11B or equivalent. Comparative anatomy with emphasis on selected groups of terrestrial vertebrates. Development and functions of the skeleton. (F) Clemens

H195. Honor Thesis. (1-4) Course may be repeated for credit. Individual conferences. Restricted to candidates for honors with the bachelor's degree. Preparation of a satisfactory report on original research. In evaluating the report, emphasis will be placed on the composition, style as well as scientific content. (F,SP) Staff

197. Field Study in Paleontology. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Meetings with instructor. Supervised experience in off-campus field work in specific areas in paleontology. Regular meetings with instructor and written report. (F,SP) Staff

198. Directed Group Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

224. Paleontology and Evolution of Fishes. (4) Two hours of lecture and two 3-hour laboratories per week. Prerequisites: 125 and 126, and Zoology 109 or Zoology 109 or equivalent. Emphasis in evolution of fishes and functional morphology, paleontology of fishes. (F) Radian

225. Paleontology and Evolution of Amphibians, Reptiles and Birds. (4) Two hours of lecture and two 3-hour laboratories per week. Prerequisites: 125 and 126, and Zoology 109 or Zoology 109 or equivalent. Emphasis in evolutionary, functional morphology, and paleontology of the non-mammalian land vertebrates, with emphasis on the Mesozoic Era. (F) Radian

226. Evolution and Systematics of Mammals. (4) Two hours of lecture, two 3-hour laboratories and one 1-hour discussion per week. Prerequisites: 125, 126, and Zoology 109 or equivalent. Study of fossil record of Mammalia; comparative research on modern animals contributing to determination of mammalian systematic relationships. One weekend off-campus field trip will provide experience with collecting techniques. (SP) Clemens

227. Mammalian Paleofaunas of the World. (4) Two hours of lecture and two 3-hour laboratories per week. Succession of world’s mammalian faunas, their geography, stratigraphy, and ecology as related to geologic history and to contemporary paleobiology. (F) Savage

234. Biology of Mollusks. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Systematics, ecology, functional morphology, evolution, biogeography of selected groups. (F) Savage

240. Advanced Stratigraphic Paleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Topics may vary from year to year but include evaluations of current literature and discussions aimed at refinement of paleontologic disciplines in stratigraphy.

*Not offered 1988-89
1 On leave, spring
2 On leave, fall
3 On leave, spring
4 On leave, service
5 Recipient of Distinguished Teaching Award
and geochronology, emphasizing established scientific principles, global tectonics, evolutionary biological theory. (F,SP) Savage

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241. Ancient Climates. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Review and analysis of paleontological and geological evidence for and its uses in reconstructions of earth's past climates. (F,SP) Fry

242. Advanced Paleobiogeography. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Topics will vary from year to year but will include consideration of changing distributional patterns of major groups of organisms in time and space, evolutionary relationships, processes of speciation, and biogeographic and distributional patterns of major groups of organisms. (F,SP) Fry

243. Advanced Paleoclimatology. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Topics vary from year to year but will include paleoclimatology of major groups of organisms or major environments from population, community evolution, or taxonomic perspectives. (F) Berry

245. Advanced Marine Micropaleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Topics vary from year to year but will include paleoclimatology of major groups of organisms or major environments from population, community evolution, or taxonomic perspectives. (F,SP) Radwin

246. Seminar in Topics of Evolution Above the Species Level. (2) Course may be repeated for credit. Two hours of seminar per week. Current issues in evolutionary biology and paleobiology, using both neontological and paleontological data. Intensive study of a small number of broad questions in evolution per semester, to be determined by interest of participants and current developments in the field. (F,SP) Radwin

247. Application of Multivariate Statistics to Problems in Paleontology. (3) Two one-hour lectures and one 3-hour laboratory per week. Prerequisites: Biomedical and Environmental Health Sciences 130A or consent of Instructor. The use of cluster analysis, principal component analysis, and discriminant analysis in paleontology will be examined in detail. Lectures will include discussions of data selection, assumptions and purposes of analyses, standardization of data, calculation of analyses and interpretation of results. In laboratory studies students will use computer programs to analyze assigned data sets and data from their research in biogeography, biosтратigraphy, palaeoceanography, morphometrics and taxonomy. (SP) Berry

250. Seminars in Paleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Advanced study in paleontology and current literature in various fields of paleontology. Topics vary from year to year. (F,SP)

250A. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Berry

250B. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Clemens

250D. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Fry

250E. Seminars in Paleontology. (2) Hickman

250F. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Radwin

250G. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Radwin

250H. Seminars in Paleontology. (2) Must be taken on a satisfactory/unsatisfactory basis. Staff

260. Directed Research Preparation. (1-8) Course may be repeated for credit. Sections 1-8: letter grading; sections 9-16: satisfactory/unsatisfactory grading. Individual conferences. Staff

284. Directed Thesis Research. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Open to qualified graduate students working on master's thesis research. (F,SP) Staff

285. Directed Field Studies. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Field work. Open to qualified students directly engaged in field studies. (F,SP) Staff

299. Research in Paleontology. (1-4) Course may be repeated for credit. Sections 1-8: letter grading; sections 9-16: satisfactory/unsatisfactory grading. Individual study. Staff

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Staff

360. Seminar in Teaching of Paleontology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. The aims and methods of teaching paleontology at the college and university level. Open to all graduate students in the department and to others with consent of instructor. (F) Radwin

401. Museum Procedures and Techniques. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour discussion and three hours laboratory per week. Prerequisites: Consent of Instructor. Curation and collection management of natural history materials to provide practical experience necessary for career in museums. (F,SP) Clemens

301. Professional Preparation. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture per week. Prerequisites: Graduate standing and appointment as a graduate student instructor. Principles of teaching paleontology at the college level. Weekly seminars on teaching methods in Paleontology. (F,SP) Radwin

385. Seminar in Teaching of Paleontology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. The aims and methods of teaching paleontology at the college and university level. Open to all graduate students in the department and to others with consent of instructor. (F) Radwin

401. Museum Procedures and Techniques. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour discussion and three hours laboratory per week. Prerequisites: Consent of Instructor. Curation and collection management of natural history materials to provide practical experience necessary for career in museums. (F,SP) Clemens

Interdepartmental Studies Courses

Lower Division Courses

IDS 16. Evolutionary Biology—An Introduction for Non-Biology Majors. (2) Formerly Zoology 16. Two 1-hour lectures per week. This course assumes no background in science. It will cover the history of evolutionary ideas, Darwin's theory and more modern genetic theories of evolution and the major features of the fossil record. Prerequisites: Consent of instructor. Curation and collection management of natural history materials to provide practical experience necessary for career in museums. (F,SP) Hickman

Upper Division Courses

IDS 112L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Three hours of lab per week plus two weekend field trips in September and October. Prerequisites: Must be taken in conjunction with IDS 116L. An introduction to the techniques of Quaternary pollen analysis: recovery of sediment cores from lakes and peat bogs, extraction of fossil pollen from sediment cores, collection of surface samples and graphical presentation of results. Sponsoring departments: Geography and Paleontology. (F) Byrne

IDS 215. Faunal Analysis in Archaeology. (4) Three hours of lecture, one hour discussion, and two 3-hour laboratory per week. Prerequisites: Paleontology 250 or a course in comparative anatomy. Introduction of systematics of animals commonly found in archeological contexts, principles and procedures in faunal analysis of archeological sites, practical training in osteology and research methods, and preparation of a faunal analysis of an archeological site. Sponsoring departments: Anthropology and Paleontology. (SP) Clemens, Savage

IDS 228. Human Evolution, Prehistory and Paleoenvironments. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. A seminar course devoted to consideration of human evolution in the context of broad environmental, human adaptation, and related archeological subjects. Sponsoring departments: Anthropology and Paleontology. (SP)

Related courses in other Departments

Biology 101. Principles of Paleontology. (3)
Biology 160. Marine Geobiology. (2)

Parasitology
(School of Public Health, Interdepartmental Graduate Groups)

Office: 19 Warren Hall, 642-6531

Professors:
Nina M. Agabian, Ph.D. (Biomedical and Environmental Health Sciences)
John L. Anderson, Ph.D. (Entomology and Parasitology)
Frederick L. Dunn, M.D. University of California at San Francisco, (Environmental Health Sciences)
Robert S. Goldsmith, M.D. University of California at San Francisco, (Environmental Health Sciences)
Jerry L. Hardy, Ph.D. (Biomedical and Environmental Health Sciences)
Dudley Heymann, Ph.D. University of California at Berkeley- San Francisco Medical Program
Yoshinori Tanida, Ph.D. (Entomology and Parasitology)
Constantino H. Tempeis, Ph.D. (Biomedical and Environmental Health Sciences)
Naylan A. Vedros, Ph.D. (Biomedical and Environmental Health Sciences)
Ching C. Wang, Ph.D. University of California at San Francisco (Pharmacology)
Clarence J. Weimann, Ph.D. (Entomology and Parasitology)

Associate Professors:
Robert S. Lane, Ph.D. (Entomology and Parasitology)
John E. Simmons, Ph.D. (Zoology)
Wayne P. Sousa, Ph.D. (Zoology)

Assistant Professor:
James H. Leech, M.D. University of California at San Francisco (In-Residence)

Lecturers:
Anne H. Good, M.D., Ph.D. (Microbiology and Entomology)
George O. Poinar, Ph.D. (Entomology and Parasitology)

Fellow:
Paul H. Silverman, Ph.D. (Lawrence Berkeley Laboratory)

Graduate Advisers: Nina M. Agabian, James L. Hardy and Robert S. Lane.

This program is administered by an interdepartmental group composed of staff members drawn from various departments interested in parasitology. Graduate study leading to the M.S. and Ph.D. degrees is offered. Students with a bachelor's degree in a biological science may be admitted to the program. The varied background and interests of the supervising group offer the prospective students a broad
scope of educational opportunities. A common interest of the group is host-parasite interactions. Hosts of primary interest are those in the animal kingdom. The parasites under consideration cover a broad range of invertebrate and microbial forms, and special attention is directed to parasites of man and domestic animals. Subjects for research may be chosen in the classical areas of parasitology, but students may also choose from a wide variety of disciplines that can be brought to focus on a host-parasite relationship, such as molecular biology, immunology, microbiology, virology, etc.

Facilities for study and research by graduate students are located in the administrative units of the faculty members of the group. These include the Department of Entomological Sciences, the Department of Zoology, the Department of Debtoriology and Immunology, and the School of Public Health on the Berkeley campus and the Department of Epidemiology and International Health, the Department of Medical Sciences, the Center for Human Virology, the Department of Chemical and Physical Chemistry on the San Francisco campus.
People educated in pest management have job opportunities in both the private and public sectors—for example, in biotechnology, genetic engineering companies, chemical and consulting firms; agriculture, agribusiness, food processing, and forestry operations; U.S. Department of Agriculture, U.S. Forest Service, National Park Service, and state and local government agencies and departments with environmental protection responsibilities.

The pest management curriculum also helps to satisfy the qualifications for the licensed agricultural pest control adviser examination in California. California recognizes pest control advisers as agricultural pest control advisers: (1) A person who provides recommendations concerning any agricultural use; (2) A person who offers himself/herself as an authority on any agricultural use; (3) A person who acts as a general adviser on any agricultural use and who solicits service or sales outside of a fixed place of business.

Upper Division Courses

*120. Introduction to Pest Management. (4) Two 1-hour lectures, one 9-hour field trip on alternating Fridays. Prerequisites: Biology 1A-1B, and one course in ecology (may be taken concurrently) or consent of instructor. Principles, philosophy, and methods of applying the integrated pest management approach in agriculture, forest, and urban situations. Topics include sampling of harmful and useful species, evaluation of damages, and utilization of control technologies. Attention given to social, economic, political, and environmental aspects of pest control. Offered even-numbered years only. (F)

*134. Chemical and Cultural Control Methods in Pest Management. (3) Three 1-hour lectures per week. Prerequisites: 120, Chemistry 8A-B or equivalent, or consent of instructor. Chemical and agronomic techniques used in pest management; advantages and limitations. (SP)

*155. Forest Pest Management. (3) One 3-hour lecture/discussion per week. Four overnight field trips per semester. Prerequisites: Forestry 106, Entomology 100, or Plant Pathology 120, or consent of instructor. Identification, life history, and ecology of weeds and pests in forest ecosystems; their impacts on forest resource values and management objectives, and interactions with man's activities. Diagnosis and evaluation of forest pest situations, and strategies of control and regulation in a systems context. (SP)

197. Field Studies in Pest Management. (1-3) Course may be repeated for credit. To be arranged. 1 unit for three hours of work per week on part of student. Prerequisites: Consent of instructor. Supervised experience in off-campus organizations related to specific aspects of pest management. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

198. Directed Group Studies. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group discussion, research, and reporting on selected topics. Student initiation of choice of subjects is solicited and welcomed. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial. Prerequisites: Upper division standing and consent of instructor. Supervised independent study or research on topics relevant to pest and conflict studies that are not covered in depth by other courses. Topics to be initiated by students. (F,SP)

Interdepartmental Studies Courses

IDS 173. Technology, Doctrine and Politics in the Nuclear Arms Race. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Upper division standing or consent of instructor. This survey course examines the interaction of technological innovation, strategic planning, and political processes to understand the dynamics of the nuclear arms race. The course will provide an intensive introduction to the literature of the subject. The student will be trained to critically help in understanding contemporary conditions and the possibilities of future developments. Sponsoring departments: Peace and Conflict Studies and Physics. (F,Schwartz

IDS 191. Public Health and Nuclear War. (2) Formerly Public Health 290. Three hours lecture and one hour of discussion per week. The course will examine the impact on public health of the current arms race and the threat of nuclear war. Topics to be considered through lecture, discussion, and directed readings include: the physical and medical effects of nuclear detonation, as well as the economic, psychological, and health dimensions of destruction from preparation for detonation. Conflict resolution and other preventive measures will be explored and tested. Sponsoring departments: Public Health, Peace and Conflict Studies. (SP) Winkeinstein, Hurst, Leonard

Pest Management

(College of Natural Resources)

Department Office: 218 Wellman Hall, 642-6660, and 147 Hilgard Hall, 642-5121

The pest management program is administered jointly by the Departments of Entomological Sciences and Plant Pathology.

Agriculture, forestry, recreation, and urban living represent some of the most important human activities in this world. To fully appreciate and understand how these areas function and interact requires an in-depth knowledge of natural resources, technology, institutions, and human needs. The pest management curriculum is an interdisciplinary program designed to provide you with the necessary background to manage biological problems that occur in these situations. The objective of the major is to train people to think holistically so that pest problems may be handled in the manner most compatible with the environment and of greatest benefit to humanity.

As the solutions for handling biological problems become more complex because of the development of more sophisticated ideas, methods, and products, the need for people educated in pest management increases.

Petroleum Engineering

(College of Engineering)

The Petroleum Engineering program is designed to prepare students for careers in the petroleum producing industry and related fields. Petroleum engineering deals with the wide array of problems associated with the location, drilling, and completion of oil and gas wells, management of subsurface reservoirs to obtain the greatest recovery of oil and gas, development and application of enhanced oil recovery techniques, lifting of oil to the surface and surface handling of the produced fluids. Many petroleum engineers are also becoming involved in related energy areas such as extraction of oil from tar sands and oil shales, and geothermal energy production.

The exploration, development, and production of oil and gas, and other fossil fuels, in an environmentally acceptable manner become more and more complex as we continue to consume these exhaustible resources. The best estimates indicate that from two-thirds to three-fourths of all the oil ever discovered in the United States is still in the subsurface reservoirs awaiting the development of new recovery technology.

The Petroleum Engineering program reflects the energy industry's need for versatile, innovative engineers by providing a strong basic engineering curriculum while maintaining a high degree of flexibility in course offerings. Students will be able to channel their own interests by choosing one of the following three program emphases:

1. Mechanical Engineering emphasis includes extra courses in physics, mechanical processing and design.
2. Chemical Engineering emphasis. Includes physical chemistry, chemical kinetics, and mining principles.

The graduate program in Petroleum Engineering is offered as a field of study in Mechanical Engineering.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

Lower Division. Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B; Engineering 7, 28, 38, 46, 48; Geology 50, 50L; 11 units of electives.

Upper Division. Mechanical Engineering 104, 105, 106, 107A-107B, 108, 148, 149; Civil Engineering 130; Electrical Engineering 100; Chemical Engineering 140; Mineral Engineering 116; Geology 111; 19 units of electives. Electives must include 15 units of humanities and social studies and the balance (12) from one of the three following groupings: Mechanical Engineering emphasis: Physics 7C, Mechanical Engineering 102A-102B, and one other upper division Mechanical Engineering course; Chemical Engineering emphasis: Chemical Engineering 141, 142, 152, 4 additional units in upper division chemistry or chemical engineering courses; Mineral/Geological emphasis: Mineral Engineering 100, 108, and 110 and 4 additional units in mineral or geological engineering or geoscience.

For further details, consult the Announcement of the College of Engineering.
Philosophy
( College of Letters and Science)
Department Office: 314 Moses Hall, 642-2722
Chair: F. Bennett Sichell, Ph.D.
Associate Professors: Janet Broughton, Ph.D. Thompson Clarke, Ph.D. Assistant Professor: Kwong Hing Shyan, Ph.D.
Mills Professor: Richard Wolin, M.A.

The Major
Lower Division. 12A or 14A, 25A-25B.
Upper Division. 100, 104, 122.
A total of 48 units is required in the major program. Twenty-four units are required in the upper division in four required upper division courses: 100, 104, and 122. The student must take one course from the 160-178 series and one course from the 180-184 series and four additional upper division courses (one course numbered 191-198 may be counted among the four only if the major adviser gives written approval). Course 101 does not count as a major requirement.
Philosophy 12A or 14A should be passed before the end of the junior year. Philosophy 100 should be taken as soon as possible after declaring a major. One of the four additional upper division courses may be taken in another department, provided that the course selected is deemed by the major adviser to be relevant to the major.
Honor Program. With the consent of the major adviser, a student with an overall 3.3 grade-point average or higher and a grade-point average of 3.5 or higher in courses in the major may apply for admission to the honors program. This program requires completion of either (1) Philosophy H196, Senior Colloquium, or (2) a graduate seminar, admission to which is contingent upon approval of the instructor in charge. It also requires that the candidate write an acceptable honors thesis, for which four units of credit will be given under H195.

The Minor
Required: Philosophy 25A or 25B; Philosophy 104; Philosophy 122; three additional upper division courses in philosophy (excluding philosophy 101). A minimum of three of the upper division courses must be taken at Berkeley. All courses taken in the minor must be counted toward a letter-grade basis. Students must have an overall grade-point average of 2.0 in all six courses required for the minor. (A grade-point average of 2.0 must be maintained within the five upper-division courses as well.)

Lower Division Courses
2. Individual Morality and Social Justice. (4) Three hours of lecture and one hour discussion per week.

Introduction to ethical and political philosophy. (SP) Vermazen

3. The Nature of Mind. (4) Three hours of lecture and one hour of discussion per week. Introduction to the philosophy of mind. Topics to be considered may include the relation between mind and body; the structure of action; the nature of desires and beliefs; the role of the unconscious. (F) Wolheim

4. Knowledge and Its Limits. (4) Three hours of lecture and one hour discussion per week. Introduction to the theory of knowledge. (Formerly 28) Three hours of lecture and one hour of discussion per week. Introduction to the philosophy of science. (F) Feyerabend

5. Man, God, and Society in Western Literature. (4) Three hours of lecture and one hour discussion per week. Philosophical issues as expressed in poetry, drama, and the novel. This course will compare and contrast the Greek, Medieval, and modern worlds, as reflected in their greatest literature, with special emphasis on the role of the community in reconciling conflicts between sub-groups in society and the individual's ability to understand and control his own life. We will also follow man's growing realization that the changing answers to major questions are themselves self-interpreta- tions. (F) Dreyfus

7. Existentialism in Literature and Film. (4) Three hours of lecture and one hour per discussion per week. Christian, agnostic, and atheistic existentialism as expressed in the works of Dostoevsky, Malville, Kafka, Antonin Artaud, and Jean Paul Sartre. (SP) Craig, Chihara

12A. Introduction to Logic. (4) Three hours of lecture and two hours of discussion per week. Syntax, semantics, and proof theory of sentential and predicate logic. (F,SP) Craig, Mates, Chihara

12B. Introduction to Logic. (4) Three hours of lecture and two hours of discussion per week. Syntax, semantics, and proof theory of sentential and predicate logic. (SP) Craig

14A. Rudiments of Logic and the Philosophy of Logic. (4) Three hours of lecture and two hours of discussion per week.

14B. Rudiments of Logic and the Philosophy of Logic. (4) Three hours of lecture and two hours of discussion per week.

25A. Ancient Philosophy. (4) Three hours of lecture and one hour discussion per week. The history of ancient philosophy with special emphasis on the Presocratics, Plato, and Aristotle. (F) Shun

25B. Modern Philosophy. (4) Three hours of lecture and one hour discussion per week. The nature and the validity of religious ideas. (F) Feyerabend

39. Freshman Seminar. (3) Three hours of seminar per week. Study of various fields of philosophy of special interest to freshmen. Topics will vary from semester to semester and will be individually announced. Freshman seminars are restricted to fifteen students each. (F) Broughton

49. Supplementary Work in Lower Division Philosophy. (2,7,3,3) Meetings to be arranged. Prerequisite: Consent of instructor. Special course designed to facilitate repetition of a lower division course undertaken on the quarter system in which student received a deficient grade. (F,SP) Staff

Upper Division Courses

General prerequisites: students enrolling in any restricted upper division course must have completed 8 units in 2, 4, 25A or 25B or have completed, under conditions specified below, course 101. Additional prerequisites are indicated in certain courses.

Unrestricted Course

101. Philosophical Theories. (4) Three hours of lecture and one hour discussion per week. Prerequisites: Open to juniors and seniors who are not majors in philosophy and who have not taken 4 or equivalent. Fundamental problems in metaphysics and the theory of knowledge. (F) Searle

Restrictive Courses

100. Philosophical Methods. (4) Two hours of lecture and two hours of discussion per week. Prerequisites: Two courses from 2, 4, 25A, 25B. Restricted to students in the major. The course is available to departmental students with the techniques of philosophical reasoning through detailed study of selected philosophical texts and through extensive training in philosophical writing, based on those texts. Should be taken as early as possible after declaring the major. (F,SP) Vermazen, Broughton

102. Normative Ethics. (4) Three hours of lecture per week. Prerequisites: One introductory course in phi- losophy or consent of instructor. Moral philosophy studied through the examination of moral principles, moral problems, and common sense moral evaluations. Specific problems discussed will vary from year to year, but will be drawn from the following: animal rights; fetal rights; world hunger and the obligation to help the needy; killing and letting die; war; choices between lives.

104. Ethical Theories. (4) Three hours of lecture and one hour discussion per week. The fundamental concepts and problems of morality examined through the study of classical and contemporary philosophical theories of ethics. (F) Shun

105. Foundations of Ethics. (4) Three hours of lecture per week. Prerequisites: 104 or equivalent advanced investigation of fundamental questions about the nature of morality. (F) Shun

107. Moral Psychology. (4) Formerly 191X. Three hours of lecture per week. An investigation of central issues in moral psychology, such as free will, weakness of will, self-deception, moral motivation, emotions, virtues, moral education.


110. Aesthetics. (4) Three hours of lecture per week. Prerequisites: Upper division courses in philosophy or consent of instructor. Majors in literature or the arts. Visual arts/literature and music. Form, expression, representation style; interpretation and evaluation. (F) Vermazen

111. Aesthetic Theories. (4) Three hours of lecture per week. A study of aesthetic theories based on historical materials.

115. Political Philosophy. (4) Three hours of lecture per week. Analysis of political obligation and related problems. (SP) SchefTler


118. Philosophy of Law. (4) Three hours of lecture per week. Philosophical problems arising in the legal context.

122. Theory of Knowledge. (4) Three hours of lecture and one hour of discussion per week. (SP) Stroud

125. Metaphysics. (4) Three hours of lecture per week.

126. Philosophy of Religion. (4) Three hours of lecture per week. The nature and the validity of religious ideas. (F) Staal

128. Philosophy of Science. (4) Three hours of lecture per week. A survey of main topics in the logic of science and of other issues coming under the general heading of philosophy of science. (F) Adams

129. Special Topics in the Philosophy of Science. (4) Three hours of lecture per week. A discussion in some depth of one or a few special issues in, or approaches to, the philosophy of science. Details of current topics to be made available in the departmental bulletin of each semester in which the course is given. (SP) Chihara

130. Philosophy of Social Science. (4) Three hours of lecture per week. Philosophical topics arising from psychology, economics, sociology, etc.

131. Philosophy of Action. (4) Three hours of lecture per week. A consideration, inter alia, of some of the following questions: What is an action? What is rational?
action? What is the structure of practical arguments? What is the structure of explanations of actions? (F) Williams

132. Philosophy of Mind. (4) Three hours of lecture per week. Mind and matter; other minds; the concept "person." (SP) Searle

133. Philosophy of Language. (4) Three hours of lecture per week. (F) Searle

140A-140B. Intermediate Logic. (4-4) Three hours of lecture per week. Prerequisites: 12A-12B or equivalent. Major concepts, results, and techniques of modern logic. Model-theoretic treatment of propositional and first-order logic. Basic set theoretic tools. Completeness, computation, and incompleteness. (SP)

142. Philosophical Logic. (4) Three hours of lecture per week. Major aspects of propositional and first-order logic. Topics vary from occasion to occasion. (F) Stroud


152. Medieval Philosophy. (4) Three hours of lecture per week.

153. Chinese Philosophy. (4) Formerly 191F. Three hours of lecture per week. The course focuses on certain central topics in Chinese philosophy, though a survey of the history of Chinese thought is also included. The topics emphasized vary from occasion to occasion, and may include: Confucian ethical tradition; classical Chinese philosophy; a comparative study of Confucianism, Taoism and Buddhism. (F,SP)

154. 19th-Century Philosophy. (4) Three hours of lecture per week.

156. Foundations of Analytic Philosophy. (4) Three hours of lecture per week. (F) Sluga

160. Plato. (4) Three hours of lecture per week.

161. Aristotle. (4) Three hours of lecture per week.

163. Special Topics in Greek Philosophy. (4) Three hours of lecture per week. Prerequisites: 150 or 161 or equivalent. The course is designed to deal with a variety of topics in Greek philosophy. Its contents will vary from occasion to occasion. Possible topics include the history of philosophy, the role of language in Greek thought, Greek ethics, and the influence of Greek thought on later Western philosophy. (F,SP)

164. Nietzsche. (4) Three hours of lecture per week. (F) Sluga

165. Special Topics in Modern Philosophy. (4) Three hours of lecture per week. The course is designed to deal with a variety of topics in modern philosophy. Possible topics include the detailed study of an important text by a modern philosopher, or the study of a particular period or movement of modern philosophy. (F) Sluga

166. Phenomenology. (4) Three hours of lecture per week. Backgrounds of phenomenology and existentialism. Husserl and Merleau-Ponty. (F) Sluga

167. Heidegger. (4) Three hours of lecture and one 1-hour section per week. A survey of Heidegger's Being and Time. (F) Sluga

168. Wittgenstein. (4) Three hours of lecture per week. (F) Sluga

169. Special Topics in Recent European Philosophy. (4) Three hours of lecture per week. The course is designed to deal with a variety of topics in recent European philosophy. Its contents will vary from occasion to occasion. Possible topics include further work in phenomenology and existentialism, the study of a particular text by an important figure in modern European philosophy, current French and German philosophy. (F) Sluga

191. Experimental Courses. (1-4) Course content varies each semester. (F,SP)

195. Philosophy Tutorial. (4) Three hours of tutorial per week. Prerequisites: Students in Honors Program. The department will designate a tutor, under whose guidance the student will seek to satisfy the requirements of the Honors Program. (F,SP)

196. Senior Colloquium. (4) Three hours of seminar per week. A seminar for honors students in philosophy on a topic to be announced. Emphasis on the writing of papers and discussion of them.

198. Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial. One unit per weekly hour of instruction. Prerequisites: Consent of instructor. Directed study on special topics. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial. One unit per weekly hour of instruction. Enrollment is restricted by regulations listed on pages 61-82 of this catalog. (F,SP)

Graduate Courses

200. First Year Graduate Seminar. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. A combination seminar and tutorial, required of and limited to first year graduate students in philosophy. (F,SP)

204. Recent Work in Ethics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 104 or equivalent. Open to advanced undergraduates.

233. Recent Work in Philosophy of Language. (3) Course may be repeated for credit. Two hours of seminar per week.

234. Recent Work in Theory of Knowledge. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Graduate students who have not yet passed the qualifying examination. (F,SP)

250. Special Studies. (1-9) Course may be repeated for credit. Tutorial. Prerequisites: Admission to candidacy for the doctoral degree. (F,SP)

251. Directed Studies. (1-9) Course may be repeated for credit. Tutorial. Prerequisites: Consent of instructor.

Open to qualified students wishing to pursue special study or research under the direction of a member of the staff. (F,SP)

260. Seminar. (3) Course may be repeated for credit. Three hours of seminar per week. Advanced study in various fields of philosophy. Topics will vary from semester to semester. (F,SP)

262. Individual Study for Doctoral Students. (1-6) Course may be repeated up to a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Must be used for unit or residence requirements for the doctoral degree. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates of the Ph.D. (F,SP)

263. Independent Philosophical Studies. (1-4) Course may not be used for unit or residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent study. Prerequisites: Graduate standing. Reading or other advanced study by arrangement with a staff member, for preparation in advance of an examination for a higher degree. (F,SP)

Professional Courses

301. Professional Preparation: The Teaching of Philosophy. (2-6) May not be used for unit or residence requirements for doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. May not be used for unit or residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Independent study. Prerequisites: Appointment as a graduate student instructor. Students will work as tutors under the guidance of a faculty member. They will attend lectures, guide classroom discussion, and participate in a workshop in teaching methods. (F,SP)

Undergraduate Courses

IDS 167. Introduction to Chinese Philosophy. (4) New course. Two 1½-hour lectures and one hour of discussion section per week. A survey of the history of Chinese philosophy from late Shang times through the Ch'ing dynasty. Treated in some depth are a number of major Chinese thinkers including Confucius, Mencius, Hsun Tzu, Mo Tzu, Chuang Tzu, Tung Chung-shu, Chu Hsi, Wang Yang-ming, and Tai Chen. One of the major themes presented in the course is the development of Chinese ethical theory and the role of language in moral education. Other subjects covered are Chinese aesthetics, political thought, and metaphysics. (F,SP)

IDS 183. Modernity: Nietzsche, Weber, Heidegger and Foucault. (4) Three hours of lecture per week. Thinking about modernity as crisis has produced some of the most important works of our age. In this course we will examine the problematization of modernity in four thinkers: Nietzsche ( nihilism and history), Weber (rationalization and the social sciences), Heidegger (technology and thought) and Foucault (wellfare and interpretation). We will consider how each of these thinkers diagnoses the dangers and opportunities of our modern condition. (F) Dreyfus, Rabinow

Graduate Courses

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour meeting per week. Prerequisites: Student must be the cognitive science research assistant for one of the professors associated with the cognitive science program. Additional discussion meetings will be organized by the cognitive science research assistant. (SP) Dretske, Fodor, Halpern, Stich, Wilkie

IDS 237A-237B. Cognitive Science Seminar. (1-1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1½-hour meetings per week. Prerequisites: Cognitive Science Seminar. Open to qualified students wishing to pursue special study or research under the direction of a member of the staff. (F,SP)
Students who have completed the undergraduate major in physical education will find that it has prepared them with a sound theoretical basis for entrance into advanced degree programs which emphasize research, as well as for entrance into such professional programs as physical therapy, sports medicine, cardiac rehabilitation, sports and recreation management, corporate fitness, teaching, and athletic training. The department offers formal programs in such curricular fields, however.

For junior transfer students who plan to apply for admission in the area of biological science with a major in physical education, preparation should be as follows:

Students who have completed 56 to 70 semester units: Chemistry 1A and at least three of the following: Anatomy 108, Physiology 109-109L, or equivalent, Elementary Statistics, Physics 8A, Mathematics 16A, Physiology 1-1L or Physiology 109-109L (human physiology with laboratory), Psychology 1, History 5, 7B, 17A-17B or 30B, Anthropology 3 or Sociology 1.

Students who have completed 71 to 80 semester units: Chemistry 1A, Anatomy 108-108L, or equivalent, Physiology 1-1L or Physiology 109-109L (human physiology with laboratory), and at least two of the following: Elementary Statistics, Physics 8A, Mathematics 16A, Psychology 1, History 5, 7B, 17A-17B or 30B, Anthropology 3 or Sociology 1.

Courses accepted for the above requirements must be the equivalent of Berkeley campus courses.

The Major

Lower Division. Chemistry 1A; a course in elementary statistics; Physiology 1-1L (or Physiology 109-109L); Anatomy 108-108L; Physics 8A; Mathematics 16A; Psychology 1; History 5, 7B, 17A-17B or 30B; Anthropology 3 or Sociology 1.


Honors Program. A student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.5 or higher in courses in the major may, with the approval of the major adviser, apply for admission to the honors program. Requirements in the honors program are completion of Physical Education 195—4 units or Physical Education H195 and Physical Education 200—4 units; and Physical Education H196—2 units. One elective course in the major will be waived with the approval of the adviser.

Teaching Credential. The department does not offer a teaching credential in physical education. However, it does offer a state-approved waiver program in physical education. (See the Schedule of Classes each semester to determine the particular activities available.)

Graduate Degrees

Graduate work leading to the M.A. and Ph.D. degrees is offered in the Department of Physical Education. Each is a research-oriented degree, the department does not offer professional degree programs. For the M.A. degree the student may choose either Plan I (a minimum of 20 units and a thesis), or Plan II (a minimum of 24 units and comprehensive examination which covers three sub-disciplinary areas). For the Ph.D. degree, specialization in one of three broad areas is required: (1) Historical and Social-Scientific Aspects of Human Motor Performance; (2) Motor Learning, Performance, and Development; and (3) Physiological Aspects of Human Performance.

Activities Instruction

The department offers instructional classes to students in aquatics, sports, dance, fitness, combatives, and gymnastic activities. A program of exercise stress testing and prescription. Participants are offered evaluations of pulmonary function and body composition (percent fat, percent lean). Additionally, electrocardiographic (ECG) and oxygen consumption responses during graded and maximum exercise on a treadmill or bicycle ergometer are monitored. The determination of maximum oxygen consumption (VO max) is the best measure of physical fitness available. Participants are presented a computer generated evaluation of fitness status, as well as a program of exercise to maintain or improve physical fitness. This program is available to the university community on a fee basis. Inquiries should be directed to 103 Harmon Gymnasium.

Lower Division Courses

1. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the elementary level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

2. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the intermediate level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

3. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the intermediate level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

4. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the high intermediate level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

Students who have completed the undergraduate major in physical education will find that it has prepared them with a sound theoretical basis for entrance into advanced degree programs which emphasize research, as well as for entrance into such professional programs as physical therapy, sports medicine, cardiac rehabilitation, sports and recreation management, corporate fitness, teaching, and athletic training. The department offers formal programs in such curricular fields, however.

For junior transfer students who plan to apply for admission in the area of biological science with a major in physical education, preparation should be as follows:

Students who have completed 56 to 70 semester units: Chemistry 1A and at least three of the following: Anatomy 108, Physiology 109-109L, or equivalent, Elementary Statistics, Physics 8A, Mathematics 16A, Physiology 1-1L or Physiology 109-109L (human physiology with laboratory), Psychology 1, History 5, 7B, 17A-17B or 30B, Anthropology 3 or Sociology 1.

Students who have completed 71 to 80 semester units: Chemistry 1A, Anatomy 108-108L, or equivalent, Physiology 1-1L or Physiology 109-109L (human physiology with laboratory), and at least two of the following: Elementary Statistics, Physics 8A, Mathematics 16A, Psychology 1, History 5, 7B, 17A-17B or 30B, Anthropology 3 or Sociology 1.

Courses accepted for the above requirements must be the equivalent of Berkeley campus courses.

The Major

Lower Division. Chemistry 1A; a course in elementary statistics; Physiology 1-1L (or Physiology 109-109L); Anatomy 108-108L; Physics 8A; Mathematics 16A; Psychology 1; History 5, 7B, 17A-17B or 30B; Anthropology 3 or Sociology 1.


Honors Program. A student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.5 or higher in courses in the major may, with the approval of the major adviser, apply for admission to the honors program. Requirements in the honors program are completion of Physical Education H195—4 units or Physical Education H195 and Physical Education 200—4 units; and Physical Education H196—2 units. One elective course in the major will be waived with the approval of the adviser.

Teaching Credential. The department does not offer a teaching credential in physical education. However, it does offer a state-approved waiver program in physical education. (See the Schedule of Classes each semester to determine the particular activities available.)

Graduate Degrees

Graduate work leading to the M.A. and Ph.D. degrees is offered in the Department of Physical Education. Each is a research-oriented degree, the department does not offer professional degree programs. For the M.A. degree the student may choose either Plan I (a minimum of 20 units and a thesis), or Plan II (a minimum of 24 units and comprehensive examination which covers three sub-disciplinary areas). For the Ph.D. degree, specialization in one of three broad areas is required: (1) Historical and Social-Scientific Aspects of Human Motor Performance; (2) Motor Learning, Performance, and Development; and (3) Physiological Aspects of Human Performance.

Detailed Information concerning admission, degree requirements, and graduate student appointment is available upon request from the graduate secretary, 200 Hearst Gymnasium.

Activities Instruction

The department offers instructional classes to students in aquatics, sports, dance, fitness, combatives, and gymnastic activities. A program of exercise stress testing and prescription. Participants are offered evaluations of pulmonary function and body composition (percent fat, percent lean). Additionally, electrocardiographic (ECG) and oxygen consumption responses during graded and maximum exercise on a treadmill or bicycle ergometer are monitored. The determination of maximum oxygen consumption (VO max) is the best measure of physical fitness available. Participants are presented a computer generated evaluation of fitness status, as well as a program of exercise to maintain or improve physical fitness. This program is available to the university community on a fee basis. Inquiries should be directed to 103 Harmon Gymnasium.

Lower Division Courses

1. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the elementary level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

2. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the intermediate level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

3. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the high intermediate level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park
5. Physical Education Activities. (5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered at the advanced level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

6. Physical Education Activities. (5) Two hours of laboratory per week. Variety of intercollegiate team sports for men. Students should select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

7. Physical Education Activities. (5) Two hours of laboratory per week. Variety of intercollegiate team sports for women. Students should select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) Park

9. Physical Education Activities for Majors. (1) Course may be repeated for credit. Four hours of laboratory per week. Sections in sport, exercise, and dance for physical education majors. (F,SP) Park

32. Fitness for Life: Physiological Adaptations to Exercise. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: Limited to freshmen and sophomores. Introduction to the body's major systems (i.e., cardio-respiratory, musculo-skeletal, nervous, muscular, etc.). Specific adaptations of these systems in response to different exercise regimens will be examined. Variations in environmental and aging influences on performance will also be discussed. Exercises designed to enhance endurance, speed, balance, agility and strength will be examined. The lab will provide students with actual opportunities to participate in the assessment of fitness. (SP)

39. Healthy, Moral and Strong: Athleticism in the Late 19th Century. (3) One 3-hour seminar per week. Prerequisites: Limited to freshmen and sophomores. This course will investigate American views of bodily fitness, healthy lifestyles, and athleticism as moral and physical regeneration and the establishment of a well-ordered society in the period from 1800 to 1914. (F)

50. First Aid. (2) Must be taken on a passed/not passed basis. One hour of lecture and one 2-hour laboratory per week. Intensive course in first aid. Upon successful completion of the course and the additional requirements of the American Red Cross, an advanced certificate will be issued. (SP) Scott

66. Descriptive Introduction to Physical Education. (2) Two hours of lecture per week. Prerequisite: High school biology or physiology. Overview of physical education with reference to the immediate and more lasting effects of physical activity on the human body including: growth and development, factors affecting motor learning, socio-psychological aspects of sports participation, and philosophical and historical considerations of sports. (F) Scott

Upper Division Courses

101. Kinesiology and Body Mechanics. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: College level courses in human anatomy with lab. Prerequisites: 10 (or BA recommended Physical structure and motor movements in various physical activities. Anatomical concepts and physical laws related to joint and muscle function. (F) Moran

102. Kinesiology of the Handicapped. (2) Two hours lecture per week. Prerequisites: 101. Causes, incidence and effects of those physical disabilities that affect participation in society. Current research and nature of programs designed to lead to optimum function of the handicapped. (SP) Moran

105A. Exercise Physiology. (4) Three hours lecture and one 3-hour lab per week. Prerequisites: A college level course in human physiology with laboratory and Chemistry 1A. Discussions of how chemical energy is captured in the body. Measurement of potential chemical energy is converted to muscular work. Energetics, direct and indirect calorimetry, pathways of carbon flow in exercise, ventilation, circulation, skeletal muscle fiber types. (F) Brooks

105B. Exercise Physiology. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 105A. Discussion of the effects of exercise on skeletal muscle, exercise and cardiovascular disease, exercise in the heat, cold, endurance, training, and performance, effects of drugs on performance, blood doping, sex differences and performance. (SP) Brooks

107. Sports Medicine. (2) Two hours of lecture per week. Prerequisites: 105A. Analysis of causes and situations of injuries in physical activities. Emphasis on the prevention, recognition, evaluation, management and rehabilitation of sports related injuries. (SP) McLauhin

108. Neuromuscular Fatigue. (2) Two hours of lecture per week. Prerequisites: Psychology 1 and elementary statistics. The analysis of fatigue and recovery processes in gross motor human activity. How various situations affect the central and peripheral nervous systems and muscular performance. (F) Eckert

110. Motor Control. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Psychology 1 and elementary statistics. Perception, learning, timing, and coordination as factors in physical activity. (SP) Lehman

111. Motor Development. (3) Three hours of lecture per week. Prerequisites: Psychology 1 and elementary statistics. Motor development from birth to maturity, age changes, sex and individual differences, maturation, and motor learning in childhood and adolescence, relation of motor performance to other aspects of behavior. (F) Eckert

112. Motor Development of the Handicapped. (2) Two hours of lecture per week. Prerequisites: 111. Motor development of the handicapped as a function of age, sex, and type of disability, influence of motivational and environmental factors on motor development according to the type of handicapping condition. (SP) Eckert

114. Psychological Bases of Physical Activity. (2) Two hours of lecture per week. Prerequisites: Psychology 1. Selected sociopsychological constructs as factors which influence physical activity. Personality variables, motivation, presence of others, and competition. (F) Bredemeier

120. Sports in American Society. (2) Two hours of lecture per week. Prerequisites: Sociology 1. Interrelationships of sports and physical recreation with other aspects of American culture. Emphasis on the twentieth century. (SP)

121. Social-Cultural Bases of Human Movement. (3) Two hours of lecture and one hour of section per week. Prerequisites: Sociology 1 or Anthropology 3. The social and cultural importance and structure, variety, and extent of sport in modern societies. Social factors such as institutions, processes, and systems are examined in relation to sport and sport groups as subcultures. (F) Bredemeier

130. History of Physical Education and Sport. (3) Two hours of lecture and one-half hour of section per week. Prerequisites: History 5, 7B, 174A, 174B, 174C, 174D. History of physical education and sport. Social, cultural, and pertinent scientific aspects. Emphasis on 17th through early 20th centuries. (F) Park

131. Curriculum Development and Administration. (2) Two hours of lecture per week. Prerequisites: 111 and 130. Curriculum development and evaluation in school and college programs of physical education including the instructional program, intramural sports and interscholastic athletics. Administrative policies and procedure pertinent to staff, facilities, equipment, budget, and program. (SP) Kyle

135A. Measurement and Evaluation in Physical Education. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Elementary statistics. Evaluation in physical education. Measurement of physical abilities and specialized motor skills. (F) Eckert

135B. Measurement and Evaluation in Physical Education. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 135A. Advanced topics in the measurement and evaluation of human motor performance. (F) Eckert

140. Recreation in American Society. (2) One and one-half hours of lecture and one hour of section per week. Prerequisites: Sociology 3. Nature, scope and significance of recreation in the social and economic life of the American people. (SP) Koehler

160. Theory of Dance. (3) Two hours of lecture and six hours of laboratory per week. Prerequisites: Activity class sections in dance and either Sociology 3 or Anthropology 3. Ethnic, social, and contemporary dance forms; development of folk forms in Europe and the Americas; present trends in the United States; nature and function of rhythm dance; theories and principles of technique and composition. (F) Bloland, L.Jue

165. Introduction to the Biomechanical Analysis of Human Movement. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 101 and 103 (activity class sections in selected sports and exercises). Basic biomechanical and anatomical concepts of human movement and their application to fundamental movement patterns, exercise, and sport skills. (SP) Scott

171. Conditioning of Athletes and Care of Injuries. (2) One hour of lecture and two hours of laboratory per week. Prerequisites: Current American Red Cross first aid certificate and college level courses in human anatomy and physiology. Conditioning and care of athletes, skill, diet, health, and activity habits. Care of injuries, with special emphasis on taping, therapy, and protective equipment. (F,SP) Park, Staff

H195. Honors Course. (2-4) Course may be repeated for credit. Individual conferences to be arranged. Special study and/or research in the field of the major. (F,SP) Park, Staff

H196. Honors Thesis. (2) Course may be repeated for credit. Individual conferences to be arranged. (F,SP)

197. Field Study in Physical Education. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences to be arranged. Supervised experience relevant to specific aspects of physical education, sport and fitness. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Park, Scott

198. Supervised Independent Study and Research Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences to be arranged. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Park, Staff

Graduate Courses

200. Seminar in Physical Education. (2) Hours of class per week. Critical review of literature and research methods. (F) Brooks, Park

201. Seminar in Kinesiology and Body Mechanics. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 105A. A critical review of current literature on neuromotor control. (F) Brooks

206. Seminar in Neuromotor Control. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 105A. Critical review of current literature on neuromotor fatigue, its sites and mechanisms. The core material is physiological: changes in
neuromuscular transmission, electromyograms, excita-
tion-contraction coupling and metabolism in fatigue. Rea-
dings will also include history of the study of fatigue
and its operational definition, central versus peripheral
literature on neuromuscular fatigue, its sites and mech-
anism of action, and the conditions and physiological
changes in neuromuscular transmission, electromyograms,
excita-
tion-contraction coupling and metabolism in fatigue. Rea-
dings will also include history of the study of fatigue
and its operational definition, central versus peripheral
sites of fatigue, and relations to motor control. (SP)

211. Seminar In Motor Development. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 111. Controversy theories of develop-
ment. Changing motor abilities and behavior from childhood through youth and age. (F) Eckert

212. Seminar In Motor Development of the Handi-
capped. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 112. Special
problems in the motor development of the handicapped
with reference to type of disability, maturational level, sex,
and environmental factors.

214. Seminar In Psychosocial Bases of Physical Activity. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 121. Criti-
cal review of current literature on social psycho-
logical constructs pertinent to physical activity experi-
ences. (F) Bredemeyer

221A. Seminar In Sociocultural Bases of Human
Movement. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 121. Criti-
cal review of current literature in the social importance
and structure, variety, and extent of sport in modern societies. (SP)

221B. Seminar In Sociocultural Bases of Human
Movement. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 121. Critical
review of current literature dealing with the nature and
function of play, games, and sports in diverse cultures. (F,SP) Park

230. Seminar In History of Physical Education and
Sport. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 130. Historical
analyses of physical education and sport in various soci-
cies. Emphasis on Western Europe and the United
States. (SP) Park

231. Seminar In Contemporary Administrative Theo-
ries and Problems In P.E. (2) Course may be repeated for credit. Two
hours of seminar per week. Prerequisites: 130. Historical
analyses of physical education and sport in various soci-
cies. Emphasis on Western Europe and the United
States. (SP) Park

290. Research. (2-12) Course may be repeated for credit. Hours to be arranged. (F,SP) Park, Staff

295. Department Seminar. (0) Course may be repeated. Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture per week. Presentations of research
and lectures by faculty, visiting lecturers and students. Masters degree students required to enroll each time offered until course work is completed. Doctoral students
required to enroll each time offered until advancement to candidacy. (SP) Park

299. Special Study for Graduate Students. (2-3)
Course may be repeated for credit. Hours to be arranged. Advanced study of special topics under the direction of faculty member. (F,SP) Park, Staff

600. Teaching in Laboratory/Discussion Sections. (1-6) Course may be repeated for credit. Hours to be
arranged. Open only to qualified graduate students. (F,SP) Park, Staff

600A. History of Physical Education and Sport. (1-6) Park

600B. Kinesiology. (1-6) Park

600C. Motor Development. (1-6) Eckert

600D. Physiological Hygiene. (1-6) Brooks

600E. Psychological Bases of Physical Activity. (1-6) Bredemeyer, Lehman

600F. Socio-Cultural Bases of Physical Activity. (1-6) Bredemeyer, Park

601. Individual Study for Master's Students. (3-12) Course may be repeated for credit. Must be taken on
a satisfactory/unsatisfactory basis. Hours to be arranged. Individual study to prepare for master's comprehensive
examination. Units may not be used for unit or residency requirements for a master's degree. (F,SP) Park, Staff

602. Individual Study for Doctoral Students. (3-12) Course may be repeated for credit. Must be taken on
a satisfactory/unsatisfactory basis. Hours to be arranged. Individual study in consultation with a major field adviser
to prepare for doctoral examinations. Units may not be used for unit or residency requirements for the doctoral
degree. (F,SP) Park, Staff

605. Training in Research Methods in Physical Edu-
cation. (1-4) Course may be repeated for credit. Must
be taken on a satisfactory/unsatisfactory basis. Hours to be
arranged. Experiences in methods appropriate to the
conduct of research in various areas of the field of
physical education. Students may only enroll in an area
which corresponds to his/her area of emphasis in gradu-
ate study. A grade such experiences clearly contribute to
the attainment of the student's academic objectives. Units
may not be used for unit or residency requirements for
a master's degree. (F,SP) Park, Staff

Professional Courses

300. Problems and Methods in Teaching Physical Education. (2) One hour of lecture and three hours of
laboratory per week. Prerequisites: 9; 165; 105A; 110 or 125A. Course analyses of ethical and theoretical problems
involved with physical activities in schools, community
agencies, and private organizations. (F) Frey, White

405. Exercise Stress Testing Techniques. (1-3) Course
may be repeated for credit. One 3-hour laboratory and one
1-hour discussion per week. Prerequisites: 105A or
consent of instructor. Theory and practice of exercise
stress testing and prescription. Techniques include: pul-
monary function testing, body composition and analysis,
recording of ECG, determination of blood pressure,
treadmill and bicycle testing, maximal oxygen consumption determination, data interpretation and ex-
ercise prescription. (F,SP) Brooks

in, for example, physics or chemistry, while also studying astronomy and geology as well as computer
science.

Plan A
(Broad introduction to physical science)

Lower Division Courses. Mathematics 1A-1B, 51 or 51A; Physics 8A-8B; Chemistry 1A-1B; Computer Science 8.

Upper Division Courses. Physics 132; Chemistry 130A-130B; Psychological Optics 110; Statistics 131A. Electives in physical sciences, mathematics and statistics, with the approval of the adviser to complete a total of 30 upper-division units in the major. Up to 6 upper-division units in engineering and/or computer science will be accepted with the approval of the adviser.

Plan B
(Option of departmental concentration)

Lower Division Courses. Mathematics 1A-1B, 50A-
50B; Physics 7A-7B-7C; Chemistry 1A-1B or 4A-
4B; recommended Chemistry 14.

Additional Required Courses. Geology 100A or
Astronomy 7 or 127A.

Upper Division Courses. Two of the three courses
Physics 105, 110A, or 137A, Chemistry 120A or
(for students well-enough prepared) 104. Electives in
physical sciences, mathematics, and statistics with approval of the adviser to complete a total of 24 upper division units. Up to 8 upper division units in engineering and/or computer science will be accepted with approval of the adviser.

Honors Program. Students with a grade-point av-
rage both overall and in the major of at least 3.3 may wish to participate in an honors program leading to graduation with honors. The honors program will include two semesters of work in a departmental honors program with a senior thesis.

Single Subject Teaching Credential. All credential candidates must be certified under the provisions of the California Teacher Preparation and Licensing Act of 1970. Prospective single subject teachers in physical science are encouraged to complete the field major in physical sciences. Students may be required to pass a state examination in addition to completing a program of professional preparation. For further information on requirements for the Single Subject or Multiple Subject Credential, see the An-
nouncement of the School of Education.

Physics

(College of Letters and Science)

Department Office: 366 LeConte Hall, 642-7166
Chair: P. Buford Price, Ph.D., D.Sc.

University Professors:


Edward Teller, Ph.D., LL.D., Sc.D., LL.D. (Emeritus)

Professors:

Kinsey A. Anderson, Ph.D. University of Minnesota. Space physics

Kurt Bertel, Ph.D. California Institute of Technology. Elementary particles, high energy physics, and plasma physics.

Frank S. Crawford, Ph.D. University of California at Berkeley. Optical physics, high energy physics, and plasma physics.

Owen Chamberlain, Ph.D. University of California. Elementary particles, high energy physics, and plasma physics.

Raymond Y. Chiao, Ph.D. Massachusetts Institute of Technology. Optics, Elementary particles, high energy physics, and plasma physics.


Edward T. Commins, Ph.D. University of California. Atomic and nuclear physics.

Frank S. Crawford, Ph.D. University of California at Berkeley. Elementary particle physics.

Field Major in Physical Sciences

This program has been developed for students who wish to concentrate on the physical sciences on a broader basis than is possible in a departmental major. Two plans are offered within the major. Plan A is based on Physics 8, which is required of life sciences students, and Mathematics 16, which is required in part by prospective education majors. Through this plan a student preparing for a career in envi-
ronmental or health science may major in physical science and at the same time acquire the necessary pre-professional preparation. For example: Plan A together with 12 units of chemistry and a year of biology, will meet the entrance requirements of most medical schools. Plan B is based on Physics 7 and Math-
ematics 1, which are required by physical science and engineering departments. Within this plan it is possible to complete much of the departmental major

*^Recalled to active service

*^On leave, spring

*^On leave, fall

*^Recipient of Distinguished Teaching Award
Keneth M. Crowe, Ph.D. University of California at Berkeley. Modern energy physics.
Robert B. Ely, Ph.D. University of California at Berkeley. Optics and spectroscopy.
Robert F. Ey, Ph.D. Massachusetts Institute of Technology. Elementary particle physics.
Donald A. Giesler, Ph.D. California Institute of Technology. Solid state and magnet physics.
Werner Hoffmann, Ph.D. University of Karlsruhe. Elementary particle physics.
J.D. Jackson, Ph.D. Massachusetts Institute of Technology. Theory of elementary particle physics.
Gilbert Shapiro, Ph.D. Columbia University. Elementary particle physics.
Charles L Schwartz, Ph.D. Massachusetts Institute of Technology. Elementary particle physics.
Lawrence J. Hel, Ph.D. Harvard. High energy theory, cosmology, and government laboratories.
Erwin L. Hahn, Ph.D. University of Illinois, D.Sc. Solid state, modern optics.
Sumner P. Davis, Ph.D. University of California at Berkeley. Elementary particle physics.
Alan M. Portis, Ph.D. University of California at Berkeley. Elementary particle physics.
Kenneth M. Crowe, Ph.D. University of California at Berkeley. Modern energy physics.
Lawrence J. Hel, Ph.D. Harvard. High energy theory, cosmology, and government laboratories.
Erwin L. Hahn, Ph.D. University of Illinois, D.Sc. Solid state, modern optics.
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Erwin L. Hahn, Ph.D. University of Illinois, D.Sc. Solid state, modern optics.
Sumner P. Davis, Ph.D. University of California at Berkeley. Elementary particle physics.
Alan M. Portis, Ph.D. University of California at Berkeley. Elementary particle physics.
Lawrence J. Hel, Ph.D. Harvard. High energy theory, cosmology, and government laboratories.
Erwin L. Hahn, Ph.D. University of Illinois, D.Sc. Solid state, modern optics.
Sumner P. Davis, Ph.D. University of California at Berkeley. Elementary particle physics.
wave motion, electrostatics and heat. Some topics of biological interest are usually included in series 8A-8B. (Sequence begins F) Staff

8B. Introductory Physics. (4) Students with credit for 7B or 7C will not receive credit for Physics 8B. Three hours of lecture and one hour of discussion per week plus ten 3-hour laboratory sessions per semester. Prerequisites: 7A or equivalent. Electromagnetism, optics and modern physics. (F,SP) Staff

10. Descriptive Introduction to Physics. (3) Open to students who have taken any of 7A-7B-7C, H7A-H7B-H7C, or any 8A or equivalent. Three hours of lecture and one hour of discussion per week. Prerequisites: Open to students with or without high school physics. A brief presentation of some of the more important phenomena in physics with experimental illustration. (F,SP) Staff

21. Physics of Music. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: No previous courses in Physics are assumed, although Physics 10 is recommended. Physical principles encountered in the study of music. The applicable laws of mechanics, fundamentals of sound, harmonic content, principles of sound production in musical instruments, musical scales. Numerous illustrative lecture demonstrations will be given. Only the basics of high school algebra and geometry will be used. (SP) Staff

9. Lower Division Physics Seminar. (1.5) Staff

49. Supplementary Work in Lower Division Physics. (1-3) Staff

Lower Division Courses

1A-1B-1C-1D. Experimental Four Semester Physics for Scientists and Engineers. (3;3;3;3) Three 1-hour lectures and an average of one 2-hour lab per week. Prerequisites: 1A must be taken concurrently with Math 1A, 1B with Math 1B, IC with Math IC, ID with Math 50A. Physics 1A is recommended for the non-science major student who desires to gain some understanding of basic physical concepts. These courses fulfill, in part, the natural science requirements of the College of Letters and Science. All students planning to take lower division courses, except Physics 10, should have completed trigonometry.

1A. Mechanics and Simple Harmonic Motion. Physics 1A. (4) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 7A, Math 1A, 1B, 50A or equivalent. Mechanics and wave motion. (F,SP) Staff

7B. Physics for Scientists and Engineers. (4) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 7A, Math 1A, 1B, 50A or equivalent. Heat, electricity, and magnetism. (F,SP) Staff

7C. Physics for Scientists and Engineers. (4) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 7B, Math 1A-1B, Math 50A-50B (Math 50B may be taken concurrently). Electromagnetic waves, physical optics, relativity, and quantum physics. (F,SP) Staff

Lower Division Courses

H7A-H7B-H7C. Physics for Scientists and Engineers. (4) Three hours of lecture, one hour of discussion and three hours of laboratory per week. Prerequisites: High school physics, Math 1A or 1AS; Math 1B or 1BS (which may be taken concurrently). Mechanics and wave motion. (F,SP) Staff

8A. Introductory Physics. (4) Students with credit for 7A will not receive credit for 8A. Three hours of lecture and one hour of discussion per week plus ten 3-hour laboratories per semester. Prerequisites: Math 50A or equivalent and consent of instructor. Mechanics, mathematical physics, wave motion, electrostatics and heat. Some topics of biological interest are usually included in series 8A-8B. (Sequence begins F) Staff

8B. Introductory Physics. (4) Students with credit for 7B or 7C will not receive credit for Physics 8B. Three hours of lecture and one hour of discussion per week plus ten 3-hour laboratory sessions, five 3-hour laboratory experiments, and one hour of discussion per week. Prerequisites: 8A or equivalent. Electromagnetism, optics and modern physics. (F,SP) Staff

12. Introductory Nuclear Physics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 8A-8B or equivalent. Introduction to the fission of uranium-235. Nuclear reactions; nuclear models. (F,SP) Staff

12A-12B. Particle Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 12A-12B. (Sequence begins F) Staff

12C. Quantum Mechanics. (4-4) Four hours of lecture and one hour of discussion per week. Introduction to the methods of quantum mechanics, with applications to atomic, nuclear, and elementary particle physics. (Sequence begins F,SP) Staff

13. Special Relativity and General Relativity. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 12A-12B. Staff

13A-13B. Quantum Physics. (4-4) A general descriptive course of selected topics in contemporary physics. Subject matter will vary and may include topics from special and general relativity, atomic and nuclear physics, radar, fundamentals of quantum mechanics and fundamentals of quantum physics, and other topics of interest to the instructor. (F) Staff

14A-14B. Solid State Physics. (4-3) Three hours of lecture and one hour of discussion per week. Introduction to the methods of quantum mechanics with applications to atomic, nuclear, and elementary particle physics. (Sequence begins F,SP) Staff

11. Modern Physics and Advanced Electrical Laboratory. (4-4) Three hours of lecture, one hour of discussion and three hours of laboratory per week. Prerequisites: 7B, Math 1A-1B, Math 50A-50B (Math 50B may be taken concurrently), Electromagnetic waves, physical optics, relativity, and quantum physics. (F,SP) Staff

110A-110B. Electromagnetism and Optics. (4-4) Three hours of lecture, one hour of discussion and three hours of laboratory per week. A course emphasizing electromagnetic theory and applications; charges and currents; electric and magnetic fields; dielectric, conducting, and magnetic media; radiation, interference and diffraction, ray optics and applications. (Sequence begins F,SP) Staff

111. Modern Physics and Advanced Electrical Laboratory. (4-4) Staff

112. Introduction to Statistical and Thermal Physics. (3) Three hours of lecture and one hour of discussion per week. Basic concepts of statistical mechanics, microscopic basis of thermodynamics and applications to macroscopic systems, the laws of thermodynamics, statistical interpretation of macroscopic systems, phase transitions, quantum distributions, elementary kinetic theory of transport processes, fluctuation phenomena. (F,SP) Staff

123. Computational Physics. (2) New course. Must be taken on a passed/not passed basis. Three hours of seminar and three hours of laboratory. Prerequisites:
153. Physics in the American System. (1) Must be taken on a passed/not passed basis. One and one-half hours of lecture per week plus optional section meetings. Prerequisites: Instructor of course in physical science or consent of instructor. A critical study of the political, economic, and social forces that influence the work of physicists and scientists generally. (SP) Staff

180. Physics of Energy Conversion and Use. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A or equivalent. Examination of energy conversion. (SP) Staff

H190. Physics Honors Course. (2) Course may be repeated for credit. Must be taken on a passed/not passed basis. A seminar which includes study and reports on current theoretical and experimental problems. Open to all students. (SP) Staff

H19S-A-H195B. Senior Honors Thesis Research. (2,2) Credit and grade will be awarded upon completion of the full sequence. Prerequisites: Open only to students in the honors program. Thesis work under the supervision of a faculty member. To obtain credit the student must, at the end of two years, submit a satisfactory thesis. A total of four units may be taken. The work may be divided between on or two courses in any way. (F,SP) A in one year from F, B in another year from S.

196. Directed Group Study. (1-4) Must be taken on a passed/not passed basis. Enrollment is restricted by regulations on pages 81 and 82 of this catalog. (F,SP) Staff

198. Supervised Independent Study. (1-3) Must be taken on a passed/not passed basis. Enrollment is restricted by regulations on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

205A. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 105 or equivalent. Lagrange and Hamiltonian dynamics, variational methods, symplectic, kinematics and dynamics of rotation, canonical variables and transformations, perturbation theory, non-linear dynamics, KAM theory. (F) Staff

205B. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 205A. Kinetics, systems, dissipative systems. Attractors. Emphasis on recent developments, including turbulence. (SP) Staff

208A. Introduction to Quantum Electronics and Nonlinear Optics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A-110B and 137A-137B, 210A, 221A, or their equivalents are recommended. Seminal theories of emission and absorption, theory and operation of common laser systems, wave propagation in anisotropic and nonlinear media, nonlinear optical phenomena such as second harmonic generation and parameter amplification. (F) Staff

208B. Introduction to Quantum Electronics and Nonlinear Optics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 208A or consent of instructor. Various topics in nonlinear optics and coherent light, such as parametric mixing, Raman and Brillouin scattering, self-focusing, photon echoes, self-induced transparency, two-photon absorption and high resolution spectroscopy, multiphoton processes. (SP) Staff

210A. Theory of Electricity and Magnetism. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A-110B or equivalent. Methods of mathematical physics, with emphasis on electricity and magnetism. General study of partial differential equations, special functions, Green's functions, complex variable methods, approximation methods. (F) Staff

210B. Theory of Electricity and Magnetism. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 210A. Electrodynamics. Maxwell's equa-

tions, relativity, radiation, diffraction, interactions of radiation with matter. (SP) Staff

211. Equilibrium Statistical Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112 or equivalent. Foundations of statistical physics: Ensemble theory, degenerate systems. Systems of interacting fermions and bosons. Thorvald and electrical properties of energy conversion material. Physics and thermodynamics of the efficient use of energy. (SP) Staff


216. Special Topics In Many-Body Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B or equivalent recommended. Quantum theory of many-particle systems. Applications of this theory and the ideas of perturbation theory. Pairing phenomena, superfluidity, equation of state, critical phenomena, phase transitions, nuclear matter. (F) Staff

221A. Quantum Mechanics. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B or equivalent. Introductory quantum mechanics; quantum theory of measurement; matrix mechanics; Schroedinger theory; symmetry and invariance principles; theory of angular momentum; stationary state problems; time dependent perturbation theory; time dependent perturbation theory; theory of scattering. (F) Staff

221B. Quantum Mechanics. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A. Many-body methods, radiation field quantization, relativistic quantum mechanics, applications. (SP) Staff

222. Special Topics In Mathematical Physics. (2-4) Course may be repeated for credit with consent of instructor. Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Application of a branch of mathematics to physical problems. Topics to be announced by the department. Particular attention will be given to recent developments in methods and to the unifying mathematical ideas. (F,SP) Staff

223. Group Theory and Quantum Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B or consent of instructor. Introduction to group theory and group representation; brief survey of quantum mechanics of atoms, molecules, and solids, emphasizing applications of group theoretical methods. (F) Staff

225A-225B. Relativistic Particle Physics. (5,5) Three hours of lecture and one hour of discussion per week. Prerequisites: 222A, 225A. Fleming diagram calculation including many examples such as Compton, Moller, and Bhabha scattering. Higher order diagrams and renormalization. Renormalization group. Consequence of charge conjugation, parity reflection, and time reversal. Isospin, intrinsic function SU(3), and static quark model SU(6). Gauge symmetries of colors and flavors. Spontaneous breaking of symmetries. Parton model and quark confinement in chromodynamics. (Sequence begins F) Staff

228. Theory of Weak Interactions. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 225A or consent of instructor. Phenomenological theory of weak interactions based on four-fermi interactions. Decays of leptons and hadrons, mesons, neutrino scattering at high energies. Unified gauge models of weak and electromagnetic interactions, in particular, Glashow, Pais, and Weinberg model and its experimental verification. Grand unified models of electroweak and strong interactions. (F) Staff

230A-230B. Quantum Theory of Fields and Particles. (4,4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B and 225A, or equivalents. Starting at the foundations, the course will study the development of quantum field theory, with emphasis on quantum electrodynamics. Topics selected from recent developments in field theory, such as functional integral formalism, nonabelian gauge fields, renormalization group, and asymptotic and constructive field theories. (Sequence begins F) Staff

231. General Relativity. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 210B or equivalent, or consent of instructor. An introduction to Einstein's theory of gravitation. Tensor analysis, general relativistic models for solar system, black holes, Einstein's field equations. Applications, for example, to the solar system, dense stars, black holes, and cosmology. (SP) Staff

240A-240B. Quantum Theory of Solids. (4,4) Three hours of lecture and one hour of discussion per week. Prerequisites: 141A-141B and 221A-221B or equivalents, or consent of instructor. 240A is prerequisite to 240B. Phenon, magnon, plasmon, polaron, and electron fields in solids and their interactions; superconductivity; many-body techniques; Green's functions; Brillouin zones and symmetry; excitons; impurity states; transport processes; Fermi surfaces; neutron scattering; recoilless emission; theoretical methods in magnetic resonance. (Sequence begins F) Staff

242A-242B. Theoretical Plasma Physics. (4,4) Three hours of lecture and one hour of discussion per week. Prerequisites: 142 or consent of instructor. Analysis of plasma behavior according to the Vasov, Folkor-Planck and other models. Theory of plasma states, stability, equilibrium, transport and interaction with radiation. Rigorous kinetic theory. Offered every other year. Sequence starts in the fall semester only. (F) Staff

243. Physics of Ionized Gases. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112, 137A, or consent of instructor. Some familiarity with plasma physics is recommended. Basic procedures for solving problems of ionized gases, macroscopic description of partially ionized plasmas, including electron reactions, radiation and transport phenomena, plasma production and decay. Application to atmospheric and astrophysical sciences, high speed gas dynamics, and electric discharges. (SP) Staff

250. Special Topics In Physics. (2-4) Course may be repeated for credit with consent of instructor. Prerequisites: Consent of instructor. Topics will vary from semester to semester. See Department of Physics Announcements. (F,SP) Staff

251. Introduction to Graduate Research In Physics. (1) Formerly 251A-251B. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture and one 1-hour discussion section per week. Prerequisites: Graduate standing in Department of Physics or consent of instructor: A survey of experimental and theoretical research in the Department of Physics designed for first-year graduate students. One regular meeting each week and a one-hour tutorial in experimental techniques. Meetings include discussions with research staff. (F) Staff

252. Issues in the Teaching of Physics. (2) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour lecture per week. Prerequisites: Senior or graduate standing in physics or consent of instructor: Discussion of issues and recent developments important to the teaching of physics. Especially highly recommended for graduate student instructors and students without prior teaching experience, to help them in their physiology teaching activities in graduate school and subsequent careers. (F) Reif

270. Seminar. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. (F,SP) Staff

295. Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. (SP) Staff

299. Special Study for Graduate Students. (1-4) Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. (F,SP) Staff
Physiology-Anatomy

(College of Letters and Science)

Department Office: 2549 Life Sciences Building, 642-5978
Chair: Robert I. Macey, Ph.D.

Professors:
Beth Burnside, Ph.D. University of Texas, Austin. Cell proliferation and repair.
*Marlan O. Diamond, Ph.D. University of California. Neuroanatomy, environment, asymmetry, hormones
John G. Forte, Ph.D. University of Pennsylvania. Membrane proteins, transport and energetics
Walter J. Freeman, Ph.D. University of California. Neuropsychology, neuropsychology, nonlinear brain dynamics
Constance Cooper, Ph.D. University of California at Berkeley. Cell and molecular biology
Robert I. Macey, Ph.D. University of Chicago. Membrane transport, renal.
*

Terry E. Mechen, Ph.D. University of California at Los Angeles. Epithelia and renal transport.
Fred M. White, Ph.D. University of California at Berkeley. Cell and molecular biology
Charles S. Nicol, Ph.D. Michigan State University. Hormones, growth regulation and cancer
Lester Fashler, Ph.D. Yale University. Biological oxidations and bioenergetics
Lawson L. Rosenberg, Ph.D. Johns Hopkins School of Medicine. Physiology of the endocines
Herbert H. Srebrik, Ph.D. University of California at Berkeley. Renal transport, nutrition
Paula S. Timiras, M.D., Ph.D. University of Roma; University of Arizona. Neuroendocrinology of development and aging
Roger Y. Tenen, Ph.D. University of Cambridge. Cell biology, molecular engineering
Gerald Westheimer, Ph.D., F.R.S. Neurobiology
Robert S. Zuckerkandl, Ph.D. University. Cellular neurophysiology, synaptic biophysics

Associate Professors:
Jeffry A. Winer, Ph.D. University of Tennessee. Neuroanatomy, comparative neurobiology, neurochemistry

Adjunct Associate Professor:
Alexandre T. Quintanilha, Ph.D. University of Witwatersrand, Johannesburg. Physiological aspects of cryoprotection

Assistant Professors:
Gary L. Freston, Ph.D. University of Iowa. Molecular endocrinology
Haloc-Ping H. Moore, Ph.D. California Institute of Technology. Cell biology, neurobiology

Major Advisers: Ms. Diamond, Mr. Freeman, Mr. Nicoll.

Graduate Advisers: Ms. Timiras, Mr. Westheimer (Physiology); Mr. Srebrik (Anatomy).

Major in Physiology

Goals. The curriculum outlined below leads to the A.B. degree in Physiology. It is intended to provide a broad understanding of the basic sciences underlying the life process, of the functions of the various parts of living organisms, and of the integrated physical response of whole organisms to the environment in which they live, together with the functional changes that occur in living organisms with the passage of time during their life span.

Lower Division. Chemistry 1A-1B (4-4); Chemistry 8A-8B (3-4); Mathematics 1A-1B (3-3); Physics 8A, 8B (4-4).

Upper Division. Physiology 100 (5) and 101 (5); Physiology 100L (1.5) and 101L (1.5); either Anatomy 108-108L (3-2) or Anatomy S104 (4); either Biochemistry 102 (4) or 100A-100B (4-4), and three additional upper division courses, two of which must be in physiology. Recommended: two additional semesters of coursework in physics, mathematics, or chemistry; e.g., Chemistry 5 or 130A-130B.

Honors Program. To be enrolled in the honors program a student must maintain a grade-point average of at least 3.0 overall and in the major, (2) complete the undergraduate major in physiology stipulated above, (3) complete at least 6 units of course work or equivalent, and (4) submit a satisfactory thesis based upon the research work performed.

Graduate Program in Physiology

Students qualified for admission may elect a course of work leading either to the M.A. degree or directly to the Ph.D. degree in physiology. The M.A. degree is not prerequisite for the Ph.D. degree. Candidates for the M.A. degree must have completed the equivalent of the requirements for the undergraduate major shown above, in addition to the minimum requirements for the particular graduate degree as follows:

1. The M.A. degree in physiology is to be earned according to Plan I of the Graduate Division, which includes the satisfactory completion of 20 units of course work and a thesis.

2. The Ph.D. degree in physiology. Required: Biochemistry 102 (4) or 100A-100B (4-4); Chemistry 130A (2-5), and another course in physical chemistry or a quantitative science and at least one year of graduate teaching with the graduate advisor; a course in statistics; at least eight units of upper division or graduate courses each in physiology and morphology; and at least 15 units of upper division or graduate courses in the area of concentration.

Preliminary oral exams are mandatory for all Ph.D. students following their first year of study.

Before advancement to candidacy for the Ph.D. degree the student must (a) demonstrate ability to make an accurate written translation from the physiological scientific literature in two of the languages approved by the department(s) (e.g., French, German, Russian, or computer language); (b) be sponsored by a major professor for dissertation research; and then pass an oral qualifying examination to test general knowledge of physiology and related subjects which are approved by the chair of the graduate advisers. On passing the oral examination the student may receive the degree of Candidate in Physiology.

All candidates for the Ph.D. degree must acquire teaching experience equivalent to a minimum of one semester of full-time teaching as a graduate student instructor (e.g., two semesters of one-half-time or four semesters of one-quarter-time teaching). A dissertation is required based upon original research according to Plan B of the Graduate Division.

For further details concerning the graduate degrees please consult the graduate advisers in physiology.

Graduate Program in Anatomy

In addition to meeting the general requirements of the Graduate Division, the student must have had the following courses, or their equivalents, before proceeding to the graduate program in Anatomy: Biology 1A-1B (4-4); Chemistry 1A-1B (4-4); Chemistry 5 (3), Chemistry 8A-8B (4-4); Mathematics 1A-1B (3-3); Physics 1A-1B (4-4); Psychology 102 (3-4); and Biochemistry 102 (4). An adequate reading knowledge in two of the languages approved by the department(s) (e.g., French, German, Russian, or computer language) is also recommended before proceeding to the oral qualifying examination, which covers the major subdivisions of anatomy and related fields. A dissertation based upon original research is to be prepared according to Plan B of the Graduate Division.

Preliminary oral exams are mandatory for all Ph.D. students following their first year of study.

*On leave, spring
†Recipient of Distinguished Teaching Award
139. Computer Simulations in Physiology. (3) Formerly 39. Must be taken on a passed/ not passed basis. One 1-hour lecture and two 3-hour laboratories per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). Basic laboratory techniques and computer concepts. Class sessions and reading assignments present special topics in physiology which are particularly suitable for computer simulation. Students will be required to use microcomputers to set up standard simulations to be followed by their original problems. (SP) Timiras, Rosenberg

141. Physiology of the Endocytoces. (3) Three 1-hour lectures per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). Mole-
cular mechanisms by which microorganisms elicit specific biological responses and regulate gene expression; hormone-receptor interactions; synthesis, transport and targeting of hormones. (SP) Macey

142. Molecular Endocrinology. (3) Three 1-hour lectures per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). Molecular mechanisms by which microorganisms elicit specific biological responses and regulate gene expression; hormone-receptor interactions; synthesis, transport and targeting of hormones. (SP) Macey

150. Physiology and Pathology of Oxygen. (2) Two 1-hour laboratory periods per week. A lower division undergraduate course in biophysics and biochemistry. Molecular biology: transport and consumption of oxygen. The role of oxygen in energy generation and in the regulation of physiological and pathological processes. Mutants, vitamins, and food substances that counteract oxygen toxicity. (F) Packer,

213. Seminar in Membranes and Transport. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: Graduate standing and consent of instructor. Current research on membrane structure and function. (SP) Forte

214. Intracellular Signaling. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: 101 or consent of instructor. Experimental methods for studying some of the mechanisms by which one part of a cell can tell another what to do: changes in membrane potential and ion fluxes, pH, free radicals, cyclic nucleotides, protein phosphorylation, lipid pathways. (F) Tsien

216. Seminar in Neuroendocrinology. (1) Course may be repeated for credit. One 1-hour lecture per week. Prerequisites: Consent of instructor. Current research in the field will be considered. Offered odd years. (SP) Nicoll

217. Free Radicals and Oxygen Toxicity In Biology. (2) Course may be repeated for credit. One 1-hour lecture per week. Prerequisites: 101 or consent of instructor. Chemistry of free radicals and activated species; generation of free radicals and singlet oxygen in vivo and in vitro methods of detection, including spin trapping and chemiluminescence; biological defense mechanisms; oxidative damage; photodynamic effects; benefits and liabilities of oxygen toxicity to cells; physiological mechanisms involving free radicals and singlet oxygen. (SP) Timiras, Packer

220. Advanced Methods in Cell Physiology. (3) New course. One 1-hour lecture and 6 hours of laboratory per week. Prerequisites: P100L, P101L, graduate status. Modern approaches to the study of cell and membrane function including fluorimunence specroscopy, electron spin resonance, rapid quench kinetics, microelectrode measurements, gel electrophoresis, phospholipid blyer studies, receptor identification, hormonal activation effects. (SP) Forte, Macey, Machen, Firestone, Moore

*241. The Endocrine Glands. (3) Three 1-hour lectures per week. Prerequisites: 100-101; organic chemistry; biochemistry. The endocrine glands of mammals and the metabolic reactions mediated by their hormones. (SP) Timiras, Rosenberg

242. Seminar In Endocrine Physiology. (1) Course may be repeated for credit. One 2-hour discussion per week. Prerequisites: Consent of instructor. Laboratory techniques and computer concepts. Class sessions and reading assignments present special topics in physiology which are particularly suitable for computer simulation. Students will be required to use microcomputers to set up standard simulations to be followed by their original problems. (SP) Timiras, Rosenberg

106. Survey of Mammalian Physiology. (3) Students who have taken 100, 101 will receive no credit for 105. Three 1-hour lectures per week. Prerequisites: Anatomy 101, Physiology 101-102. The physiological function of mammalian systems, including integrated function of brain and muscular systems; study of function of cells, tissues and organs. (SP) Timiras, Rosenberg, Winer

109L. Laboratory of Mammalian Physiology. (2) Students who have taken 100L or 101L will receive no credit for 109L. One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: Anatomy 101, Physiology 101. Physiology 109 should be taken concurrently. Laboratory experiments demonstrating the functional mechanisms underlying life processes in mammalian systems. (SP) Timiras, Rosenberg

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual laboratory research for students. Prerequisites: Consent of instructor. Undergraduate research by small groups. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Undergraduate research by small groups. (F,SP) Staff

Graduate Courses

*211. Seminar in Epithelial Physiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion per week. Prerequisites: Graduate standing and consent of instructor. Advanced topics in epithelial transport will be considered. (SP) Tsien

*212. Seminar in Cell Physiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: Graduate standing and consent of instructor. Current research on cell structure and function. (SP) Forte

191. Upper Division Courses

100. Organ Physiology. (5) Formerly 100B. Five 1-hour lectures per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). Recommended: a course in vertebrate anatomy. Physical and chemical basis of organ and tissue function. Vascular and endocrine functions in mammals, including endocrine, cardiovascular, respiratory, gastrointestinal and renal systems. (F) Forte, Macey, Nicoll

100L. Organ Physiology Laboratory. (1.5) Formerly 101B. One 4-hour laboratory and one 2-hour discussion or demonstration on alternate weeks. Prerequisites: 100 (or concurrent enrollment). Basic laboratory techniques and experiments in endocrinology, organ physiology and tissue fluids. (F) Forte, Firestone

101. Cellular and Neural Physiology. (5) Formerly 100A. Four 1-hour lectures and two 1-hour discussions per week. Prerequisites: 100 (or concurrent enrollment). One semester of full time teaching as a graduate assistant required. One 2-hour discussion per week. Prerequisites: Computer concepts. Class sessions and reading assignments present special topics in physiology which are particularly suitable for computer simulation. Students will be required to use microcomputers to set up standard simulations to be followed by their original problems. (SP) Timiras, Rosenberg

139. Computer Simulations in Physiology. (3) Formerly 39. Must be taken on a passed/ not passed basis. One 1-hour lecture and two 3-hour laboratories per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). One 1-hour lecture and two 3-hour laboratories per week. Prerequisites: Biology 1A-1B, Chemistry 6A-6B, Biochemistry 102 (or concurrent enrollment). Basic laboratory techniques and computer concepts. Class sessions and reading assignments present special topics in physiology which are particularly suitable for computer simulation. Students will be required to use microcomputers to set up standard simulations to be followed by their original problems. (SP) Timiras, Rosenberg

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual laboratory research for students. Prerequisites: Consent of instructor. Undergraduate research by small groups. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Undergraduate research by small groups. (F,SP) Staff

Graduate Courses

*211. Seminar in Epithelial Physiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion per week. Prerequisites: Graduate standing and consent of instructor. Advanced topics in epithelial transport will be considered. (SP) Tsien

*212. Seminar in Cell Physiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: Graduate standing and consent of instructor. Current research on cell structure and function. (SP) Forte

213. Seminar in Membranes and Transport. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: 101 or consent of instructor. Experimental methods for studying some of the mechanisms by which one part of a cell can tell another what to do: changes in membrane potential and ion fluxes, pH, free radicals, cyclic nucleotides, protein phosphorylation, lipid pathways. (F) Tsien

216. Seminar in Neuroendocrinology. (1) Course may be repeated for credit. One 1-hour lecture per week. Prerequisites: Consent of instructor. Current research in the field will be considered. Offered odd years. (SP) Nicoll

217. Free Radicals and Oxygen Toxicity In Biology. (2) Course may be repeated for credit. One 1-hour lecture per week. Prerequisites: 101 or consent of instructor. Chemistry of free radicals and activated species; generation of free radicals and singlet oxygen in vivo and in vitro methods of detection, including spin trapping and chemiluminescence; biological defense mechanisms; oxidative damage; photodynamic effects; benefits and liabilities of oxygen toxicity to cells; physiological mechanisms involving free radicals and singlet oxygen. (SP) Timiras, Packer

220. Advanced Methods in Cell Physiology. (3) New course. One 1-hour lecture and 6 hours of laboratory per week. Prerequisites: P100L, P101L, graduate status. Modern approaches to the study of cell and membrane function including fluorimunence specroscopy, electron spin resonance, rapid quench kinetics, microelectrode measurements, gel electrophoresis, phospholipid blyer studies, receptor identification, hormonal activation effects. (SP) Forte, Macey, Machen, Firestone, Moore

241. The Endocrine Glands. (3) Three 1-hour lectures per week. Prerequisites: 100-101; organic chemistry; biochemistry. The endocrine glands of mammals and the metabolic reactions mediated by their hormones. (SP) Timiras, Rosenberg

242. Seminar In Endocrine Physiology. (1) Course may be repeated for credit. One 2-hour discussion per
243. Seminar in Molecular Mechanisms of Hormone Action. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour discussion per week. Prerequisites: Physiology 101 or consent of instructor. Current experimental methods for studying the structure and function of cellular organelles, including membrane biogenesis, intracellular transport, protein sorting and targeting, secretion, receptor-mediated endocytosis. Emphasis will be placed on specializations of nerve cells. (SP) Moore

246. Sensory Physiology. (2) One 1-hour lectures per week. Prerequisites: 100-101 or consent of instructor. Translation, coding and information processing in sensory systems. Correlation of findings from neuro-physiology, psychophysics and perception. (F) Weatherhead

251. Seminar in History of Neurophysiology. (1) Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture per week. Prerequisites: Consent of instructor. Selected readings in classical texts of physiology with emphasis on the historical development of ideas about the nervous system. (F) Freeman

272. Advanced Topics in Physiological Transport. (2) One 1-hour seminar-workshop and one 2-hour laboratory per week. Prerequisites: Course in differential and integral calculus; 172 or concurrent enrollment in 172 is required. Recommended: Course in elementary physics, or in physical chemistry. Introduction to passive transport across cell membranes. Identification of passive, facilitated and active transport processes in cell membranes of single cells and heterocellular epithelia. Workout of group exercises and discussion of laboratory literature. Laboratory will involve modeling and computer simulation of various transport systems. (SP) Macey, Forte

282. Seminar in Development and Aging. (1) Course may be repeated for credit. One 2-hour discussion per week. Prerequisites: Consent of instructor. Lectures by visiting speakers active in the areas of development and aging, with particular emphasis on the neuroendocrine systems, as well as presentation and evaluation of research in these areas conducted by seminar participants. (FSP) Timiras

290. Seminar in Neurobiology. (1) Course may be repeated for credit. One 2-hour discussion per week. Prerequisites: Consent of instructor: Discussions and readings in special topics to be varied each semester. (FSP) Freeman, Zucker, Westheimer

292. Department Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture per week. Departmental seminar dealing with various topics in functional neuroanatomy. (FSP) Staff

293. Seminar in Physiology and Anatomy Research. (1) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Graduate standing in Physiology or Anatomy. Seminar on current research in areas of interest by departmental faculty to familiarize entering students with opportunities for graduate research. (F) Staff

298. Special Study in Physiology. (1-12) Course may be repeated for credit. Individual arrangements to be made. Prerequisites: Consent of instructor. Graduate credit may be given for qualified independent study. (FSP) Staff

299. Individual Research in Physiology. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual arrangements to be made. Prerequisites: Consent of instructor. Original research in physiology by graduate students. (FSP) Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major professor. Prerequisites: For candidates for Ph.D. Intended to provide an opportunity for qualified students to pursue for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (FSP) Staff

Professional Courses

290. Supervised Teaching of Physiology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion and six hours of practice in tutoring physiology per week. Prerequisites: 101 or 101 and consent of instructor. Development of traditional and nontraditional teaching methods, and their practical application to physiology instruction.

302. Practice of Teaching Physiology. (2) Course may be repeated for credit for severa up to four units. Must be taken on a satisfactory/unsatisfactory basis. Weekly conference with instructor and teaching hours as assigned. Prerequisites: Appointment as a graduate student instructor. Teaching laboratories, and/or discussions for physiology, or IDS courses; analysis of specific format and problems. (FSP) Staff

492. Physiological Instrumentation. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and two hours of laboratory per week. Prerequisites: Graduate standing in physiology or IDS courses; consent of instructor. Instruction in the design and construction of mechanical instruments, application of individual mechanical instrumentation projects to monitoring of physiological parameters. (F) Zucker

Anatomy

242. Anatomy. Lower Division Courses

29. The Brain: Its Potential. (2) Must be taken on a passed/not passed basis. One 2-hour per week. Prerequisites: 101 and 102, or consent of instructor. Development of traditional and nontraditional teaching methods, and their practical application to physiology instruction. Beginning at the cellular level and working into the systems of the brain. (SP) Offered even years. Diamond

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Consent of instructor required. Individual research by lower division students. (FSP) Staff

Upper Division Courses

105. Histophyology. (4) Two 1-hour lectures, one 1-hour discussion and one 3-hour laboratory per week. Prerequisites: Biology 1A-1B. The structural basis for the function of mammalian (particularly human) tissues and organ systems. Both light and electron microscopic levels of organization are considered. (SP) Bumsie

106. General Human Anatomy. (3) Three 1-hour lectures per week. Prerequisites: Biology 1A-1B or Chemistry 1A-1B. The functional anatomy of the human body as revealed by gross and microscopic examination. Designed to be taken concurrently with 103. (FSP) Staff

108L. General Human Anatomy Laboratory. (2) One 4-hour laboratory per week. Prerequisites: Biology 1A-1B or Chemistry 1A-1B, concurrent enrollment with 106 or following 106 required. Prepared human dissections, models and microscopic slides. May be taken concurrently with 108. (F) Diamond

110. Mammalian Neuroanatomy. (3) Two 1-hour laboratory each week. Prerequisites: Consent of instructor. Properties of neurons and neural systems in terms of their structures and functions. Examination of various transport systems. Offered odd years. (SP) Winer

151. Developmental Anatomy. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: *Not offered 1988-89

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Undergraduate research by small groups. (FSP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Undergraduate research by small groups. (FSP) Staff

203. Functional Neuroanatomy. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Consent of instructor: Development, structure (gross and microscopic) and functional relationships of the mammalian nervous system. (SP) Diamond

205. Systematic and Regional Human Anatomy. (7) Three 1-hour lectures; three 4-hour laboratories per week. Prerequisites: Anatomy 151 or Biology 108 or other advanced work in mammalian biology; consent of instructor required. Dissection, x-ray and surface anatomy of the body, with special reference to the functional capacities of the structure examined. (FSP) Srebnik

206. Seminar in Advanced Neuroanatomy. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour lectures per week. Prerequisites: Consent of instructor. Current research in functional neuroanatomy. Offered odd years. (SP) Diamond

210. Anatomy of Human Development. (3) Two 1-hour lectures per week. Prerequisites: Graduate standing in biological science. Informal conferences and demonstrations. Outside reading required. (FSP) Srebnik

211: Seminar in Contemporary Neuroanatomical Techniques. (2) Course may be repeated for credit. One 1-hour lecture per week. Prerequisites: Consent of instructor. Current research in mammalian and amphibian transport mechanisms in sensory and motor systems. (F) Winer

298. Special Study in Anatomy. (1-12) Course may be repeated for credit. Individual arrangements to be made. Prerequisites: Consent of instructor. Graduate research by small groups. (FSP) Staff

299. Individual Research in Anatomy. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual arrangements to be made. Prerequisites: Consent of instructor. Individual research by graduate students. (FSP) Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. May not be used, ** bitten, spring

*Recipient of Distinguished Teaching Award
for unit or residence requirements. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major professor. Prerequisites: For candidates for Ph.D. intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of the candidate for the Ph.D. (F,SP)  Staff

Professional Courses

302. Practice of Teaching Anatomy. (2) Course may be repeated for two semesters up to four units. Must be taken on a satisfactory/unsatisfactory basis. Weekly conference with instructor and teaching hours as assigned. Prerequisites: Participation in a seminar of teaching assistant. Teaching laboratories, discussions for Anatomy, Biology, or IDS courses; analysis of specific format and problems. (F,SP)  Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 112. Mammalian Neurophysiology. (3) Two 1-hour lectures per week, each followed by a 1/2-hour discussion section. Prerequisites: Biology 1A-1B or consent of instructor. Properties of neurons and neural systems in terms of their function in relation to reflex and goal-directed behavior. Sponsoring departments: EECS and Physiology-Anatomy. (SP)  Weibrin, Freeman

IDS 114A-114B. Advances in Aging: Alzheimer’s Disease; Biological and Social Dimensions. (2,2) One 3-hour lecture per week in the evening. Prerequisites: High school biology and chemistry. This interdisciplinary curriculum will single out specific topics in aging of great current interest (fall, Alzheimer’s Disease; spring, Strategies for Intervention) and present lectures on all aspects of each topic (biomedical, health, social, economic, legal, and ethical). Invited speakers with special expertise in these areas will participate. Credit for the course will be based on a term paper. Sponsoring departments: Optometry, Physiology-Anatomy, Public Health, Social Welfare. (F,SP)  Timiras, Minkler

Graduate Courses

IDS 200A. Cellular Neurobiology. (3) Two 1-1/2 lectures per week. Prerequisites: Chemistry 1B, Mathematics 1B, Physics 88, and an introductory neurobiology course. Physical-chemical basis of membrane potentials, electrotonus, action potential generation and propagation, synaptic transmission, receptor function, and volume conductor potentials. Sponsoring departments: Physiology-Anatomy, Biophysics, and EECS. (F)  Owen, Lecar, Lewis

IDS 200B. Integrative Neurobiology. (3) Two 1-1/2 lectures per week. Prerequisites: IDS 111 or Zoology 121. In-depth consideration of current research questions central to the understanding of the organization of nervous systems, and of the behavior mediated by these systems. When appropriate these questions are illustrated with examples drawn from both the vertebrate and invertebrate literature. Circuit, networks, or system analogs and analysis will be emphasized where these approaches lend clarity. Sensitive integration is discussed in small groups in terms of the development of current research questions central to the understanding of the nervous system and of the behavior mediated by these systems. When appropriate these questions are illustrated with examples drawn from both the vertebrate and invertebrate literature. (F)  Amundson

IDS 200L. Neurobiology Laboratory. (5) Two 6-hour laboratories plus one 3-hour demonstration per week. Prerequisites: IDS 200A-200B. (200A may be taken concurrently) or consent of instructor. Intended to provide the graduate and advanced undergraduate students with a working knowledge of current anatomical, physiological, and behavioral techniques in neurobiology through demonstrations, discussions, and individual research projects. Topics include synaptic transmission, excitable membranes, sensory reception, and circuits of neural generating behavior. Sponsoring departments: Physiology-Anatomy, Biophysics and Medical Physics, and Zoology. (SP)  Weibrin, Freeman

IDS 282. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and discussion per week. Prerequisites: Consent of instructor. Reviews and reports of current research in tumor biology. Sponsoring departments: Biomedical and Environmental Health Sciences, Zoology, Physiology-Anatomy, and Microbiology. (F,SP)  Nandy, Bern, Bloor, Nicol, Bushing

IDS 285. Systems and Integrative Biology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar/lecture every other week. Prerequisites: Graduate standing in biophysics, bioengineering, nutritional sciences, or physiology. Presentation and discussion of current research in integrative, developmental, and regulatory biology. Emphasis on interdisciplinary communication and approaches. Sponsoring departments: Biophysics and Medical Physics. (F,SP)  Forte, Suskind, Hayes, Williams  Staff

Undergraduate Programs

Plant and Soil Biology

The major in plant and soil biology provides academic training in basic biological concepts of soil-plant interactions. The curriculum is broadly based, covering chemical, physical, and biological aspects of soils, as well as soil-plant relationships, plant nutrition, plant physiology and biochemistry. The curriculum in plant and soil biology provides excellent undergraduate preparation for graduate studies in soil science and other natural resource fields. The bachelor's degree qualifies students for employment as soil scientists with public agencies or various firms and laboratories doing environmental consulting, crop management, and soil testing.

Soil Resource Management

The curriculum in soil resource management is excellent preparation for professional and applied scientific employment in soil conservation and environmental protection. Graduates in the major achieve an understanding of the scientific principles underlying soil resource classification, evaluation and inventory.

Graduate Programs

The department participates in programs of graduate study leading to the M.S. and Ph.D. degrees. These emphasize background training, the development of concepts, laboratory research, and scientific leadership. Areas of emphasis include interdepartmental graduate programs in soil science, plant physiology, mineralogy, and agricultural and environmental chemistry. Areas of specialization include plant nutrition and environmental plant physiology, soil microbiology, chemistry and biochemistry, soil-plant relationships, nutrient cycling, salinity research, forest soils, soil-root interactions, pedology, land use, and radiobiology.

Lower Division Courses

10. Soils and Their Significance to Society. (3) Three 1-hour lectures per week. Introduction to soils, their relationship to ecosystems, their significance to society, and interpretation of soil properties for land-use decisions. (F)  Gersper

Upper Division Courses

100. Soil Characteristics. (4) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Chemistry 1A-1B. Introduction to physical, chemical, and biological properties of soils; methods of soil description, identification, geographic distribution, and uses; the role of soil in supplying water and nutrients to plants; aspects of soil as a habitat for organisms. Soil management for agriculture and forestry will also be discussed. (F)  McColl

101. Development and Morphology of Soils. (2) Two hours of lecture per week. Prerequisites: 100 or equivalent. Interdisciplinary courses in geology and biology. Development, morphology, and classification of soils as related to climate, biota, geography, and topography, and time. Soils as a functioning component of ecosystems. (F)  Amundson

101F. Field Study of Soil Development. (1) Eight field trips per semester. Prerequisites: Consent for current enrollment in 101. The field study of soil development and morphology as related to climate, biota, geology, topography, and time. Involves eight day-long Saturday field trips to locations surrounding the Bay Area. (SP)  Amundson
102. Soil Physics. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: 100 and Math 16A. Analysis of important physical processes occurring in soils and of the soil physical properties affecting them. Offered even numbered years. (F) Waidron

105. Summer Field Course. (6) Prerequisites: 100, 101, or 103. Field observations with lecture/demonstrations throughout California. Eight hours per day of field or lecture, five days per week, plus travel time for six weeks. Field study of soils with emphasis on their characteristics, morphological, and genesis. Field exercises in classifying/monitoring soils and preparation of survey reports. Practice in evaluating soils for agriculture, range, forest, and other uses. Extraassess. Amundson

110. The Soil As a Medium for Plant Growth. (3) Three hours of lecture per week. Prerequisites: Chemistry 1A-1B and 8A. Chemical, physical, and biological processes which control nutrient availability in soil-plant systems, ion movement, water potential relations, plant-microbial interactions emphasized. Characteristics and causes of acid, alkaline, and saline soils. (F) Staff

111. Soil Microbiology. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B or 11A-11B. Introduction to soil microorganisms; their diversity and their activities in relation to soil organic matter, soil properties, the rhizosphere, and biogeochemical cycling. (SP) Firestone

111L. Soil Microbiology Laboratory. (2) One 3-hour laboratory and one 1-hour lab per week. Prerequisites: 111 (to be taken concurrently). Laboratory work to acquaint the student with soil microorganisms, their isolation and handling, and the measurement of their activities in soil. Planned to accompany lectures in 111. (SP) Firestone

112. Soil Chemistry. (2) Two hours of lecture per week. Prerequisites: 100, 101, or 110. Physicochemical properties influencing the sorption and solubility of plant nutrient and other important elements in soils. (SP) Doner

112L. Soil Chemistry Laboratory. (2) Two 3-hour labs per week. Prerequisites: 100, 101, 110. The application of routine and special laboratory techniques for the study of soil chemical properties. (SP) Doner

115. The Nutrition of Green Plants. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. Evolution of modern concepts of plant nutrition, including functional aspects of inorganic nutrients, photosynthesis, and nitrogen metabolism. (SP) Staff

117. The Nutrition of Green Plants Laboratory. (3) One hour of lab and six hours of laboratory per week. Prerequisites: Biology 1A-1B. Principles of mineral nutrition of plants illustrated by laboratory and greenhouse experiments. (F) Staff

161. Soil and Water Conservation. (2) Two hours of lecture per week, plus 2 hours of management per week. Prerequisites: 100 or equivalent, or consent of instructor; 101 or equivalent recommended. Review of land-use patterns and land-management practices in relation to soil resource suitability and soil-vegetative impact. Evaluation of soil use change and repercussions of land misuse. Interpretation of soil research data and soil survey information in making land-use decisions. Offered even-numbered years. (F) Geraper

169. Senior Seminars. (1) One hour of student seminars and one hour of discussion per week. Prerequisites: Senior standing in soil resource management or plant and soil biology. Student seminars directed to integration of the economic, social, and political aspects of soil resource management or plant and soil biology. (SP) Staff

188. Directed Group Study. (1-3) May be repeated for credit. Must be taken on a pass/no-pass basis. Can be taken 1 hour per week for 1-3 units. Prerequisites: Upper division standing. Selected topics in

202. Soil Physics. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 102. Special topics in soil physics and physics of the plant environment with emphasis on the soil-plant-atmosphere flow of water. Offered odd-numbered years. (SP) Waidron

211. Advanced Soil Microbiology and Biochemistry. (2) Course may be repeated for credit. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 111: Microbial processes and their role in soil nutrient transformations. The ecology of microbes in the soil environment. Origin, nature and properties of soil organic matter. Offered even-numbered years. (F) Firestone

212. Advanced Soil Chemistry. (2) Two hours of lecture per week. Prerequisites: 112; Chemistry 130A. Application of chemical thermodynamics to soil systems; mechanisms of sorption on soil materials. Offered odd-numbered years. (SP) Doner

235. Seminar in Soil Science. (1) Course may be repeated for credit. One hour of seminar and one hour of discussion per week. Prerequisites: Graduate standing in soil science, plant physiology, or related field. Graduate student seminars on selected topics in soil science. (FSP)

236. Seminar in Plant Physiology. (1) Course may be repeated for credit. One hour of seminar and one hour of discussion per week. Prerequisites: Graduate standing in appropriate field. Graduate student seminars on selected topics in plant physiology. (FSP)

260. Research in Plant and Soil Biology. (1-12) Course may be repeated for credit. Four hours of research/ laboratory per week per unit. Prerequisites: Graduate standing in plant and soil biology. (FSP, SP)

601. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. Four hours of research/laboratory per week per unit. Prerequisites: Graduate standing in appropriate field. Individual study for the comprehensive or language requirements in consultation with the field adviser. (FSP, SP)

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Two 2-hour lectures or laboratories per week per unit. Prerequisites: Graduate standing in appropriate field. Individual study with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (FSP, SP)

Staff

199. Supervised Independent Study and Research. (1-4) May be repeated for credit. Must be taken on a pass/no-pass basis. One hour of lecture/discussion per week per unit. Prerequisites: Upper division standing. Selected topics in soil science for advanced undergraduates. (FSP, SP)

Graduate Courses

Plant Pathology

Department Office: 147 Hilgard Hall, 642-5121
Chair: Joseph G. Hancock, Jr., Ph.D.

Undergraduate Program

Plant Pathology involves the study of interactions among plants, pathogens, and their environment, with the objective of developing effective procedures for the protection of plants from disease. The subject area is exceptionally broad embracing the response of the plant to the environment and to disease agents such as bacteria, fungi, seed plants, and viruses. Plant pathologists are involved in the study of such diverse problems as host-parasite physiology, molecular genetics of pathogenicity, microbial ecology, and integrated pest management, utilizing cultural, chemical, molecular, genetic, and biological control approaches. Because of the fundamental importance of plants as food, fiber and recreational resources, the discipline makes an important contribution to human welfare.

To function as a professional plant pathologist, graduate training to the M.S. level is required, and the Ph.D. is highly desirable. A primary purpose of the undergraduate major in plant pathology is to prepare students for graduate work in the discipline. Because of the broad requirements, the major is also well suited for students who wish to obtain a strong background in plant biology or general microbiology. Lower division requirements are the same as those listed in Bioresource Sciences. For upper division requirements, see the Announcement of the College of Natural Resources.

Undergraduate Program in Bioenergetics

(See Molecular Plant Biology.)

Plant Pathology (College of Natural Resources)
Graduate Programs

This program is administered by the Department of Plant Pathology and offers graduate education leading to the M.S. and Ph.D. degrees. Applicants should have a bachelor's degree in plant pathology or an equivalent field that includes a broad background in physical and biological sciences, including bacteriology, biochemistry, molecular biology, plant cell biology, and plant physiology.

The field is primarily concerned with the study of plant diseases and protection of a wide range of crop plants from disease losses. The subject area is exceptionally broad, embracing the responses of the plant to the environment and to disease agents, such as bacteria, fungi, seed plants and viruses, as well as their control. This leads to research on fundamental problems such as host-parasite physiology, molecular genetics, comparative virology and microbial ecology. It includes applied programs such as integrated pest management and biological control. Areas of emphasis include biological deterioration of wood, epidemiology and diagnosis of plant diseases; forest pathology; physiology of pathogenic fungi and bacteria; and taxonomy, ecology, and behavior of soil-borne plant pathogens.

The department maintains extensive research facilities, including greenhouses and a broad range of specialized research equipment. One of the largest plant pathology reprint libraries in the world is also maintained.

Lower Division Courses

23. Introduction to Microbiology of Natural Resources. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: Biology: Chemistry 88.

Upper Division Courses

120. Plant Diseases. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Biology: Chemistry 1A-1B. An introductory course in plant diseases. Diseases play an important throughout the world as well as those important in California and include non-infectious diseases as well as those resulting from infection by bacteria, mycoplasma, fungi, viruses, nematodes and phorigermics. Studies in the laboratory with fresh or preserved material and information given in lectures. (F) Reabte

197. Field Study in Plant Pathology. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hours laboratory/discussion per week per unit. To be arranged. Supervised experience in off-campus organizations relevant to specific aspects of plant pathology. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hours of laboratory/discussion per week per unit. To be arranged. Prerequisites: Consent of instructor. Special topics will be offered from time to time. (F,SP) Staff

199. Supervised Independent Study and Research. (1-9) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hours of laboratory/discussion per week per unit. To be arranged. Prerequisites: Consent of instructor. Supervised independent study (upper division). (F,SP) Staff

200A. Advanced Plant Pathology. (4) Two 1-hour lectures and one 3-hour lab per week. Prerequisites: 120 or consent of instructor. History and development of concepts of plant pathology with emphasis on fungal plant pathogens, taxonomy, ecology and role of diseases of plant pathogenic fungi including problems in collection, cultivation, and identification of fungal pathogens. (F) Gordon, Hancock, Parmeter

200B. Advanced Plant Pathology. (4) Two 1-hour lecture and one 3-hour lab per week. Prerequisites: 120 or consent of instructor. The isolation, identification, characterization and taxonomy of plant pathogenic bacteria and viruses. The ecology, physiology and control of bacterial and viral plant diseases. (SP) Schiro, More

Graduate Courses

201. Seminar in Plant Pathology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar per week. An advanced research seminar on topics in plant pathology. (F,SP) Epstein

207. Epidemiology and Control of Plant Disease. (3) Three hours of lecture per week. Prerequisites: 120. Theory and practice of plant disease control and management. Chemical, cultural and biological, and genetic methods. Epidemiology of plant disease, inoculum-disease relationships, factors involved in the development of epidemics. (F) Linow

209. Molecular Plant Pathology. (2) Includes former 205. Two 1-hour discussions per week. Prerequisites: Consent of instructor. An integrated approach to the study of disease mechanisms at the molecular, biochemical and cellular level. Emphasis will be placed on using a genetic approach to study pathogenicity and mechanisms of disease resistance in higher plants. Opportunities and limitations for engineering agricultural crops for plant disease control will be covered. Offered even-numbered years only. (SP) Panopoulos

210. Disease of Plant Disease. (2) One hour of lecture and 5 hours discussion per week. Prerequisites: Consent of instructor. Trips to observe and discuss symptomology of diseases in nature, approaches to control, cultural practices for major California crops, and influences of crop management on disease development. (F,SP) Weinhold

211. Advanced Plant Virology. (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour of discussion per week. Prerequisites: 200A-B, and consent of instructor. Seminar discussion by graduate students of current research in the field of plant virology. (F) Morris

212. Advanced Soil Microbiology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: 200A-B, and consent of instructor. Seminar discussion by graduate students of current research in the field of soil microbiology with emphasis on plant pathogenic microorganisms and biological control. (F) Gordon, Huisman, Hancock

213. Molecular Basis of Plant Disease. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: 200A-B, and consent of instructor. Seminar discussion by graduate students of current research in the field of plant pathogenic bacteria. (SP) Schiro, Staskawicz

214. Plant Pathogenic Bacteria. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: 200A-B, and consent of instructor. Seminar discussion by graduate students of current research in the field of plant pathogenic bacteria. (SP) Schiro, Staskawicz

215. Topics in Forest Pathology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour discussion per week. Prerequisites: 200A-B and consent of instructor. Seminar discussion by graduate students of current research in the field of forest pathology. (SP) Parmeter, Cobo

288. Directed Group Study. (1-6) Course may be repeated for credit. Four hours lab/discussion per week per unit. Prerequisites: Consent of instructor. Special topics will be offered depending on interests of qualified students and availability of staff. (F,SP) Staff

299. Research in Plant Pathology. (1-12) Course may be repeated for credit. Four hours lab/discussion per week per unit. Prerequisites: Consent of instructor. Research in plant pathology. (F,SP) Staff

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Four hours of lab/discussion per week per unit. Prerequisites: Consent of instructor. Individual study for comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP) Hancock

602. Individual Study for Doctoral Students. (1-8) May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Four hours of lab/discussion per week per unit. Prerequisites: Consent of instructor. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Hancock

Political Economy of Industrial Societies

(College of Letters and Science)

Group Major Office, Institute of International Studies, 209 Moses Hall, 642-4466

Major Adviser: Mr. Rosberg and Mr. Martic (Institute of International Studies). Coordinators: Mr. Abrams (History); Mr. Aggarwal (Political Science); Ms. Bonnell (Sociology); Mr. Cohen (City and Regional Planning); Mr. Epstein (Business Administration); Mr. Feldman (History); Mr. Fishlow (Economics); Mr. Gregory (Political Science); Mr. Hammel (Anthropology); Mr. Janos (Political Science); Mr. Johnson (Political Science); Mr. Landau (Political Science); Mr. Reed (Geography); Mr. Rochlin (Institute for Governmental Studies); Mr. Saragoza (Chicana Studies); Mr. Seawright (Business Administration); Ms. Tyson (Economics); Mr. Ward (Economics); Mr. Wlensky (Political Science); Mr. Zysman (Political Science)

Group Major in Political Economy

Industrial societies have undergone a series of unexpected developments in recent years that have affected industrial democracies as well as developed socialist countries. These developments are difficult to understand by conventional means because of their diversity and complexity.

Because the political economy of industrial societies program stresses an interdisciplinary format, the program offers students a chance to study the nature of problems and opportunities with which industrial societies are confronted so as to better understand how problems may be solved and opportunities seized. The program has major diet priority to the historical, comparative, and analytical study of what industrial societies have in common and how they differ.

In order to achieve a better understanding of these issues, students in the program design their interdisciplinary plans of study in consultation with their faculty adviser. Within individual study plans, particular emphasis is placed on the institutions and values that have shaped, and sometimes created, the nature of contemporary events. Students also study the means available for planning and
problem solving in addition to examining the effects of current issues on the global scene.

For a detailed description of the program and course offerings please obtain a brochure from the Group Major Office.

Declaration of Major. Berkeley students must declare the major not later than the semester in which they are completing their 61st unit. Unless they declare the major before declaring, they must have completed two of the required lower division courses and must be enrolled in a third. Students transferring in their junior year should wait until the semester before declaring. They must have no more than 75 completed units and must have completed two of the lower division prerequisites and be in the process of completing a third.

Students will be admitted to PEIS if their grade-point average in courses relevant to the major is at least 3.2. Relevant courses include courses in business administration, economics, political science, history, mathematics, statistics, city planning, public policy, industrial psychology, and related resources, geography, and anthropology courses. In addition, the faculty committee reserves the right to review transcripts and statements of purpose and to interview the student seeking admission to the major with a grade-point average in relevant course work under 3.2. In reviewing these candidates, the committee will consider factors such as a demonstrated interest in graduate level work, independent research, special projects, etc.; b) extracurricular academic activities such as work, internships, participation in student conferences; and c) demonstrated ability to do advanced and intelligently state legitimate reasons for interest in the major in a five-page statement of purpose.

Please check with the Group Major Office regarding current eligibility requirements and application procedures. At the time of this catalog was published, renewal requirements may be changed.

Advising. In the major, great importance is assigned to advising. The purpose of advising is to give students' personal interests the appropriate academic orientation within the major's intellectual goals. When declaring, students must devise a plan of courses to complete the major, to be discussed and approved by a major adviser. Changes in the plan must also be approved by an adviser.

Lower Division. Economics 1. Introduction to Economics; History 5. Modern European History; History 7. U.S. History from the Civil War to the Present; Political Science 2. Comparative Politics; Statistics 2, 20, 21; or Anthropology 190A; optional: Mathematics 1A-1B (required only of students taking Economics 190A). Students must satisfy the mathematics requirement. Must be taken in addition to the other lower division requirements, not in lieu of them.)

Introductory courses on data processing and computer science are strongly recommended.

Upper Division. 30-36 units. Upper division courses are organized as follows: Methodology (two courses), introductory sequence (two courses), fields of concentration (seven courses).

Methodology. Economics 100A-100B or Economics 101A-101B.

Introductory Sequence. Political Science 138B or History 160 or 161 or Economics 115; and Political Science 120A or 126A or 126B.

Fields of Concentration. Seven Courses. No more than three courses from any one department may be used to fulfill the following course work:

I. Models of the Industrial State: three one-semester courses.


II. Systems of Interdependency: one one-semester course.

Agriculture and Resource Economics 231; Anthropology 148; Biology 150; Business Administration 188; Conservation and Resource Studies 110, 163; Economics 111B, 115, 162, 181, 182, 183; History 130A, 130B, 162A, 162B; Field Studies 196H; Interdepartmental Studies 100; Military Affairs 121, 145A, 145B, 171; Political Science 120A, 120B, 121, 122, 124A, 124B, 125, 126A, 127, 129C, 137A.

III. Planning and Policy Making: one one-semester course.

Business Administration 112, 130; City and Regional Planning 110, 112, 127, 250; Economics 125, 136, 152, 155, 156, 171, 172, 173; Geography 110; Mass Communications 103; Political Science 125, 138B, 182, 184, 185, 187A, 187C; Public Policy 170, 173, 174, 176, 177, 179, 180, 181, 184, 185, 189.

IV. Additional Field Courses: two one-semester courses.

Resource Management.

Human: Anthropology 115; Business Administration 150, 151, 154; Conservation and Resource Studies 160; Economics 121, 151, 157, 175; Geography 125; Legal Studies 145, 160; Political Economy of Natural Resources 141; Population Studies 110; Psychology 120; Sociology 113, 116, 126.

Environmental: Anthropology 148; Biology 150; Conservation and Resource Studies 110, 115, 150, 151, 163, 189; Economics 125, 155, 158; Energy and Resources 100; Geography 101, 120, 125, 130, 131, 132; Political Economy of Natural Resources 100, 101, 102, 151; Political Science 125; Public Policy 181; Sociology 125.

No course taken to fulfill major requirements may be taken passed/not passed.

Up to two substitutions of courses may be permitted in the major. Students may substitute an approved course not officially approved by the Executive Committee of the College of Letters and Science for use in the major program with approval from the Group Major Office concerning current eligibility requirements.

A maximum of three courses outside the College of Letters and Science may be included in the major, e.g., courses in business administration, city and regional planning, conservation and resource studies, education, engineering, political economy of natural resources, social welfare, and journalism.

Honors Program. Students accepted into the honors program will enroll in Political Economy of Industrial Societies H195A-H195B. Senior Honors Seminar (4). Students will write a thesis under the supervision of the seminar instructor. Please consult with the Group Major Office concerning current eligibility requirements.

Upper Division Courses

100A-100B. Scope and Methods of Research. (4,4) Three hours of lecture and one hour of discussion per week. A two-semester course. 100A is not prerequisite to 100B. Introduction to research methods available for the collection, interpretation, and use of information critical to the solution of the problems in which characterize industrialized and newly industrialized societies. The first semester focuses on methodological topics; the second considers the issues. A major paper is required. (F,SP)

150. Advanced Study in Political Economy of Industrial Societies. (3) Course may be repeated for credit as topics change. One 3-hour seminar per week. Prerequisites: Consent of instructor and background in political economy or related social sciences. Advanced, multidisciplinary research in current issues of political economy and industrialization. Students will write a thesis on a specific geographical area or topics with appropriate comparative materials included. A major research project is required as well as class presentation. Topics change each semester.

H195A-H195B. Senior Honors Thesis. (4,4) Credit and grade to be awarded upon completion of the sequence. Two 2-hour seminars per week. Prerequisites: Check with the department office for current requirements. The honors student is required to write a thesis on research performed in the H195A-H195B course. The thesis will be reviewed by a member of the faculty committee and approved by a selected group of the same committee. (F,SP)

Field Studies. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group meetings to be announced. Prerequisites: Upper division standing and consent of instructor. (F,SP)

Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual meetings to be announced. Prerequisites: Written proposal must be approved by a faculty adviser. Enrollment restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP)

Political Science

(College of Letters and Science)

Department Office: 210 Barrows Hall, 642-6333

Professors:

Joyoitinda Das Gupta, Ph.D.
Giuseppe Di Palma, Ph.D.
Lowell Dittmer, Ph.D.
James Gregory, Ph.D.
Ernesto Diaz, Ph.D. (Robson Research Professor of Government)
Nobman Jacobson, Ph.D.
Andrew C. Jenos, Ph.D.
Tom F. Jowell, Ph.D.
Robert A. Kagan, Ph.D.
Martin Landau, Ph.D.
Gail Lapidus, Ph.D.
Tod R. La Porte, Ph.D.
Eugene C. Lee, Ph.D.
William K. Miller, J.D., Ph.D.
Paul Seabury, Ph.D.
Kenneth N. Waltz, Ph.D.
Robert A. Kagan, Ph.D.
Michael P. Roglin, Ph.D.
Ceri G. Rosberg, D.Phil.
Robert A. Pollin, Ph.D. (Robson Research Professor of Government)
Paul H. Ralby, Ph.D.
Kenneth N. Waltz, Ph.D.
Aaron B. Wildavsky, Ph.D.
Harold L. Winters, Ph.D.

On leave, spring, fall

Recalled to active service

Recipient of Distinguished Teaching Award
The Major

The major in political science at Berkeley consists of a minimum of 13 courses: (a) four lower division courses; (b) Political Science 1, 2, 3, and 4 (equivalent courses approved by the department may be accepted in lieu of these); (b) two history courses, one in American history and one in Western European history; (c) one capstone course from the following list: I. American history: History 7A, 7B, 17A, 17B, 121A, 122, 123, 124A, 124B, 130A, 130B, 131A, or 131B. II. European history: History 3A, 3B, 5, 150A, 150B, 150C, 160A, 160B, 160C, 160D, 165A, or 165B. (These six lower division courses, or their upper division equivalents, are required, and four must be completed before declaration of the major.) (d) Upper division political science courses from those 4 unit offerings numbered 101-189 (or their equivalents).

Honors Program. Students who have acquired a minimum of 90 semester units, maintained a 3.3 grade-point average in both the major and overall course work undertaken at Berkeley, and completed at least two upper division political science courses at Berkeley are eligible to apply for the honors program. (H150A and H160B or H165A and H165B). Students generally are required to perform independent research and write a major paper or scholarly thesis, or participate in an honors seminar. However, students may not graduate with honors unless they have a GPA of 3.3 or higher overall and in the major in their record at the time of graduation. Interested students should consult the undergraduate adviser for more information and an application. Enrollment in the honors courses requires the written approval of a sponsoring faculty member.

Further Information. For updated information on the major, honors program offerings, undergraduate courses consent and faculty scheduling, contact the undergraduate office, 210A Barrows Hall. Booklets describing the undergraduate program for 1988-89 are available. For field or area concentrations of the major, honors program offerings, undergraduate office, 210A Barrows Hall. Booklets require the written approval of a sponsoring faculty member.

Higher Degrees. Inquiries should be addressed to the departmental graduate office, 210B Barrows Hall.

Lower Division Courses

1. Introduction to American Politics. (4) Students who have taken Political Science 100 will receive no credit for this course. Three hours of lecture and one or two hours of discussion per week. An introduction to the structure and operation of the American political system, primarily at the national level. (F,SP)

2. Introduction to Comparative Politics. (4) Three hours of lecture and one or two hours of discussion per week. This course deals with the basic problems and processes that all political systems face and examines their particular expression in western, communist, and third-world settings. (F,SP)

3. Introduction to Empirical Analysis and Quantitative Methods. (4) Three hours of lecture and one or two hours of discussion per week. Analytical and methodological problems of political inquiry, with an emphasis on quantitative analysis and measurement. (F,SP)

4. Introduction to Political Theory. (4) Three hours of lecture and one or two hours of discussion per week. An approach to the understanding of politics through the perspectives and language of the political theorist. (F,SP)

5. National Security Policy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course PS 52 may not receive credit for PS 20. Three hours of lecture and one hour discussion/conference per week. Analysis of the evolution, development, and formulation of U.S. national security policy. Fundamental concepts will be the translation of these concepts into specific policy objectives and supporting programs, the relationship to foreign policy, and current national security problems. (F,SP)

6. Upper Division Courses

- American Politics
- Political Theory
- Political Science
- Women and Politics
- Selected Topics in American Politics
- The Policy Process
112B. History of Political Theory. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 112A may not receive credit for 112B. Three hours of lecture and one hour of discussion per week. Early modern political thought up to the French Revolution, including Machiavelli, Hobbes, Utilitarianism, Marxism, and contemporary theory. (F,SP)

113A-113B. American Political Theory. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter courses 113A-113B may not receive credit for these courses. Three hours of lecture and two hours of discussion per week. Basic problems of political theory as viewed within the context of American history and institutions. (F,SP)

114. The Theorist and His Theory. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 114 may not receive credit for this course. Three hours of lecture per week. Prerequisites: One semester of 112 or 113. Intensive study of one great political theorist. Topic will vary with instructor. (F)

115A-115B. Marxist Political Theory. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 115 may not receive credit for quarter course 115B. Three hours of lecture and one hour of discussion per week. (F,SP)

117. Political Theory In Nonwestern Societies. (4) Students who have taken quarter course 145C may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: One semester of 112 or 113. Intensive study of one topic, problem, or intellectual movement in political theory. Topic will vary with instructor. (F,SP)

118. The Development of Marxist theory during Marx's lifetime. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 118A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: 118A. The development of Marxist theory during Marx's lifetime. (F,SP)

International Relations

120A. International Relations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 120A may not receive credit for 120A. Three hours of lecture and one hour of discussion per week. Comparative foreign policy. (F,SP)

120B. International Relations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 120B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: 120A. United Nations, Organization of American States, NATO, Warsaw Pact. Organization of African Unity, Arab League. (F,SP)

123. Selected Topics in International Relations. (4) Course may be repeated for credit with a different topic or consent of instructor. May be taken on a passed/not passed basis. Students who have taken quarter course 120C may not receive credit for 120C. Three hours of lecture and one hour of discussion per week. Prerequisites: 120A or 120B or consent of instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

124A. War and Politics In History. (4) May be taken on a passed/not passed basis. Students who have completed quarter course 124A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Theories of war: the relationship of politics to war in history; historical varieties of strategic doctrine; the implementing of strategy; the endings of war. (F,SP)

124B. Politics and Military Strategy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 124B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The interrelationships among military strategy, technology, science; relationships between strategic doctrine, national security concepts, and domestic politics. (F,SP)

125. Science, Technology and International Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 125 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: Non-majors welcome. Role of objective knowledge in the definition and solution of such international conflict issues as environmental degradation, arms control, resource technologies, nuclear weapons, and the type of institutions created to cope with these. (F,SP)

126A-126B. International Political Economy. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter courses 126A-126B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Economic concepts in the study of international political behavior. Political concepts influencing the choice of economic policies. (F,SP)

127. American Foreign Policy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 127 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Analysis of competing conceptual frameworks in American foreign policy. (F,SP)

130. American Political Movements. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 130 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: 129A or equivalent. A course on the American political movements of the 20th century. The role played by various political movements in U.S. domestic and international affairs. (F,SP)

131. Political Inquiry. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 131 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: Non-majors welcome. Role of objective knowledge in the definition and solution of such international conflict issues as environmental degradation, arms control, resource technologies, nuclear weapons, and the type of institutions created to cope with these. (F,SP)

132A-132B. Quantitative Methods for Political Science. (4,4) May be taken on a passed/not passed basis. Credit and grade to be awarded upon completion of the sequence. Students who have taken quarter course 132A may not receive credit for 132B. Three hours of lecture and one hour of discussion per week. Prerequisites: 132A is a prerequisite to 132B. Compressive introduction to research methods, statistical analysis, and computer usage in the social sciences. Emphasis on critical analysis and interpretation of existing empirical research and individual student research projects. Uses basic methodological needs of all political science majors. (F,SP)

133. Selected Topics in Quantitative Methods. (4) Course may be repeated for credit. May be taken on a passed/not passed basis. Three hours of lecture and one hour of discussion per week. Prerequisites: 131 or 132. See departmental announcements. Topic to vary with instructor. (F,SP)

Comparative Politics

136A. Theory in Comparative Analysis. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 136A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Major themes in comparative analysis. Political systems, culture, authority and other themes in the study of comparative politics. Subject matter will vary. See departmental announcements. (F,SP)

136B. Method in Comparative Analysis. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140C may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Prerequisites: 136A. Method in the field of comparative politics. Use of comparison in description, hypothesis-testing, and theory construction. Methodological issues that arise in comparing national units and in making comparisons across different cultures. (F,SP)

137A. Revolutionary Change. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 137A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The comparative method in the field of comparative politics. Use of comparison in description, hypothesis-testing, and theory construction. Methodological issues that arise in comparing national units and in making comparisons across different cultures. (F,SP)

137B. Revolutionary Movements. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 137B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Ideas as instruments of political action. A comparison of radical movements from the Middle Ages to the present day. The comparative method in the study of modern movements and institutions. (F,SP)

137C. Intellectuals In Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 137C may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Intellectuals as a social group in the process of modernization. Definitions of "intellectual," Renaissance antecedents, men of letters in the eighteenth century, the Romantic reaction. Intellectuals in the theories of Marx and his followers are the main course. (F,SP)
Three hours of lecture and one hour of discussion per week. The course provides an introduction to the study of political parties and party systems in democratic societies. It examines the historical origins of parties and party systems, the main lines of cleavage in democratic societies, and the impact of ideologies, electoral systems and parliamentary arrangements, governing coalitions, and the policy consequences of political parties. (F,SP)

139D. Comparative Political Economy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140D may not receive credit for 139D. Three hours of lecture and one hour of discussion per week. The course provides an introduction to political behavior. The effect on Southeast Asian politics of the law, the extension of suffrage, the emergence of political parties and of national citizenship. Special emphasis will be placed on the structure of politics as it has changed in the course of democratic development. (F,SP)

139E. U.S.-European Relations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 147F may not receive credit for 139E. Three hours of lecture and one hour of discussion per week. A lecture course which assumes no previous study of U.S.-European relations. This course will review the early history of the Atlantic Alliance, the development of South East European politics, and the transformation of Cold War politics from bipolar to multipolar. (F,SP)

140C. Selected Topics in Communist Politics. (4) Course may be repeated for credit with a different topic and consent of instructor. May be taken on a passed/not passed basis. Three hours of lecture and one hour of discussion per week. For details see departmental announcements. (F,SP)

140D. Selected Topics in Comparative Politics. Course may be repeated for credit with a different topic and consent of instructor. Students who have taken quarter course 149D may not receive credit for 140D. Three hours of lecture and one hour of discussion per week. For details see departmental announcements. (F,SP)

Area Studies

141A. Soviet Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 141A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The course provides an introduction to the origins of the USSR from Lenin through Brezhnev. Emphasis is placed on the study of the development of the Communist party of the USSR and the role of ideology in Soviet society. (F,SP)

141B. Soviet Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 141B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of the Communist party of the USSR from Lenin through Brezhnev. Emphasis is placed on the study of the development of the Communist party of the USSR and the role of ideology in Soviet society. (F,SP)

141C. East European Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 141D may not receive credit for 141C. Three hours of lecture and one hour of discussion per week. A study of the political process in relation to social structure and national diversity. A comparison of communist and prewar political systems and analysis of contemporary political developments. (F,SP)

142A-142B. Middle East Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter courses 142A or 142B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism, State building, authority, and social relations. (F,SP)

142B. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 146B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism, State building, authority, and social relations. (F,SP)

143A. Development Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 143A may not receive credit for 143B. Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism, State building, authority, and social relations. (F,SP)

143B. Northeast Asian Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 143A or 143B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. An examination of political institutions in China, Japan, and Korea. Emphasis upon such topics as nation-building, political modernization, and the nature of current political processes and problems. (F,SP)

144A-144B. Southeast Asian Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 144A may not receive credit for 144B. Three hours of lecture and one hour of discussion per week. An examination of political institutions in China, Japan, and Korea. Emphasis upon such topics as nation-building, political modernization, and the nature of current political processes and problems. (F,SP)

145A-145B. South Asian Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 145A or 145B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The study of political behavior. The effect on Southeast Asian politics of the law, the extension of suffrage, the emergence of political parties and of national citizenship. Special emphasis will be placed on the structure of politics as it has changed in the course of democratic development. (F,SP)

146A. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 146A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. An examination of political institutions in China, Japan, and Korea. Emphasis upon such topics as nation-building, political modernization, and the nature of current political processes and problems. (F,SP)

147A. Western European Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 147A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism, State building, authority, and social relations. (F,SP)

147B. Western European Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 147B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism, State building, authority, and social relations. (F,SP)

147C. British Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter courses 144A-144B may not receive credit for 147C. Three hours of lecture and one hour of discussion per week. An examination of political institutions in China, Japan, and Korea. Emphasis upon such topics as nation-building, political modernization, and the nature of current political processes and problems. (F,SP)

147D. Southern European Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 147D may not receive credit for this course. Three hours of lecture and one hour of discussion per week. An examination of political institutions in China, Japan, and Korea. Emphasis upon such topics as nation-building, political modernization, and the nature of current political processes and problems. (F,SP)

147E. U.S.-European Relations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 147E may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of political institutions and of political behavior. The effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

148A. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 148A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of political institutions and of political behavior. The effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

148B. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 148B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of political institutions and of political behavior. The effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

148C. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 148C may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of political institutions and of political behavior. The effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

148D. African Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 148D may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of political institutions and of political behavior. The effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)
especially the creation of NATO, and the conflicts that were common between the U.S. and Europe in the 1950s and 1960s. It will also focus on more recent sources of conflict, including detente, crisis outside of the NATO area, military burden sharing, money and trade. (F,SP)

147F. The Politics of France. (4) Three hours of lecture and one hour of discussion per week. The development of French politics in the context of the political institutions, groups and institutions of government. Economic and foreign policies. (F)

147G. Government and Politics of Germany. (4) Three hours of lecture and one hour of discussion per week. (F)

148A-148B. Latin American Politics. (4,4) Two 1 1/2-hour lectures and one hour of discussion per week. Political institutions, groups and parties in Latin American countries. Basic characteristics of political processes in Latin America; problems of political development and modernization and political change. Comparative study of political systems, institutions, groups and political culture. (F,SP)

Public Law and Jurisprudence

149. Selected Topics In Area Studies. (4) New course. Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. For details see departmental announcements. Topic will vary with instructor. (F,SP)

150. The American Legal System. (4) Students who have taken 150A during the 1983-84 or 1984-85 academic year will receive no credit for 150. Two 1 1/2-hour lectures and one hour of discussion per week. The nature of the American legal system; the interrelationships of judges, lawyers, police, political officials, bureaucrats, press, and general public; the political and social aspects of the legal process. (F)

151. The Jury System. (4) Students who have taken 151B during the 1983-84 or 1984-85 academic year will receive no credit for 151. Three hours of lecture and one hour of discussion or conference per week. The place of the jury in the judicial and political system. Selection and behavior of juries on the local, state, and federal level. (F,SP)

157A-157B. Constitutional Law of the United States. (4,4) Two 1 1/2-hour lectures and one hour of discussion per week. Fundamental principles of constitutional law, leading cases, causes, and consequences of legal decisions.

A. The Federal System

B. Civil Liberties (F,SP)

158. Selected Topics In Public Law and Jurisprudence. (4) Two 1 1/2-hour lectures and one hour of discussion per week. For details see departmental announcements. (F,SP)

Political Behavior

161. Public Opinion, Voting and Participation. (4) Three hours of lecture and one hour of discussion per week. The nature of public opinion, attitude formation, electoral turnout and choice, political cleavages, the role of the mass public. (F,SP)

162. Communications and Politics. (4) Three hours of lecture and one hour of discussion per week. The role of mass communication, propaganda, political persuasion, and information campaigns in the political process. (F)

164A. Political Psychology and Involvement. (4) Three hours of lecture and one hour of discussion per week. Personality factors in political behavior; psychological roots of decision-making; leadership; psychological sources of political belief; conflict theory. (F)

164B. Political Psychology and Involvement. (4) Three hours of lecture and one hour of discussion per week. Extreme belief, protest and violence, ideology socialization, political recruitment, participation to political activity and office. (SP)

188A-168B. Seminar In Political Behavior. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 168A or 168B may not receive credit for 168A-168B. Three hours of lecture and one hour of conference per week. Prerequisites: For advanced undergraduates and graduate students with consent of instructor. Review of major topics in political behavior through examination of theories, findings, and significant studies in the field. Topics: ideology, voting participation, party identification, political conformity, tolerance, dissent, personality and group influence on political beliefs and conduct. (F,SP)

169. Selected Topics In Political Behavior. (4) Three hours of lecture and one hour of discussion per week. For details see departmental announcements. (F,SP)

Sub-National Government and Politics

170. Comparative State Politics. (4) Two 1 1/2-hour lectures and one hour of discussion per week. The role of the states in the federal system: the structure and operation of state governments, including political institutions, parties, interest groups, and the determinants of policy outcomes. (SP)

171. California Politics. (4) Two 1 1/2-hour lectures and one hour of discussion per week. An inquiry into the political environment of the state—historical, economic, geographic, and political factors. (SP)

175A. Urban and Metropolitan Government and Politics. (4) Two 1 1/2-hour lectures and one hour of discussion per week. The roles of various levels of government—local, regional, state, and national, in politics and policy-making in metropolitan regions. (F)

175B. Urban and Metropolitan Government and Politics. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Metropolitan regional planning, decision-making, and administration. (SP)

177A-177B. Political Internship Program. (4,4) Must be taken on a passed/not passed basis. Three hours of lecture; 15-20 hours field work per week. Prerequisites: Consent of faculty sponsor and department chair. Juniors and seniors only. Supervised experience in field positions with California state and local governments for 15-20 hours per week, and coordinated course work. (F,SP)

178. Selected Topics In Subnational Politics. (4) Two 1 1/2-hour lectures and one hour of discussion per week. For details see departmental announcements. (F,SP)

179. Undergraduate Colloquium In Political Science. (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour of lecture per week. Political issues facing the state of California, the United States, or the International community. (F,SP)

Public Organization, Administration, and Policy

181. Public Organization, Administration, and Policy. (4) Three hours of lecture and one hour of discussion per week. The methods used to manage the power of the bureaucracy in the American political system. An introduction to theories of organizational behavior. The effects of administrative structure upon the creation and distribution of public benefits. (F,SP)

182. Public Policy and Administration in Developing Countries. (4) Three hours of lecture and one hour of discussion per week. The political economy of policy-making and administration of government in developing countries. (F)

183. Administrative Behavior. (4) Two 1 1/2-hour lectures and one hour of discussion per week. The dynamics of public policy formulation, within bureaucratic organizations; the influence upon public organizations of the legislature and pressure groups; patterns of conflict within public organizations. (SP)

185. Public Policy and Decision Analysis. (4) Three hours of lecture and one hour of discussion per week. Variations in decision-making and policy analytical approaches; concepts of rationality in politics, analysis of the political uses of policy analysis, game theory, bargaining as applied to policy issues. (SP)

187A. Seminar: Bureaucracy and the Modern State. (4) Two hours of lecture and one hour of discussion per week. A review of the rise of the modern bureaucracy, its implications for the character of the state and the nature of social relations, and the opportunities, problems, and dilemmas it creates. (SP)

187C. Seminar: Technology and Politics. (4) Three hours of lecture and one hour of discussion per week. The relationship of technology to social/political change, scope of challenges of democratic governance of technical developments, the bases for technological assessment in the congressional setting, and alerts for the future in the development of public policy. (SP)

189. Selected Topics In Public Organization and Policy. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

Special Studies

H190A-H190B. Honors Seminars. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: Senior honors candidates and consent of instructor. Offerings vary from year to year. May be one or two semesters. Credit and grade awarded upon completion of thesis. Applications and details through the Undergraduate Office. (F,SP)

191. Experimental Courses. (4) Three hours of lecture per week. (SP)

191S. Cal-in-the-Capitol. (2) Must be taken on a passed/not passed basis. Two hours of seminar and one hour of individual conference per week. Prerequisites: Enrollment limited to those 70 students participating in the spring Cal-in-the-Capitol program in Washington, D.C. The course is designed to provide prospective interns with the opportunity to gain an understanding of some important issues facing our national government and an appreciation of the way these issues are dealt with in Washington D.C. The course simulates the internship experience by giving class members the opportunity to work with Berkeley experts who will make demands of the students' research skills. (SP)

191U. Model United Nations. (3) One 2-hour seminar per semester. Prerequisites: Consent of instructor. Important issues facing our national government and participation in the United Nations structure and procedures. (F,SP)

191W. Subnational Politics. (1-3) Must be taken in conjunction with, or in conjunction with, a related lecture course. Open only to students who have taken, or are taking, a related lecture course. (F,SP)

H195A-H195B. Senior Honors Thesis. (4,4) Four hours each week, to be arranged. Prerequisites: Senior honors candidates. Independent research and thesis. Satisfies thesis requirement for honors candidates. One or two semesters, at the instructor's option; if two semesters, credit and grade to be awarded upon completion of the sequence. Applications and details available through undergraduate office. (F,SP)

198. Special Research Project. (1-3) Regular individual meetings. Prerequisites: Consent of faculty sponsor and department chair. Regular individual meetings. Satisfies thesis requirement for honors candidates. Independent study of an advanced topic resulting in a substantial research paper. (F,SP)

199. Field Study In Political Science. (1-3) Must be taken on a passed/not passed basis. By arrangement with faculty. Prerequisites: Consent of faculty sponsor and department chair. Supervised experience relevant to student's research and to student's professional goals. (F,SP)

*Not offered 1988-89
On leave, spring
Recalled to active service
†Recipient of Distinguished Teaching Award
Graduate Courses
A statement on admission to graduate work may be obtained from the graduate office in the department. Properly qualified undergraduates may be admitted to graduate courses or seminars with special permission of the instructor.

Comparative Analysis
200. Major Themes in Comparative Analysis. (4) Three hours of seminar per week. Subject and work to be studied vary with instructor. See departmental announcements. (F)

201A-201B. Comparative Analysis of Industrial Democracies. (4;4) Three hours of seminar per week. The comparative study of politics in Western societies. The place of parties, political structures, interest groups, and economic institutions. The relation between domestic political developments and the international system. The effect of economic development on political change. (SP)

202A. Theories of Development and Political Change. (4) Three hours of seminar per week. Issues of social organization and political change. Theories of progress, development, modernization, and dependence. (F)

202B. Theories of Development and Political Change. (4) Three hours of seminar per week. Issues of social organization and political change. General theoretical formulations as they relate to processes of economic, social, and political change in the context of several Third World countries. (SP)

203. Comparative Analysis of Communist Societies. (4) Three hours of seminar per week. An analysis of the interaction between Communist systems with particular reference to institutional and ideological differences, presented at an advanced level for graduate students. Discussion and papers required. (F)

204. Authoritarianism. (4) Three hours of seminar per week. An advanced analytic, descriptive, theoretical, and normative inquiry into the concept of authoritarianism. Lectures and discussions will review prevailing definitions, pursue descriptive accounts of the history and current practice of authoritarian systems, undertake comparative assessments, and compare authoritarian systems or construction dealing with such politics. Efforts will be made to address the normative issues involved in the treatment of authoritarianism—particularly in its modern variants. (SP)

205. The Nation-Building Process. (4) Three hours seminar per week. The nation-state is the most significant political unit in the contemporary world. This course focuses on its origins, essential characteristics as well as on different patterns of national development, the relation of national development to modernization, the role of internal and external factors in the national development process and current challenges to the national definition of political life. (F)

207. Revolutionary Change. (4) Three hours seminar per week. Analysis and comparative study of the occurrence of various forms of revolution in society. Materials are drawn from political philosophy, systems theory, and empirical research. (SP)

208. Development Policy. (4) May be taken on a pass/no pass basis. Students who have taken quarter courses 208A-208B may not receive credit for this course. Three hours of seminar per week. Students from other disciplines are welcome. Comparative analysis of various forms of revolution in society. Materials are drawn from political science inquiry. (F,SP)

209A. Comparative Political Economy. (4) Emphasis on three models of modern society—capitalist, mass, and corporatist—as they apply to countries labeled capitalist, socialist, pluralist, and totalitarian. The aim is to evaluate convergence theory and explore divergent paths of development among rich countries. Special attention to stagnation, the welfare state, mass media, role of intellectuals. (F,SP)

209B. Comparative Public Policy. (4) Two hours of seminar and one hour conference per week. Contrast national responses to similar social problems among rich countries. Students will compare two or more nations similar in economic development, culture and political systems to explore the effect of policy actors, their goals and strategies. Three hours of seminar per week. Prerequisite: Consent of Instructor. Topic will vary with instructor. (F,SP)

Political Theory
213. American Political Theory. (4) Three hours seminar per week. Prerequisites: 112A or consent of instructor. Basic problems of political theory will be examined within the context of American historical development. (F)

214. Themes in Western Political Theory. (4) Course may be repeated for credit. Three hours of seminar per week. Themes to be determined by instructor. (F,SP)

215. Contemporary Theory and Political Science. (4) Three hours of seminar per week. Properties of theory—both classical and contemporary—as employed in the discipline. A selection of readings will vary with each offering. (F,SP)

217. Politics and Culture. (4) Three hours seminar per week. An examination of interrelationships of politics, economics, and culture, normally with specific focus on American material. Research reports will be written and discussed during the semester. (F)

218A-218B. Colloquium in Political Theory. (4;4) Credit and grade to be awarded upon completion of sequence. Three hours of seminar per week. An intensive examination of political theory and the enterprise of theorizing about politics, with attention to selected aspects of social science theory and contemporary philosophy. (F)

219. Symposium in Political Theory. (4) Course may be repeated for credit with consent of instructor. Three hours of seminar per week. Discussion of original work in political philosophy. (F,SP)

International Relations
220A. Theories of International Relations. (4) Three hours seminar per week. Prerequisites: Previous work in international relations. Origin, application, and utility of major concepts featured in the study of international relations. Relation of various strands of political and social theory to international relations. (F)

220B. Theories of International Relations. (4) Three hours seminar per week. Prerequisites: 220A. The construction of theories in the field of international relations. (SP)

221. International Organization. (4) Three hours seminar per week. Evolution of international institutions in response to changes in knowledge and international political conditions in fields of economic relations, science and technology, health, education, and management of conflict as reflected in United Nations and specialized agencies, regional organizations, and common markets. (SP)

222. Nationalism and Imperialism. (4) Three hours seminar per week. Prerequisites: 200 or 202. Themes in the theory of nation-building illustrated with Western and non-Western case studies. (SP)

223. Selected Topics in International Relations. (4) Course may be repeated for credit with different topic and consent of instructor. May be taken on a satisfactory/unsatisfactory basis. Three hours seminar per week. Prerequisites: Consent of instructor. For details see departmental announcements. Topic will vary with instructor. (F,SP)

226A-226B. International Political Economy. (4;4) Three hours seminar per week. Prerequisites: Introductory courses (graduate or undergraduate) in international relations, foreign policy, international organizations, and political economy. The creation, maintenance, transformation, and decay of international organizations designed to manage or regulate interstate activities relating to trade, money, resource use, technology, and physical environment. (F)

227A. International Relations and Foreign Policy. (4) Three hours seminar per week. Convergence and conflict among foreign policies in international politics, the nature of national decision-making in foreign policy, comparison of diplomatic bargaining, military and other behavioral styles in international politics. (F)

228. National Security Policy. (4) One-hour seminar per week. Evolution of military doctrine, especially since World War II; the role of Congress and the Executive Branch in the making of security policy; arm racing and arms control; the use of military force; and recent and future problems of national security. This emphasis is on the United States. (SP)

229A. Soviet Foreign Policy. (4) Three hours seminar per week. Soviet perceptions, priorities, policy toward West and East Europe, Third World, Sino-Soviet conflict. (F)

229B. Soviet-American Relations. (4) Three hours seminar per week. The rise and fall of détente, and the factors that facilitated the rise of détente; character and evolution of Soviet-American relations during the 1970s; the future of super-power collaboration and conflict. (SP)

Empirical Theory and Quantitative Methods
230. Political Inquiry. (4) Three hours seminar per week. Introduction to the epistemological and methodological issues that characterize political science inquiry. The processes involved in theory generation in the social sciences; the discovery, communications, confirmation, and articulation of logical, empirical, normative truth claims. Research procedures in political science inquiry. (F)

231A. Quantitative Analysis in Political Research. (4) Three hours seminar per week. Prerequisites: 132A-132B or Statistics 120A. Introductory course in the analysis of political data. (F,SP)

231B. Quantitative Analysis in Political Research. (4) Three hours seminar per week. Prerequisites: 132A or equivalent. Topics from multi-equation causal modeling and introductory econometrics, with special emphasis on procedures appropriate for political data, including survey data. (SP)

231C. Econometrics for Political Science. (4) Three hours seminar per week. Prerequisites: 231B or...
equivalent. Econometric theory and applications at a more advanced level than 231B. Special emphasis on simultaneous equation estimation and its extensions. Selected topics from factor analysis, scaling theory, analysis of covariance structures, and Bayesian methods. (SP)

232. Formal Models of Politics. (4) Three hours of seminar per week. Mathematical models of politics with applications to political learning, bargaining, and democratic theory. Topics from game theory, collective choice theory, and mathematical psychology. (F)

235. Introduction to Research Methods. (4) Three hours of seminar per week. Overview of methods of political research. Theories, concepts, variables, hypothesis formulation, decision and quantitative and qualitative methodology. Basic data collection techniques. Approaches to data analysis. Provides an overview of different statistical techniques, but does not teach statistics per se. (SP)

238. Selected Topics in Methodology. (4) Course may be repeated for credit with a different topic. May be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Consent of instructor. For details see departmental announcements. Topic will vary with instructor. (F,SP)

Area Studies

241A. Soviet Politics. (4) Three hours of seminar per week. Theoretical roots of Soviet Communism. The development of industrialization and political development from the revolution through the Stalinist period. Cross reference to other national models of communism and revolution. Change. (F)

241B. Soviet Politics. (4) Three hours of seminar per week. Specialized topics in Soviet politics in comparative perspective. Leninism as organization theory and revolutionary strategy. Stalinism as a model of nation-building, modernization and totalitarianism, de-Stalinization as a theme of liberalization, political succession, and the character of contemporary Soviet political-making; ethnic integration, social stratification and political stability. (SP)

241C. East European Politics. (4) Three hours of seminar per week. Prerequisites: 1410 or equivalent or consent of instructor. The governments of East Europe (defined as the area between the Soviet Union and West Germany) with emphasis on growing ideological and institutional diversity. The relationship between national tradition, social structure and political change. (F)

242. Topics in Middle East Politics. (4) May not receive credit after taking 242A or 242B under quarter system. May be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: 142A or 142B or consent of instructor. An advanced seminar, designed to encourage synthesis of empirical research and theoretical reflection. Focused each year on a specific dimension of Middle East politics (state formation, local politics, sectarianism, Islamic political thought, etc.). A seminar paper and class presentations are required. (F)

243A. Chinese Domestic and Foreign Policies. (4) One 3-hour discussion per week. Focus on domestic and foreign policies of China. (F,SP)

243B. Japanese and Korean Domestic—Foreign Policies. (4) One 3-hour discussion per week. Focus on domestic and foreign policies of Japan and Korea. (F,SP)

244. China. (4) Three hours of seminar per week. Analysis of the politics of the Chinese People’s Republic. (SP)

244A. China. (4) Three hours of seminar per week. Analysis of the politics of China. (F,SP)

244B. China. (4) Three hours of seminar per week. Analysis of the politics of the Chinese People’s Republic. (SP)

245. State and Economy in Japan. (4) Three hours of seminar per week. Research on the Japanese capitalist developmental state. Topics include the comparative study of advanced industrial systems, economic bureaucracies, industrial policy, foreign trade, and patterns of conflict. (F)

245A. South Asian Politics. (4) Three hours of seminar per week. Major themes of politics and international relations in India, Pakistan, Burma and the mountain kingdoms. (SP)

245B. Southeast Asian Politics. (4) Three hours of seminar per week. Evaluation of the strengths and weaknesses of current literature in an attempt to design studies advancing the substantive knowledge as well as the theoretical and methodological sophistication of Southeast Asian studies. (F)

246. African Politics. (4) Three hours of seminar per week. Politics of Sub-Saharan Africa: relations of state and society in the context of weak states; state building; societal pluralism; the political role of ethnicity; crises states and proto-national states; ethnic states; oppression and rearticulation; conflict and class formation; political order and development; modernization and ethnicity; and interstate conflict and international order. (F)

247A-247B. Western European Politics. (4,4) Three hours of seminar per week. Major themes of politics and international relations of Western Europe. (F)

247C. Theories of German Political Development. (4) One 3-hour discussion per week. This course focuses on a wide range of themes, including the development of the German political system, its adaptability to changing social conditions, and the role of political ideology in shaping political development. (SP)

248A-248B. Latin American Politics. (4,4) Either part of the 248A-248B sequence may be taken separately for credit. Three hours of seminar per week. Explores different analytic approaches to Latin American politics, focusing both on major concepts (clientelism, corporatism, the state, legitimacy, nationalism) and different explanatory approaches (focusing on factors such as political institutions, social order and economic change, political structure and institutions and political culture). (F)

249. Selected Topics in Area Studies. (4) Course may be repeated for credit with a different topic. May be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Consent of instructor. For details see departmental announcements. Topic will vary with instructor. (F,SP)

Public Law and Jurisprudence

250. Legal Theory and Institutions. (4) Three hours of seminar per week. The organization and behavior of legal institutions, with particular reference to American courts and administrative agencies. Institutional research on the law of public choice, public policy, and the organization of enforcement and decision-making processes. Readings include empirical studies, judicial opinions, jurisprudential writings and organization theory. (F)

257. Constitutional Law. (4) Three hours of seminar per week. Fundamental principles of constitutional law, leading cases, judicial decisions affecting the liabilities, rights, duties and procedures of governmental officers and agencies, causes and consequences of legal decision, judicial behavior. (SP)

258. The Jury System. (4) Three hours of seminar per week. Development and current functions of juries; investigations will include State and Federal grand juries and trial juries. Emphasis on jury selection and on the effects of jury membership composition on jury functioning and jury decisions. (SP)

259. Selected Topics in Public Law. (4) Course may be repeated with a different topic and consent of instructor. May be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Consent of instructor. For details see departmental announcements. Topic will vary with instructor. (F,SP)

Public Organization, Administration, and Policy

280A. Public Organization Theory. (4) Three hours of seminar per week. A survey of the literature of organization and management theory, emphasizing the major writers and distinctive contributions of various disciplines. (F)

280B. Comparative Administration. (4) Three hours of seminar per week. A comparative analysis of the structures and processes which are used to control public bureaucracies in selected political systems and the effects of those controls on the major characteristics of administrative performance. (SP)

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*On leave, spring, fall
†Recipient of Distinguished Teaching Award
Special Studies

290. Dissertation Research. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 3-hour seminar per week. In consultation with a major field adviser, intended to provide opportunity for qualified graduate students working toward the M.A. degree. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. Open to students engaged in supervised research projects in Political Science. (F,SP)

291. Experimental Course. (4-12) Course maybe repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. The problems of administering economic development programs in poor countries. Participation emphasis is placed on rural development, the problems of relating bureaucratic structures to peasant communities, and the relevance of organization theory to non-Western administration. (F)

298. Research Topics in Public Organization. (4) Three hours of seminar per week. Content of course will alternate between budgeting and information systems. (F,SP)

299. Independent Study in Preparation for the M.A. Essay. (4-6) Credit to be awarded upon completion of the M.A. essay. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. Open only to qualified students advanced to candidacy for the Ph.D. (F,SP)

299A. Independent Study in Preparation for the M.A. Essay. (4-6) Credit to be awarded upon completion of the M.A. essay. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. Open only to qualified first-year graduate students working toward the M.A. degree. (F,SP)

602. Individual Study for Doctoral Students. (4-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. Individual study in consultation with the major field adviser, intended to provide opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP)

Professional Courses

388. Professional Preparation for Graduate Student Instructors. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with a staff member with emphasis on the teaching of undergraduate courses in political science. (F,SP)

404. Research Skills. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. Individual research work under supervision of faculty members. Open to students engaged in supervised research projects in Political Science. (F,SP)

Interdepartmental Studies Courses

Lower Division Courses

IDS 1. Technology and Society. (3) Three 1-hour lectures per week. Role of technology in the solution of social problems. Historical development of modern technology. Examples of technological systems: communications, data processing, materials, energy generation. Sponsoring departments: Political Science and EECS. (F,SP)

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)

IDS 207. Managers and Management. (3)

IDS 208. Techniques of Management Control. (3)

IDS 209. Applied Microeconomics. (3)

IDS 210. Organizational Understanding for Managers. (3)

IDS 211. Public Sector Accounting. (3)

IDS 212. Financial Management. (3)

IDS 214. Organizational Skill for Managers. (3)

IDS 217. Technology, Tasks, and Politics. (3)

IDS 218. Information Resource Management. (3)

IDS 219. Financing Tools for Public Managers. (3)

For information about these and other courses related to this program, see the Public and Nonprofit Management section of this catalog.

Population Studies (College of Letters and Science)

Office: Graduate Group in Demography, 2232 Piedmont Avenue, 490-3000

Advisors: Mr. Hammel, Mr. Wachtcr, Mr. Lee.

There is no undergraduate group major in population studies. The Division of Special Programs does, however, offer undergraduate courses on the subject of population. A listing of the faculty and description of the graduate program are given under Demography. Senior undergraduates are eligible to enroll in the graduate courses if otherwise qualified.

Lower Division Courses

5. Seminar in Population. (2) One 2-hour seminar per week. Introduction to the study of population. History of human populations, theories about causes and consequences of population changes especially mortality, fertility, marriage, divorce, and migration. Enrollment is limited to 12 students. (F,SP)

Staff Upper Division Courses

100. Introduction to Population Theory. (3) Two 1½-hour lectures per week. Population structure and change in developed and developing countries, and in the past. Social and economic consequences for development, resources, employment, households, social security, etc. The influence on fertility, mortality and migration, of social, economic, technological, and political factors. (SP)


Psychology (College of Letters and Science)

Department Office: 3210 Tolman Hall, 642-5292
Chair: Enrjco E. Jones, Ph.D.

Professors:

Jonas Langer, Ph.D. Clark University. Cognitive development.

Russell L. DeWatkins, Ph.D. University of Michigan. Sensory psychology, color, bilingulism.

Stephan E. Palmer, Ph.D. University of California. Visual and attention.

Robert W. Levenson, Ph.D. Vanderbilt University. Human psychophysics.

Mary B. Math, Ph.D. John Hopkins University. Attachment, speech process, etiology.

Robert A. Mendelsohn, Ph.D. University of Michigan. Neuropsychology of learning and memory.

Christina Makale, Ph.D. University of London. Social, health psychology.

Carol A. Mandel, Ph.D. University of Michigan. Personality theory and assessment.


Charian J. Nemeth, Ph.D. Cornell University. Social psychology and memory.

Stephen E. Patn, Ph.D. University of California. Visual information processing and cognition.

Deborah A. Riley, Ph.D. Ohio State University. Learning in animals.

Bever H. Rosch, Ph.D. Harvard University. Cognition, concepts, semantics, thinking.

Mark R. Rosenzweig, Ph.D. Harvard University. Neurosciences and behavior.

David T. Sobin, Ph.D. Harvard University. Psycholinguistics.

Guy E. Swanson, Ph.D. University of Chicago. Personality development and socialization.

Janet E. Tetlock, Ph.D. Yale University. Social, political behavior.


John S. Watson, Ph.D. Cornell University. Development in infancy.

Rhona S. Weinert, Ph.D. Yale University. Clinical, community, school.

Shadon Stock, Ph.D. Bowling Green University. Industrial/organizational/personnel.


Frank M. Beach, Ph.D., D.Sc. (Emeritus) University of Chicago. Hormones and behavior.


Catherine Landrith, Ph.D. (Emerita)

Jean Walker Macfarlane, Ph.D. (Emeritus)

Paul H. Mussen, Ph.D. (Emeritus) Yale University. Personality development.

Leo J. Postman, Ph.D. (Emeritus) Harvard University. Human learning and memory.

Benvy E. Ritchie, Ph.D. (Emeritus)

Alex C. Sherriffs, Ph.D. (Emeritus)

Read D. Tuddenham, Ph.D. (Emeritus) University of California. Differential.

Associate Professors:

Mark B. Brewood, Ph.D. University of California. Developmental psychology.


Enrico E. Jones, Ph.D. University of California. Psychotherapy research, child development.

Barbara A. Metz, Ph.D. University of Illinois. Judgment, decision-making, measurement.
Seth D. Roberts, Ph.D. Brown University. Cognitive processes in animals

Adjunct Professors:

Seth D. Roberts, Ph.D. Brown University. Cognitive

Assisting Professors:

Perception

Adjunct Professors:

of humans in complicated situations.

The major attempts to give basic and well-rounded

developmental, biological, comparative, differential,

ranging from the study of behavior of the simplest

faculify or department. This is true at Berkeley, where

The fact that psychology is so diverse means, how

the emphasis is upon empirical research and the

psychology. The areas covered include social, de

strongly urged to examine closely our upper division

those present at Berkeley, prospective majors are

course offerings to see if they are consonant with

conceming alternative programs, contact the Student

and students interested in these fields should con-

Services Office, 3305 Tolman Hall.

into the behavior of others. The objective study of

behavior is one of the major themes of intellectual

for further training in a variety of areas, the under-

medicine, law, education, and business, psychology

provides important basic knowledge and principles.

(3) For students planning on graduate work in psy-

(2) one 198 or 199 course of at least 2 units may be

upper division units completed to 28. No more than

(1) maintenance of an overall grade-point average of 3.3; (2) achievement of a grade-point average of 3.3 in upper division psychology courses; (3) submission of a thesis of high quality based upon independent study with a member of the Psychology Department faculty, and marked by satisfactory completion of at least 3 units of course 193 or H185A-B. Evaluation of the thesis is the responsibility of first, the faculty supervisor and then of the departmental committee on undergraduate honors. It is the responsibility of the latter group to decide on the level of honors to be awarded. Additional information concerning the honors program is available in the Student Services Office, 3305 Tolman Hall.

Graduate Study

Preparation. The Department of Psychology regards completion of an undergraduate major in psychology or a cognate field as the best preparation for graduate study. The undergraduate program should include a course in statistical methods and a laboratory in experimental psychology. A student who is a fully qual-

2. Statistics-methodology: Psychology 101

3. Additional Psychology courses to bring the total upper division units completed to 28. No more than one 198 or 199 course of at least 2 units may be offered for completion of the major unit requirement.

Honors Program. The award of departmental honors is contingent upon: (1) maintenance of an overall grade-point average of 3.3; (2) achievement of a grade-point average of 3.3 in upper division psychology courses; (3) submission of a thesis of high quality based upon independent study with a member of the Psychology Department faculty, and marked by satisfactory completion of at least 3 units of course 193 or H185A-B. Evaluation of the thesis is the responsibility of first, the faculty supervisor and then of the departmental committee on undergraduate honors. It is the responsibility of the latter group to decide on the level of honors to be awarded. Additional information concerning the honors program is available in the Student Services Office, 3305 Tolman Hall.

Graduate Study

Preparation. The Department of Psychology regards completion of an undergraduate major in psychology or a cognate field as the best preparation for graduate study. The undergraduate program should include a course in statistical methods and a laboratory in experimental psychology. A student who is a fully qualified applicant always greatly exceeds the number of the nature, methods and aims of contemporary psychology. Work in the seminars will include reading in primary and secondary sources, class reports and a paper. For schedule of offerings see Psychology Department announcements during pre-enrollment week each semester. Limited to 15 students per section. (F, SP)

*14. Psychology of Gender. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1 or consent of instructor. Examination of various factors in the development of feminine and masculine roles, including personality, social processes, biology, and culture.

39. Topical Seminars in Psychology. (3) May be repeated once for credit but not with the same in-

one semester. Limited to 15 students per section. (F, SP)

W. Watson, Main

45A. Freshman Seminars. (1) Must be taken on a passed/not passed basis. One 2-hour seminar meeting per week. Seminars in various fields of psychology designed to introduce beginning students to basic methods, concepts and ideas in psychology. Work in the seminars will include readings in primary and secondary sources, class reports and a paper. For schedule of offerings see Psychology Department announcements during pre-enrollment week each semester. Limited to 15 students per section. (F, SP)

*45B. Freshman Seminars. (1) Must be taken on a passed/not passed basis. One 2-hour seminar meeting per week. Introduction to the principal areas, problems, and concepts of psychology. (F, SP)

4. Additional Psychology courses to bring the total upper division units completed to 28. No more than one 198 or 199 course of at least 2 units may be offered for completion of the major unit requirement.

Honors Program. The award of departmental honors is contingent upon: (1) maintenance of an overall grade-point average of 3.3; (2) achievement of a grade-point average of 3.3 in upper division psychology courses; (3) submission of a thesis of high quality based upon independent study with a member of the Psychology Department faculty, and marked by satisfactory completion of at least 3 units of course 193 or H185A-B. Evaluation of the thesis is the responsibility of first, the faculty supervisor and then of the departmental committee on undergraduate honors. It is the responsibility of the latter group to decide on the level of honors to be awarded. Additional information concerning the honors program is available in the Student Services Office, 3305 Tolman Hall.

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39. Topical Seminars in Psychology. (3) May be repeated once for credit but not with the same in-

one semester. Limited to 15 students per section. (F, SP)
per week. Prerequisites: Open to students in the psychology freshman cluster program. Weekly discussion of cross-cultural psychology and ethnic minority groups in the United States. Students are expected to read an article each week and actively participate in the discussion with the speaker.

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: 1 or consent of instructor and 3.4 G.P.A. or higher. Intended for freshmen and sophomores who wish to undertake a project of individual inquiry on a topic in psychology. (F,SP) Staff

Upper Division Courses

Psychology 1 is prerequisite for all upper division courses. Additional requirements are also stated for certain courses.

*107. Buddhist Psychology. (3) Two 1½-hour lectures per week. Based on traditional and direct observation of working of ordinary mind in everyday life situations. Provides contrasting perspective to present theories of cognition, perception, motivation, emotion, social interaction, and neurosis.

*108. Environmental Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101 recommended. Survey of environmental psychology, including environmental perception and assessment; cognitive maps for the large-scale environment; environmental attitudes and dispositions; analysis of behavior settings; human spatial behavior; behavioral effects of density; psychological factors in environmental planning design.

*108L. Laboratory in Environmental Psychology. (1) One 3-hour laboratory per week. Prerequisite: Concurrent enrollment in 108 and consent of instructor. Demonstrations, exercises and field projects in environmental psychology.

109. History of Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: One course in each of the three breadth areas required for the major. Development of scientific study of human and animal behavior. Consideration of history of particular subject areas—such as biological, comparative, developmental, psychodynamic, and social psychology—as well as general trends. (F,SP) Riley, Glickman

Quantitative Psychology

Upper Division Courses

101. Research and Data Analysis In Psychology. (4) Three 1-hour lectures and one 2-hour discussion per week. Prerequisites: 1 and completion of the quantitative prerequisites for the major or consent of the instructor. The use of data analytic techniques and research design. Topics to be covered include experimental design, comparison of means, comparison of frequency distributions, tests of hypotheses, regression and correlation. Students will be expected to participate in data collection and analysis. Reliability, validity and level of measurement; factorial designs and their analyses also covered. (F,SP) Kappel, Meiners

105. Introduction to Multivariate Psychological Experiments. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 1 or consent of instructor. General techniques for analyzing psychophysical experiments yielding multiple measurements of observation; emphasis on multivariate prediction methods, factor and component analysis, discrimination and classification, multivariate analysis of variance, and latent class and structural analysis. (F) Meredith

*106. Topical Seminars in Quantitative Psychology. (3) Course may be repeated for credit with a different topic and permission of instructor. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (F,SP) Test Theory. (3) Prerequisites: 104 recommended. Psychological Scaling. (3) Prerequisites: 104 or 106 recommended.

108E. Decision Making. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101. This course focuses on psychological and theoretical studies of individual decision making; basic concepts in measurement theory and experimental design; and normative and descriptive models of decision-making under certainty, uncertainty, and risk; different empirical viola- tions of normative theories. Examples of discussion topics include preference judgments, evaluations of alter- natives, probabilistic choices, and Bayesian inference. (F) Rahman

Biological Psychology

Upper Division Courses

110. Introduction to Biological Psychology. (4) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 1 and biological prerequisites for the major or consent of instructor. Survey of relations between behavioral and biological processes. Topics include sensory and perceptual processes, neural maturation, natural bases of motivation, and learning. (F) Leiman

111. Sensory Processes: Vision. (3) Two 2-hour lectures per week. Prerequisites: 110 or consent of the instructor. Examination of various aspects of visual perception (adaptation, brightness and color vision, binocular vision, object detection) in relation to anatomy and physiology of the visual system. (SP) R. DeValois, Holland, Gillespie

111L. Laboratory in Vision. (2) Two 2-hour laboratories per week. Prerequisite: enrollment in 111 and consent of instructor. Various experiments carried out in visual psychophysics and perception; observation of physiological studies of single cell responses. (SP) R. DeValois

112. Sensory Processes: Hearing. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Completion of biological prerequisites for the major or consent of instructor. Lectures cover a broad range of topics related to the psychology of hearing and the physiological system.

113. Biological Clocks: Physiology and Behavior. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Completion of biological prerequisites for the major and consent of instructor. Course in mammalian physiology recommended. A consideration of the biological clocks that generate daily, lunar, seasonal and annual rhythms in various animals, including people. Emphasis on neuroendocrine substrates, development and adaptive significance of estrous cycles, reproductive and hibernation cycles, body weight and migratory cycles.

114. Biology of Learning and Neural Plasticity. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 110 or consent of the instructor. A study of functional changes in the biological substrates of learning, memory and forms of neural plasticity related to the growth and maturation of the nervous system. (SP) Rosenzweig

115. Introduction to Comparative Psychology. (3) Students who have taken Zoology 136 or IDS 122 will receive no credit for 115. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1. Studies of animal behavior in evolutionary perspective, including analysis of behavior development, reproduction, aggression, territoriality. (SP) Breide and T. (SP) Kappel, Meiners

*116. Hormones and Behavior. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Completion of biological prerequisites for the major and consent of the instructor; a course in mammalian physiology recommended. Neural and endocrine mechanisms underlying behavior, especially reproduction of non-human mammals. Process of sexual differentiation of the neuroendocrine system will be emphasized. Hormonal influences on feeding, blonothric and aggressive behavior.

117. Biological Psychology and Problems of Human Dysfunctions. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 110. A survey of contemporary psychological approaches to problems of human disabilities including mental disorders, behavior changes following human brain injury and disease, and mental subnormality. Emphasis on nervous system models of these problems and areas of potential application of basic research development. (SP) Leiman

118. Topical Seminar in Biological Psychology. (3) Course may be repeated for credit with a different topic and with consent of instructor. One 3-hour meeting per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (SP) Riley

119. Drugs and Behavior. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 110 or consent of instructor. A survey course exploring the basic principles of psychopharmacology. The major focus of the course is on the relationship between behavior and physiological activity in the brain. Emphasis will be placed on effects of pharmacological agents on complex mental processes such as attention, motivation, learning, and memory. (SP) Martinez

For additional courses in biological psychology please see IDS listings following the graduate psychology courses.

Cognitive Psychology

Upper Division Courses

*120. Introduction to Cognitive Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101 or equivalent statistics course recommended but not required. Principle concepts and research concerning human processing of visual, auditory, and symbolic information; object recognition and classification; perceptual speed and comprehension of language; attention; theoretical model and experimental techniques in the study of imagery and other cognitive processes. (SP) Treisman

121. Animal Cognition. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1 and 5 or Statistics 2. Consideration of a range of topics concerned with the processing, organizing, and retention of information by animals; conditioning and learning in animals; symbolic processes and representations of information by animals. Species comparison of cognitive processes and approaches to the study of animals; evolution of cognition. (F) Riley, Glickman

122A. Introduction to Human Learning and Memory, (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101 is recommended. Theoretical and experimental analysis of human learning and memory; short-term and long-term memory; coding and retrieval processes; transfer and interference; mechanisms of forgetting. (F) Treisman

*122B. Advanced Topics in Human Learning and Memory. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 122A or consent of instructor; 101 is recommended. Detailed analysis of special problems in human learning and memory.

123. Concepts and Categories. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor; 101 recommended. Theoretical constructs and experimental methods in the study of human cognition with particular emphasis on the nature of concepts and categories. Topics will include category structure, prototypes, conceptual organization, meaning, thought, and cross-cultural comparisons.

124. Psycholinguistics. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: An introductory course In linguistics or consent of instructor. Introduction to psycholinguistics, emphasizing effects of psychological variables on the learning and use of language, influence of language behavior on psychological theories; special emphasis on the applicability of modern linguistic theory to the study of psychological aspects of language behavior. (SP) Slobin

125. Second Language Learning and Bilingualism. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (SP) Slobin
128. Perception. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. 101 recommended. An introduction to principles of perception, methods of perception research, and experimental procedures in visual and auditory perception. Topics will include psychophysics, perception of color, space, shape, and motion, pattern recognition, and perceptual attention. (SP) Palmer

127A. Human Problem Solving and Thinking. (3) Two 1/2-hour lectures per week. Prerequisites: 1 and completion of all other lower division prerequisites for the major or consent of instructor. Principal concepts, theories, and research findings regarding the nature of problem solving; decision-making and intellectual creativity; cognitive processes and personality correlates of effective thinking; convergent and divergent functioning.

127B. Facilitating Human Problem Solving. (3) Two 1-hour lectures and one 1-hour laboratory per week. Prerequisites: 127A and consent of instructor. Survey of theories and research regarding the importance and improvement of problem-solving and cognitive processes, fostering effective decision-making and creative functioning; developmental correlates of change; methodologies and techniques of intervention and assessment of their effectiveness. Educational and industrial applications.

128. Topical Seminars in Cognitive Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 2-hour lecture and course and one 2-hour laboratory per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (F,SP) Palmer, Kahneman

128A. Animal Learning. (3) Prerequisites: 121.
128B. Human Learning and Memory. (3) Prerequisites: 122A, 122B.
128C. Thinking and Problem Solving. (3) Prerequisites: 127A-127B.
128D. Psycholinguistics. (3) Prerequisites: 123.

129. Topical Laboratories in Cognitive Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 2-hour lecture and course and one 2-hour laboratory per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester.

Clinical Psychology

Upper Division Courses

130. Clinical Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1. Theoretical and empirical approaches to the explanation of psychological dysfunction. The relation between theories of psychopathology and theories of intervention. A critical evaluation of the effects of individual, family, and community approaches to therapeutic and preventive intervention. Thematic focus of the course may change from year to year. See department notices for details. (SP) Levenson

132. Community Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 130 or consent of instructor. Study of mental health problems from social psychological perspective, with particular concern for ecological, epidemiological and sociological factors. Critical examination of emerging methods of community intervention, including: prevention. (SP) Feinstein

133. Minority Mental Health. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 132 and consent of instructor. Overview of concepts and research findings relevant to understanding and contributing to the solution of the particular mental health problems of ethnic minority communities.

134. Field Experience in Clinical and Social Change. (3) Course may be repeated for credit. Five hours of field work and two hours of discussion with instructor per week. Prerequisites: 130 or consent of instructor. Small group discussion of issues involved in mental health work. Students must be involved in at least five hours of work per week in a mental health setting approved by the instructor. In a given semester, a specific focus may be adopted for the course. Check with the Student Services Office each semester.

138. Topical Seminars in Clinical Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 3-hour seminar per week. Prerequisites: 1 or consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (F,SP) Cowan

Developmental Psychology

Upper Division Courses

141. Development During Infancy. (3) Two 1-hour lectures and one 1-hour discussion per week. Cognitive, perceptual, and social development during the first two years of life with emphasis upon methods of observation and experimentation.

142. Cognitive Development. (3) Two 1-hour lectures and one 1-hour discussion per week. Theory and research on intellectual growth from birth through adulthood with special attention to the development of logical and physical concepts.

143. Child Language Development. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. An introductory course in linguistics or consent of instructor. Theory and research on children's linguistic development, including the sound system, grammatical structure, basic semantic categories, and sociolinguistic and discourse features.

144. Personality and Social Development. (3) Two 1-hour lectures and one 1-hour discussion per week. Theory and research on the cognitive and experiential factors related to the emergence and development of personality characteristics and relationships with others.

146. Developmental and Biological Processes in Attachment. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 110 or consent of instructor. This course provides an integrating approach to the topic of human and subhuman primate attachment. Based on ethological and evolutionary perspectives, it moves through considerations of the effects of separation and loss in non-human primates to consideration of individual differences in the organization of human attachments. Recent advances in our understanding of representational (cognitive) aspects of individual differences in human attachment are stressed. (F) Main

148. Topical Seminars in Developmental Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 3-hour seminar per week. Prerequisites: Consent of instructor. For a precise schedule of offerings, check with the Student Services Office each semester. (F,SP) Langer, Watson

148A. Development During Infancy. (3) Prerequisites: 141.
148B. Cognitive Development. (3) Prerequisites: 142.
148C. Child Language Development. (3) Prerequisites: 143.
148D. Personality and Social Development. (3) Prerequisites: 144.

149. Topical Laboratories in Developmental Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 2-hour lecture and one 2-hour laboratory per week. Prerequisites: Consent of instructor. For a precise schedule of offerings, check with the Student Services Office each semester. (SP) Langer

149A. Development During Infancy. (3) Prerequisites: 141.
149B. Cognitive Development. (3) Prerequisites: 142.
149C. Child Language Development. (3) Prerequisites: 143.

Personality Psychology

Upper Division Courses

150. Psychology of Personality. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1. A consideration of general and systematic issues in the study of personality and evaluation of major theories and points of view. (F)

151. Assessment of Personality. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 150 and consent of instructor. Theoretical and methodological issues in the assessment of personality; observational procedures; the interview; problems of communication and psychopathology. (SP) Block

151L. Laboratory in the Assessment of Personality. (1) One 3-hour laboratory per week. Prerequisites: Concurrent enrollment in 151 and consent of instructor. Demonstrations and exercises in the methods of personality assessment. (SP)

153. Stress and Adjustment. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 150 and consent of instructor. Examines stress theory and research from clinical field and laboratory settings dealing with the physiological issues involved in adjusting to life stresses. (SP) Lazarus

158. Topical Seminars in Personality. (3) Course may be repeated for credit with a different topic and consent of instructor. One 3-hour meeting per week. Prerequisites: 150 and consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester.

Social Psychology

Upper Division Courses

160. Social Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1. Survey of social psychology including interaction processes, small groups, attitudes and attitude change, and social problems. (SP) Nemeth

161. Interpersonal Processes. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160 or consent of instructor. Theory and research in interpersonal dynamics including such topics as aggression, altruism, attribution, and conformity.

162. Attitudes, Beliefs, and Influence Processes. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160 or consent of instructor. Nature and assessment of attitudes and beliefs, theories of attitude change, and experiments or field studies concerning beliefs and attitudes change.

163. Small Group Structure and Processes. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160 or consent of instructor. Social psychological theories and research methods in the area of small groups.

165. Language in Social Interaction. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Background in linguistics and psychology recommended. Variation in linguistic features, register, style, dialect and language in interaction. In relating linguistic features of participants and situation. Analysis of sociolinguistic rules, and strategic use to convey social meaning.

166. Socialization and Personality. (3) New course. Three hours of lecture per week. Prerequisites: 1. Course development and change in personality as a result of socialization in the family and in wider social relations from childhood through the middle years. (F) Swanson
188. Topical Seminar in Social Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. One 3-hour meeting per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with Student Services Office each semester. (F.SP) Lazarus, Nemeret,Tellock, Maslach, Swanson

**Differential Psychology**

**Upper Division Courses**

**171. Psychology of Abilities and Aptitudes. (3)** Two 1½-hour lectures per week. Prerequisites: 101 or equivalent course. Theory and evaluation of the principal tests of abilities and aptitudes. Historical development of psychological test methods.

**Industrial-Organizational Psychology**

**Upper Division Courses**

180. Industrial-Organizational Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101 or consent of instructor. Primarily for majors. Introduction to the field of industrial psychology, covering fundamental theory and concepts in personnel and social aspects in the field. Concerned with the processes involved in developing and maintaining both organizations. (F) Zedeck

182. Personnel Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 180 and 101 or consent of instructor. Emphasis on psychometric contributions in the development of techniques in personnel selection and development. (SP) Zedeck

**Special Course Offerings**

**Upper Division Courses**

190A. Cluster Seminars. (1) Must be taken on a passed/not passed basis. One 2-hour seminar per week. Prerequisites: Psychology major and admission to the cluster program. Weekly discussion of the nature, methods and aims of contemporary psychology. Students are expected to read an article each week and actively participate in the discussion with the speaker. (F) Maslach

*190B. Cluster Seminars. (1)* Must be taken on a passed/not passed basis. One 2-hour seminar per week. Prerequisites: Psychology major and admission to the cluster program. Discussion of cross-cultural psychological and ethnic minority groups in the United States. Students are expected to read an article each week and actively participate in the discussion with the speaker. (F)

192. Psychology in an International Context. (3) One 3-hour seminar per week. Prerequisites: Consent of instructor. Examination of the role and status of psychology as a science and profession in representative advanced and developing nations, including national and cultural differences and trends in evolution of psychology. (SP) Jones

193. Minority Issues in Psychology. (3) Three 1-hour lectures per week. Prerequisites: 1 or consent of instructor. A consideration of psychological theory and practice issues related to minority groups in the United States. (SP) Jones

195A-195B. Special Study for Honors Candidates. (1-3) Course may be repeated for credit up to a maximum of six units. Individual conferences. Prerequisites: Senior psychology major in the honors program. Independent study and preparation of an honors thesis under the supervision of a faculty member. Credit and grade awarded upon completion of the two-semester sequence. (F.SP) Staff

197. Field Study in Psychology. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: 1; appropriate upper division work in psychology (to be determined by instructor). Consent of instructor. Supervised experience relevant to specific aspects of psychology in off-campus settings. Individual and/or group meetings with faculty. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F.SP)

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor. Group study of a selected topic or topics in psychology. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F.SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F.SP) Staff

**Graduate Courses**

Graduate standing and the consent of the instructor are prerequisites for graduate offerings. (Un)dergraduates may enroll only upon approval of a faculty adviser and consent of the instructor.) Courses beginning each decade are designated as program majors and are required to provide a broad and firm base of background and general knowledge essential for a student planning to concentrate in that area of specialization. Those program majors are sufficiently general, however, for students from other areas of psychology to obtain breadth in complementary areas of study. (Most program majors are self-contained and may be taken separately. For most the sequence is not critical. Students are expected to attend and to enter the discussion per week. Theoretical constructs are discussed, as are quantitative and qualitative research designs and second year graduate students in psychology. (F,SP) Zedeck

**Quantitative Psychology**

**Graduate Courses**

201A-201B. Design and Analysis of Psychology Experiments. (3) One 3-hour lecture per week. Design and statistical analysis of psychology experiments are examined from an intuitive and practical point of view. 201A may be taken by itself and considers the most common designs found in psychology experiments. 201B is a continuation of 201A and covers the design and analysis of more complicated experimental designs. (F.SP) Keppel, Zedeck

205A-205B. Data Analysis. (3,3) Three hours of lecture and one 2-hour discussion/laboratory per week. Students will need to work through problems (homework). A general overview of data analysis and basic statistical planning is provided. From pure experimental research through field studies. Techniques of ANOVA and multiple regression/correlation will be presented as analytical models for both lab and field research. (F.SP) Staff

206B. Modern Mental Test Theory. (3) Two 1½-hour lectures per week. Prerequisites: 206A or Education 208A. Development of latent trait and item response theory by way of standard models such as the normal ogive, logistic, etc. Laserfield's latent class models will be discussed as well as special topics in strong true theory. Tailored testing will be introduced. Either Education 208B, an equivalent course, or Psychology 206B will be offered in alternate years. (F.SP) Staff

208C. Psychological Scaling. (3) Two 1½-hour lectures per week. An Introduction to the measurement of psychological value. Emphasis will be placed on psycho-physical judgments. Topics will include Weber's Law, Fechner's Law, Thurstone scaling, signal detection theory, debates on the use of gender ratings vs. magnitude estimation, the unfolding of the subjective, cross modal matching, theories of conative effects. (F) Meiners

208F. Mathematical Psychology. (3) Two 1½-hour lectures per week. This course will focus on the use of mathematical models in judgment and decision-making. Topics will include functional measurement, conjoint measurement, scale-free tests, scale convergence, multidimensional scaling, etc. Normative vs. descriptive models of decision-making will also be addressed. (F.SP)

**208G. Introduction to Linear Models. (3)** Two 1½-hour lectures per week. This course will be primarily concerned with correlation, regression, and related topics (e.g. the use of dummy coding, trending, issues related to analysis and analysis of variance, problems in interpretation.) The course will also provide an introduction to path-analysis and linear structural equations models.

**209. Qualitative Seminar. (1)** Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Reports and discussions of original research in the area of quantitative psychology. Only non-participants need report in any given semester, but all are expected to attend and to enter into the discussions. Required course for all students in the quantitative graduate program. (F.SP) Meredith

**Biological Psychology**

210A-210B. Graduate Survey of Biological Psychology. (4) Two 2-hour lectures per week. A two-semester survey of the field of biological psychology. Both semesters are required for all graduate students in biological psychology. Other graduate students may take both or either semesters for credit. First semester covers basic neural and sensory processes; second semester is concerned with learning, neural plasticity, and ethology. (F.SP) Staff

211. Hormones and Behavior. (3) One 3-hour meeting per week. Prerequisites: 210A-210B. A consideration of the influence of hormones on reproductive behaviors, including emphasis on the process of sexual differentiation and the consequences of parental behavior, sexual steroid production and hormonal involvement in nonreproductive processes, including eating, social behavior, learning and memory. Emphasis on mammals. (F,SP) Zuckerk

212. Biological Clocks and Animal Behavior. (3) One 3-hour meeting per week. Prerequisites: 210A-210B. Formal models of entrainment and generation of circadian rhythms. Consideration of the role of circadian processes in photoperiodic time measurement and on seasonal reproduction. Discussion of chemical and natural bases for generation and entrainment of biological rhythms. (F,SP) Zuckerk

216. Biological Psychology in Off-Campus Settings. Individual and/or group study and preparation of an honors thesis under the supervision of a faculty member. Credit and grade awarded upon completion of the two-semester sequence. (F.SP) Staff

218. Research Reviews on the Biological Basis of Cognition and Learning. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Consent of instructor. Discussion of recent papers on the comparative and physiological study of learning and cognition. (F.SP) Roberts

219. Biological Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Reports and discussions of original research in the area of biological psychology. Not all participants need report in any given semester, but all are expected to attend and to enter into the discussions. Required course for all students in the biological graduate program. (F.SP) Martinez

**Cognitive Psychology**

*220A. Proseminar: Cognition. (3)* One 3-hour lecture per week. Theoretical constructs and experimental methods in the study of human cognition with particular emphasis on the nature of concepts and categories. Topics will include category structure, prototypes, conceptual organization, meaning, thought, and cross-cultural comparisons.
*220B. Proseminar: Conditioning and Discrimination Learning. (3) One 3-hour lecture per week. Classical and instrumental conditioning and discrimination learning, with particular emphasis both from human and animal literature, but with emphasis on the animal work.

220C. Proseminar: Human Learning and Memory. (3) One 3-hour lecture per week. Theoretical and experimental analysis of human learning, transfer, and memory. Stress will be given to the learning and retention of verbal material. (F)

220D. Proseminar: Problem Solving. (3) One 3-hour lecture per week. Theories, methods, and findings concerning complex human problem solving, especially creative problem solving and productive thinking. Topics include cognitive and dispositional factors in convergent and divergent thinking, computer simulation, and the measurement and training of problem solving effectiveness. (F)

220E. Proseminar: Perception. (3) One 3-hour lecture per week. Principal theoretical constructs and experimental procedures in visual and auditory perception. Topics will include psychophysics, perception of color, shape, space, and motion, pattern recognition, and perceptual attention. (SP) Greeno

229. Cognitive Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1.5-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Reports and discussions of original research in the area of cognitive psychology. Not all participants must report in any given semester, but all are expected to attend and to enter into the discussions. Required course for all students in the cognitive graduate program. (F,SP) Teitelbaum

Clinical Psychology

230. Proseminar: Clinical Psychology. (3) One 3-hour lecture per week. Examination of major theoretical and historical themes in the development of modern clinical psychology, with special attention to concepts of mental health and psychopathology, models of intervention and clinical research, and emerging professional roles and institutions. (F)

231A. Clinical Psychopharmacology. (3) One 3-hour lecture per week. The interaction between psychological and physiological processes, with particular emphasis on the interplay between psychopharmacology and clinical psychology. Topics to be covered include drug interactions with the automatic nervous system; fundamental psychopharmacological concepts and models; human emotion; stress; psychopharmacological disorders; psychopharmacological substrates of personality and psychopathology; social psychopharmacology; and applications to mental health practice. (F)

231B. Ego Psychology. (3) One 3-hour lecture per week. Examination of the ego structure and functions within the context of psychoanalytic thought. Both the self-system and executive functions will be studied in the writings of classic psychoanalysts, psychoanalytic ego psychologists, object-relations theorists, as well as other contemporary positions. Re- search on ego development, perception-cognition, and fantasy will be examined. (F)

231C. Assessment of the Child in the Family and School. (3) One 3-hour lecture per week. Analysis of children's behavior and function in their family and school social settings. (F)

231D. Minority Mental Health. (3) One 3-hour lecture per week. Overview of concepts and research findings relevant to understanding and contributing to the solution of the particular mental health problems of ethnic minority communities. (F)

231E. Expectations and the Prevention of School Failure. (3) New course. One 3-hour lecture per week. Examination of the theory and research on expectancy processes in the classroom and in schooling, with particular focus on classroom and school practices which enhance the social processes of instruction and promote the development of competence in children. (F)

232A-232B. Theory and Method of Clinical Assessment. (4) One 3-hour lecture per week. Prerequisites: First-year status as graduate student in clinical psychology and consent of instructor. The theoretical and methodological foundations of clinical assessment. Required of all first-year clinical students. Two-semester sequence with grades assigned each semester. (F,SP) Staff

234A. Theories of Psychotherapy. (3) One 3-hour lecture per week. Examination of the major theories of psychotherapy and personal change. Orientations that will be covered include psychoanalytic approaches, behavioral and cognitive-behavioral techniques, the humanistic schools, and systems theory. (SP) Jones

234B. Theories of Child and Family Therapy. (3) One 3-hour lecture per week. Analysis of major approaches to promoting developmental change in children, couples, and families. (F)

234C. Theories of Community Intervention. (3) One 3-hour lecture per week. Examination of theory and research underlying social and community approaches to the promotion of mental health and the prevention of dysfunction. Analysis of major methods of intervention, with a special focus on consultation. (SP) Larrson

235. Clinical Research. (3) One 3-hour lecture per week. Strategies of research in clinical issues; clinical methods of gathering and interpreting data; case examples from the research in progress of participants in the seminar. (F) Levenson

237A. Intervention: Adult Psychotherapy. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second- and third-year clinical psychology students or consent of instructor. Psychological intervention with adults. (F,SP) Staff

237B. Intervention: Child and Family Therapy. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second- and third-year clinical psychology students or consent of instructor. Psychological intervention with children, couples, and families. (F,SP) Staff

237C. Intervention: Community. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second and third-year clinical psychology students or consent of instructor. Psychological intervention with communities. (F,SP) Staff

237D. Intervention: Supervision. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second and third-year clinical psychology students or consent of instructor. Consultation, program evaluation, program development, and preparation in community settings. (F,SP) Staff

237E. Intervention: Clinical Decision Making. (1) Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second and third-year clinical psychology students or consent of instructor. Issues in decisions about providing psychological services to individuals, families, groups, and social systems. (F,SP) Staff

238. Clinical Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1.5-hour meeting every other week. Prerequisites: Graduate standing or consent of instructor. Reports and discussions of original research in the area of clinical psychology. Not all participants need report in any given semester, but all are expected to attend and to enter into the discussions. Required course for all students in the clinical graduate program. (F,SP) Staff

Personality Psychology

250A. Perspectives in Personality: Overview. (3) One 3-hour lecture per week. Introduces the perspectives and research programs of the personality faculty to graduate students developing an interest in their field. Each week each faculty member associated with the personality program will attend to the work of a different faculty member associated with the personality program. (F)

250B. Perspectives in Personality: Trends and Issues. (3) One 3-hour lecture per week. Considers historical trends and current discussions regarding such topics as: (1) the concept of disposition; (2) person by environment transactions; (3) observational assessment of persons, and (4) personality systematics; (5) personality development and integrity or structure, and (6) formulations of personality system-social system interactions. (F)

250C. Perspectives in Personality: Stress and Coping Processes. (3) One 3-hour lecture per week. Explores the experience and consequences of stress, functioning and morality as reflected in current models and research. Focuses on human psychological studies of coping and adaptation. Occasionally may deal with theories and current discussions regarding such topics as: (1) the concept of disposition; (2) person by environment transactions; (3) observational assessment of persons, and (4) personality systematics; (5) personality development and integrity or structure, and (6) formulations of personality system-social system interactions. (F)

250D. Perspectives in Personality: Principles and Pragmatics of Personality Measurement. (3) One 3-hour lecture per week. Methods of personality measurement and assessment, with particular attention to

Developmental Psychology

240A. Proseminar: Early Cognitive Development. (3) One 3-hour lecture per week. Broad coverage of theory, methods, and research findings concerning human cognitive development in the first two years of life. Specific content areas to be emphasized will include learning processes, memory, and sensory-motor development. (SP) Main

240B. Proseminar: Human Ethology and Early Social Development. (3) One 3-hour lecture per week. The work of current British and American ethologists as these relate to human development will be critically reviewed. Influences on early social development and development of attachment relationships will be emphasized. (SP) Main

240C. Proseminar: Socialization and Personality Development. (3) One 3-hour lecture per week. The focus of the course is on the antecedents and correlates of ways, stress, coping, and early social behavior. Classical and contemporary theories will be surveyed (particularly parent-child relationships and peer influences) and relevant research findings reviewed. Research methods and methodological problems will be emphasized. (SP) Main

240D. Proseminar: Cognitive Development. (3) One 3-hour lecture per week. Stages and structures of reasoning from sensorimotor action schemes in infancy through formal operations in adolescence and adulthood, with focus upon the progressive acquisition of logical and physical concepts. Also relevant, developmental aspects of symbolization, perception, and learning will be considered. (F)

240E. Proseminar: Language Development. (3) One 3-hour lecture per week. Course may be repeated for credit. One 1-hour meeting per week. Prerequisites: Limited to second and third year clinical psychology students or consent of instructor. One 1-hour meeting per week. Prerequisites: Limited to second and third-year clinical psychology students or consent of instructor. Examination of theory and research concerning human cognitive development in the first two years of life. Specific content areas to be emphasized will include learning processes, memory, and sensory-motor development. (SP) Main

On leave, spring, fall

On leave, fall

Recalled to active service

Recipient of Distinguished Teaching Award
the qualities, attributes, talents and dispositions considered in the everyday evaluations people make of self and others. (SF)

John

261A. Research Methods in Social Psychology. (3) Staff

This course is designed to acquaint students with the development of research methods in social psychology. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing or consent of instructor. (F,SP)

261B. Research Methods in Personality. (3) Staff

This course is designed to acquaint students with the development of research methods in personality psychology. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing or consent of instructor. (F,SP)

Social Psychology

262A. Personality Development. (2) Staff

This course is designed to acquaint students with the development of personality development. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing or consent of instructor. (F,SP)

262B. Personality Development Special Topics. (2) Staff

This course is designed to acquaint students with the development of personality development special topics. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing or consent of instructor. (F,SP)

262C. Personality Development Special Topics II. (2) Staff

This course is designed to acquaint students with the development of personality development special topics II. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing or consent of instructor. (F,SP)

Special Course Offerings

290. Seminars. (2) Course may be repeated for credit. One 2-hour meeting per week. (F,SP) Staff

290A. Measurement. (2) Staff

290B. Biological. (2) Staff

290C. Comparative. (2) Staff

290D. Learning. (2) Staff

290E. Perception. (2) Staff

290F. Thinking. (2) Staff

290G. Language and Communication. (2) Staff

290H. Developmental. (2) Staff

290I. Personality. (2) Staff

290J. Social. (2) Staff

290K. Clinical. (2) Staff

290M. Industrial. (2) Staff

290C. Analysis of Variance Techniques. (2) Staff

290P. Additional Seminars on Special Topics To Be Announced. (2) Staff

299. Survey of Department of Psychology. (2) Staff

This course is designed to acquaint students with the development of the department of psychology. Topics include hypothesis testing, statistical analysis, and the interpretation of research findings. Prerequisites: Graduate standing in the department. Presentation of selected faculty members in the department and discussion of their particular research interests: substantive and methodological issues, future directions, implications for the field. Required of all incoming graduate students. (F)

299. Directed Study. (1-12) Course may be repeated for credit. Individual conference. Special study under the direction of a member of the staff. (F,SP) Staff

299. Research. (1-12) Course may be repeated for credit. Individual conferences. Individual research. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study in consultation with the major field adviser, intended to provide opportunity for qualified students to prepare research for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

300. Seminar in the Presentation and Teaching of Psychological Material. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture per week. Principles and methods of the presentation and teaching of psychological material. Evaluation of lectures, demonstrations, publications, etc., with emphasis on the teaching of undergraduate courses in psychology. (F,SP) Staff

401A-401B. Clinical Internship (Off Campus). (1-12) Credit and grade to be awarded on successful completion of the internship experience. Individual conferences. Prerequisites: Advancement to candidacy; limited to clinical psychology graduate students or consent of instructor. Individual programs of practice and supervision in approved off-campus agencies. (F,SP) Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 113. Developmental Neurobiology. (3) Staff

This seminar will focus on the development of cognitive functioning. Sponsoring departments: Education and Psychology.

IDS 237A-237B. Cognitive Science Seminar. (1;1) Prerequisites: Consent of instructor. Staff

This seminar will focus on the development of cognitive functioning. Sponsoring departments: EECS, Linguistics, Philosophy, and Psychology.

IDS 271. Seminar in Neuropsychology. (3) Staff

This seminar will focus on the development of cognitive functioning. Sponsoring departments: Education and Psychology.

Public and Nonprofit Management

(Graduate School of Public Policy)

Office: Graduate School of Public Policy, 2607 Hearst Avenue, 642-1940

Coordinator: Eugene Bardach, Ph.D.

The Program in Public and Nonprofit Management is intended to serve graduate students in professional schools who foresee administrative careers in government or nonprofit organizations. The program offers a number of core courses, listed below, and serves as a clearing house to inform students of related courses in a variety of departments and schools. The program does not award degrees. However, some of the core courses may be used by the participating schools or departments to meet their own degree requirements. The participating units are Business Administration, Education, Library and Information Studies, Public Health, Political Science, and Law.

A listing of the related courses is contained in the program's "Graduate Student's Guide to Courses," available from Jan Price Greenough, Graduate School of Public Policy, 2007 Hearst Avenue, Berkeley, CA 94720, 642-1940.

Graduate Courses

205. Advanced Seminar in Public and Nonprofit Management. (3) Course may be repeated for credit. (F,SP) Staff
Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in technology, management, and political science. The seminar is intended for students who wish to explore advanced topics in organizations, with a focus on analytical and interpersonal aspects.

207. Public Management: Managers and Management. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will emphasize the relationship between technology and the management of organizations, with a focus on strategic and interpersonal aspects.

208. Public Management: Techniques of Management Control. (2) Two 1-hour lectures per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

209. Public Management: Applied Microeconomics. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

210. Public Management: Organizational Understanding for Managers. (3) Two 1½-hour seminars per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

211. Public Management: Public Sector Accounting. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

212. Public Management: Financial Management. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

213. Organizational Skill for Managers. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

214. Information Resource Management. (3) Three hours of lecture per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

215. Technology, Tasks, and Politics. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

216. Information Resource Management. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

217. Technology, Tasks, and Politics. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

218. Information Resource Management. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

219. Analytical and Interpersonal Skills. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

220. Management Professionals in Organizations. (3) Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

221. Preventive Medicine Residency Seminar. (1-5) Course may be repeated for credit. One 2-hour seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

222. Preventive Medicine Residency Seminar. (1-5) Course may be repeated for credit. One 2-hour seminar per week. This seminar is designed for students who wish to explore advanced topics in public and nonprofit organizations. The seminar will focus on the role of technology and the management of organizations, with a focus on strategic and interpersonal aspects.

Public Health (School of Public Health)

Office of the Dean (642-2523) and Admissions (642-6531): 19 Earl Warren Hall

The following sections have been established for courses 197, 198, 199, 295, 296, 297, 298, 299, 601, and 602. The courses may be repeated for credit, but some sections may not be offered every semester.

A. Health Policy and Administration

F. Maternal and Child Health

G. Public Health Education

H. Behavioral Sciences

J. Public Health Nutrition

K. Environmental Health Sciences

L. Biostatistics

M. Department M.P.H. (BioEnv.)

N. Epidemiology

P. Biomedical Sciences

Q. Epidemiology/Biostatistics M.P.H. Program

S. Forensic Science

Programs

For a description of programs in public health, see page 78.

Schoolwide Public Health Courses

Graduate Courses

282. Introduction to Community Oriented Primary Care. (3) Two hours of lecture and three hours of laboratory. Prerequisites: Graduate standing in Public Health or consent of instructor. A history of primary care services will be presented with emphasis on the needs of the community and the constraints within the American Health Care System. Skills necessary for COPC such as making a community diagnosis, epidemiologic techniques, and data base retrieval systems, will be presented. Students will be involved with special projects while working in this area will present current research students. Students will be asked to work in teams to develop a COPC project proposal. (SP) Lashof, Smith

288. An Overview of the AIDS Epidemic. (3) New course. Course may be repeated for credit. Two 1½-hour lectures per week. Prerequisites: Prior or concurrent enrollment in BE5H 180 or consent of instructor. This course will utilize both faculty and guest lecturers to examine the biomedical, psychosocial, and public policy aspects of acquired immunodeficiency syndrome (AIDS). The spotlight will be on the impact of AIDS on the health care delivery system and implications for future health care policy. (SP) Winkelstein, Rundall

290. Introduction to Public Health. (1) One ½-hour lecture per week. Prerequisites: Graduate standing in Public Health or consent of instructor. Required of all first-year Master of Public Health degree students. The course will cover the basic concepts of public health from a historical perspective including the role of social movements. The responsibilities of local, state, and federal government, with emphasis on current issues, will be examined. (F) Lashof

294. Preventive Medicine Residency Seminar. (1-5) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Acceptance into Preventive Medicine Residency Program. One 2-hour seminar per week with additional credits for supervised experience in public health and/or preventive medicine settings. Integration and discussion of assigned material in relation to practical issues in public health and professional practice in preventive medicine. (F,SP) Smith

Interdepartmental Studies Courses

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) One 2-hour lecture per week in the evening. Prerequisites: high school biology and chemistry. This interdisciplinary course will single out specific topics in aging of great current interest (Alzheimer's disease, spring, strategies for intervention) and present lectures on all aspects of each topic (biomedical, health, socioeconomic, legal and ethical). Invited speakers with special expertise in these areas will participate. Credit for the course will be based on a term paper. Sponsoring departments: Optometry, Physiology-Anatomy, Public Health, Social Welfare. (F,SP) Timmis, Minter

IDS 191. Public Health and Nuclear War. (2) Formerly PH 129. One hour of lecture and one hour of discussion per week. The course will examine the impact on public health of the current arms race and the threat of nuclear war. Topics to be considered include health, discussion, and directed readings indicating the human and medical effects of nuclear detonation, as well as the economic, psychological, and health dimensions of destruction from preparation for detonation. Conflict resolution and other preventive measures will be explored and tested. Sponsoring departments: Public Health, Peace and Conflict Studies. (SP) Winkelstein, Hurst, Leonard

Related Courses in the Program in Public and Nonprofit Management

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)

IDS 207. Managers and Management. (3)

IDS 208. Techniques of Management Control. (3)

IDS 209. Applied Microeconomics. (3)

IDS 210. Organizational Understanding for Managers. (3)

IDS 211. Public Sector Accounting. (3)

IDS 212. Financial Management. (3)

IDS 214. Organizational Skill for Managers. (3)

IDS 217. Technology, Tasks, and Politics. (3) Three hours of seminar per week. This course examines how the nature of tasks and technologies used by public sector agencies evolve over time, affecting the character of managerial work and the politics of the policy setting. The class examines theories of effective public management and case studies of situations that require managerial initiative. Cases will be drawn from many policy areas, including public health, childcare policy, social service delivery, and regulatory policy.

IDS 218. Information Resource Management. (3) One 3-hour seminar per week. This course focuses on the surrounding discussion, communications, and content. Using case studies, it explores managerial strategies in planning, policy, and organizational contexts. Invited speakers with special expertise in this field will present their current research. Students will be asked to work in a group to learn strategies for public and nonprofit management. (F) Bergmeyer

IDS 219. Financing Tools for Public Managers. (3) One 3-hour seminar per week. This course will examine new financing tools in California and financing options available to public managers. Emphasis will be on a case study approach with the participation of leading financial officers and underwriters in California. The course will also discuss economic development aims and consider whether these aims can be achieved without significantly expanding the size of government.

IDS 220. Management Professionals in Organizations. (3) Three 3-hour lecture per week. The history and concept of professional roles. Professionalization as an alternative to bureaucracy. Adapting supervision and evaluation to fit professional norms. Professional control and responsibility. Codes of ethics. (F) Benveniste
Public Policy (Graduate School of Public Policy)

Office: 2607 Hearst Avenue, 642-4670
Dean: Eugene Smolensky, Ph.D.

Professors:
Eugene Bardach, Ph.D., University of California at Berkeley. Behavior, implementation, social theory
T. S. Friedman, Ph.D., Yale University. Applied microeconomics, public sector decision-making
David L. Kirp, J.D., Harvard University. Law, politics, economics
C. Bartlett McGuire, M.A., University of Chicago. Energy policy, regulation and organization theory, cost-benefit analysis
Arnold J. Meyer, Ph.D., University of California at Berkeley. Organization, management, planning
John M. Quigley, Ph.D., Harvard University. Education, public policy, nonprofit organizations
Richard Schiffer, Ph.D., New York University. Health sciences, public policy, political economics
Allen P. Sindler, Ph.D., Harvard University. Political science, policy process, social policy
Perry H. Tannenbaum, Ph.D., University of Illinois. Telecommunication policy, new technology, mass media, social research methodology
Marlin A. Trow, Ph.D., Columbia University. Comparative higher education, research design and analysis, professional ethics
Aaron Wildavsky, Ph.D., Yale University. Political culture, budgeting, implementation

Acting Associate Professor:
Suzanne Scotchmer, Ph.D., University of California at Berkeley. Property rights, public policy, cost-benefit analysis, welfare economics

Senior Lecturer:
Wilson John

Lecturers:
William Aham
Michael Berman
Angela Brown
Christine Curtis
Lindsay Desrochers
Abigail English
Rozanne Junker
Michael Kanin
Joyce McCann
Ezio Medlicott
Kenneth Rain
Joanna Weinberg
Ashto Yoshitawa

Affiliated Faculty:
Sally Fairfax (Conservation and Resource Studies)
Judith Gruter (Political Science)
Robert Keegan (Political Science)
Stephen Sugarman (Law)
Michael Wiesman (Economics)

Programs

For a description of programs in public policy, see page 79.

Lower Division Courses

6. Freshman-Sophomore Seminar. (3) One 3-hour seminar per week. Prerequisites: Consent of instructor. Examines a variety of current public policy problems in the political, social, and/or economic areas, and proposes to solve them, e.g., reforms of the political process, racial or gender equity. Attention will be paid to both the substance of the policy problem and ways to evaluate alternative solutions. Topics will vary from year to year. Open to freshmen and sophomores. Consult the Freshman Seminar brochure for current topics. (F) Sindler

10. Contemporary Policy Issues and Controversies. (3) One 3-hour lecture and 1.5 hour of discussion twice a week. Considers a variety of public policy problems dealing with the design and operations of the political process, equal opportunity for minorities and women, and a range of social issues. Emphasis is on both the substance of the policy and in the development of skills in defining, analyzing and resolving policy conflicts. Class discussion is an integral part of the course.

39. Seminar in American Higher Education. (3) Two 1.5-hour seminars per week. Freshman-sophomore seminar. This course will trace the evolution of the modern American university from its medieval and colonial origins. Special attention will be given to its modes of organization, governance and finance, its patterns of student life and subcultures. (SP) Trow

Upper Division Courses

*160. Civil Rights, Courts and the Policy Process. (3) Two 1.5-hour lectures per week. An examination of the role of judges and courts in making policy about civil rights. Actual court decisions and records will be reviewed to determine what a civil right is, to see how courts get involved in creating and defining civil rights, to consider the limitations on courts as policy makers in this area, and how judges and courts think about the problems. (SP) Trow

*161. Policy on Inner-City Poverty and Unemployment. (3) Two 1.5-hour lectures per week. Examines problems of inner-city poverty and unemployment by reviewing how perceptions of these social problems have changed, the policy-making process in this area, and past and present policy responses to the problems. More effective policies, drawing on a wide range of local experiences and national perspectives, will be considered.

162. Women's Rights and Public Policy. (3) Two 1.5-hour lectures per week. This course will analyze major issues raised by the contemporary feminist movement, and their impact on national and state policies. Policy areas to be covered include family law, health, civil liberties and economic equity. (F)

*163. Strategies in Using Governmental Process. (3) Two 1.5-hour lectures weekly. How do the three branches of government, the electoral and political process, the media and public polls work to resolve problems of competing interests in our society? What were the issues raised in the recent constitutional convention effort? Is democracy working?

164. Impact of Government Policies and Programs on Poor Children and Families. (3) Two 1.5-hour lectures per week. Examination of the impact of policies of state intervention and public benefit programs on poor children and families. Introduction to child and family policy, and study of specific issues, areas such as income transfer programs; housing; health care; and child abuse. (SP) English

165. Women's Rights and the Economy. (3) Two 1.5-hour lectures per week. Deals with gender equity since suffrage. Examines correlations between economic conditions in the U.S. and the prospects for advancing women's rights. Primary focus will be on legislation relative to women in the labor force; access to jobs and education; equal pay; pregnancy disability; child care; and comparable worth. (F) Weinberg

166. Science and Technology Policy: Values in Conflict. (3) Three 1.5-hour lectures per week. This course examines science and technology policy from the perspective of values including political ideology, a scientist's personal values, or societal values. Science and technology policies in the United States will be examined, as well as specific issues include nuclear technologies, the computer revolution, and biotechnology.

168. Political Communications and Public Policy. (3) Two 1.5-hour lectures per week. Prerequisites: Open to upper division undergraduates and graduate students with consent of instructor. Explores the interdependent relationships between the media and policy and from two perspectives: the efforts of public officials to get their political and policy messages across and the efforts of the media to interpret what government relations press releases, office news, media news selection (and news making), and the rush to news judgment. Case studies—press coverage of the neutron bomb and an inside look at a press office—will be the course reading and the focus of the major written assignment.

169. Contemporary Issues in the American Political Economy. (3) Two 1.5-hour lectures per week. Prerequisites: Econ 1 or equivalent. Examines several major economic issues of the 1980s, including supply-side economics; the federal deficit and its implications; new technologies and their effects for growth and employment; the changing distribution of income; and recent trends in social policy. This course will recognize a non-technical understanding of the economic issues involved, as well as the historical and political background of these problems.

170. Educational Governance and Policymaking. (3) Two 1.5-hour lectures/discussion per week. Examines how educational policy gets made and who becomes involved in the enterprise. Case histories of such topical matters as education vouchers, desegregation, teacher collective bargaining and financing, and public schools, are discussed. These cases illustrate the elements of policymaking including formulating issues, use of social science data, anticipating implementation problems.

173. Acquired Immune Deficiency Syndrome (AIDS) and Public Policy. (3) Three hours per week of seminar. Prerequisites: Upper division standing and consent of instructor. AIDs poses important and pressing challenges for rapid and non-incremental reform of public policy. This course will focus on such topics as: Have policy responses been influenced by the fact that most victims belong to socially disfavored groups? What local initiatives are most equitable and efficient? What local public policies concerning education, public reaction, and administration of the AIDs antibodies test are most promising? How should research be managed and at what level of funding? (SP) Kirp

*174. Issues in Environmental Policy. (3) Two 1.5-hour lectures per week. Prerequisites: Economics 1 or equivalent. An exploration of American regulatory and administrative processes for promoting environmental quality. How do political, economic, legal, and institutional factors shape current approaches to environmental regulation? Introduces technological and administrative theories of regulation. Case studies of regulatory decisions permit students to apply theories to specific environmental problems, including, air pollution, toxic waste disposal, pesticide regulation, and power plants.

175. Making Legislative Policy. (3) One 3-hour lecture per week. Prerequisites: Consent of instructor. A critical review of differing schools of policy thinking with respect to various issues, e.g., consumer protection, energy and resource, mass health and safety regulation. (SP) Bardach

177. Quantitative Approaches to Public Policy Analysis. (3) Two 1.5-hour lectures per week. Prerequisites: Economics 1 or equivalent. An exploration of American regulatory and administrative processes for promoting environmental quality. How do political, economic, legal, and institutional factors shape current approaches to environmental regulation? Introduces technological and administrative theories of regulation. Case studies of regulatory decisions permit students to apply theories to specific environmental problems, including, air pollution, toxic waste disposal, pesticide regulation, and power plants.

181. Energy Policy. (3) Two 1.5-hour lectures per week. Prerequisites: Consent of instructor. A critical review of differing schools of policy thinking with respect to various issues, e.g., consumer protection, energy and resource, mass health and safety regulation. (SP) Bardach

178. Public Policy-Making Issues in California: Applying Concepts. (3) New course. One 3-hour lecture per week. This course examines public policy-making in California by applying concepts such as advocacy vs. analysis; incrementalism vs. pluralist decision making; leadership, and centralization/decentralization of structures to the topical areas of education, health, physical infrastructure and toxic issues, including pollution, energy policy, and economic issues, the current tax revolt and the budget process.

179. Current Issues in Public Policy Analysis. (3) Two 1.5-hour lectures per week. Prerequisites: Economics 1 or equivalent. An exploration of American regulatory and administrative processes for promoting environmental quality. How do political, economic, legal, and institutional factors shape current approaches to environmental regulation? Introduces technological and administrative theories of regulation. Case studies of regulatory decisions permit students to apply theories to specific environmental problems, including, air pollution, toxic waste disposal, pesticide regulation, and power plants.
183. Developing, Implementing, and Evaluating Social Policies and Programs. (3) Two 1½-hour lectures per week. An examination of the substance of various American current social policies and programs, such as those in the area of day care, family, and drug treatment. Special attention will be given to how those policies and programs developed and to problems in implementing and evaluating them effectively. (SP) Browne

184. The Economics of Public Policy Solving. (3) Two 1½-hour lectures per week for 8 weeks. Prerequisites: Economics 100A or 101A or equivalent. Lectures will cover extensions and applications of microeconomic theory as required for use in practical public policy analysis. Case studies of the techniques will be drawn from diverse policy applications: welfare reform, national health insurance, public employment, energy shortage, public regulation and others. (SP) Baruch

185. An Introduction to the Politics of Policy Ad- \n\viation. (3) Two 1½-hour lectures per week. Starting with an overview of policy-making processes in the U.S., this course examines the functions of advice, who provides it to whom, the conditions under which it is accepted or rejected, and the bureaucratic environment of policy advising. It explores advising by examining domestic and foreign policy issues. (F) Meilman

186. Equal Opportunity, Affirmative Action, and Public Policy. (3) Two 1½-hour lectures per week. Examines the values and interests in equal opportunity policy, with emphasis on affirmative action, minority admissions in higher education, and the policy controversies embodied in recent court cases. The role of the government's role in determining such policies will also be considered. (SP) Hufstetler

187. Legal Institutions and Public Policy. (3) Two 1½-hour lectures per week. Issues of public policy are increasingly resolved by the judiciary. How does judicial policy making differ from policy making as carried out elsewhere in government? How should the issues of policy making in courts be evaluated? The course involves the study of the courts in issues of public policy changed the character of the judiciary? Among current issues interpreting the law and policy to be discussed: abortion, pre-embryonic rights, and environmental zoning. (F) Prerequisites: Consent of Instructor. Examination of the application of analytical and accounting models to public decision making problems. In 259. One 3-hour meeting per week. Prerequisites: Consent of Instructor. This course discusses and criticizes the conceptual foundations of cost/benefit analysis and analyses its depth some important policy issues such as endogenous prices of other commodities, methods as endogenous prices of other commodities, methods to infer willingness to pay, valuation of life, uncertainty, and the rate of discount. (F) Scottcher

190. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: Consent of Instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged. (Staff)

190B. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: Consent of Instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged. (Staff)

191. Supervised Independent Study and Research. (1-4) May be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: Upper division standing. For upper division students wishing to pursue special study and directed research under direction of a member of the staff. Enrollment is restricted to students who have completed the core curriculum. (Staff)

192. Core Curriculum

Note: Core curriculum courses are open only to students in the School of Public Policy.

200A-200B. Introduction to Policy Analysis. (1,4) Grade credit. May be repeated for credit. Consent of instructor. Examination of the sequence of events that make up the policy process and the techniques of problems of public policy. Throughout the academic term, students will apply knowledge of politics, economics, sociology, and quantitative methods in the analysis of increasingly complex problems. (F,SP) Baruch

205. Advanced Policy Analysis. (3) Three hours of seminar per week. Prerequisites: Open only to majors who have completed their core curriculum. Each student will conduct a thorough analysis on a major policy question. In this research, students will apply the interdisciplinary methods approaches and perspectives studied in the core curriculum. (SP) McGuire, Sirdler, Tannenbaum

210A-210B. The Economics of Public Policy Analysis. (4,4) Two 2-hour lectures per week plus one 2-hour section per week. Prerequisites: Open only to students in the Graduate School of Public Policy. Theories of microeconomic behavior of consumers, producers, and bureaucrats are developed and applied to specific policy areas. Ability to analyze the effects of alternative policy actions in terms of 1) the efficiency of resource allocation and 2) equity, is stressed. Policy issues selected to show a broad range of actual applications of theory and a variety of policy strategies. (F,SP) Friedman

220. Law and Public Policy. (4) Two 2-hour lecture/discussions per week. Prerequisites: Open only to students in the Graduate School of Public Policy. Focuses on legal aspects of public policy by exposing students to primary legal materials, including court decisions and legislative and administrative regulations. Skills of interpretation and legal craftsmanship are developed. Re- lationships among law and policy are explored through case-centered studies. (F) Meltsner

220A-220B. Political and Organizational Aspects of Public Policy Analysis. (4,4) Two 2-hour lectures/discussions per week. Prerequisites: Open only to students in the Graduate School of Public Policy. This course examines the political and organizational factors involved in implementing new policies, choosing among alternatives, gaining acceptance, ensuring implementation, and coping with unanticipated consequences. Materials will include case studies, theoretical, empirical, and interpretive works from several disciplines. (F,SP) Kip Kirk

224A-240B. Decision Analysis, Modeling, and Quantitative Methods. (4,4) Two 2-hour lectures per week. Prerequisites: Open only to students in the Graduate School of Public Policy. An integrated course on the use of quantitative techniques in public policy analysis: computer modeling and simulation, linear programming and optimization, decision theory, and statistical and economic analysis of policy-relevant data. The student develops a facility in distilling the policy relevance of numbers through an analysis of case studies and statistical data sets. (F,SP) McGuire

Graduate Courses

250. Political and Organizational Environment of Policy Analysis. (3) One 3-hour meeting per week. This course is intended for students not in the Graduate School of Public Policy interested in developing skills in relating political and organizational factors to the analysis of public policy. Explores political feasibility, especially the ways in which political and organizational considerations constrain the adoption and implementation of alternative policies. Attention is given to the political role of the analyst, planner or advisor. (F) Prerequisites: Consent of Instructor. The process of implementing any new public policy is often attended by delay, the distortion of goals, and minimal results from maximal effort. This course examines the political and organizational factors producing these problems and considers strategies for counteracting them. (F) Scottcher

257. Implementation and the Policy Process. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. The process of implementing any new public policy is often attended by delay, the distortion of goals, and minimal results from maximal effort. This course examines the political and organizational factors producing these problems and considers strategies for counteracting them. (F) Scottcher

259. Cost-Benefit Analysis. (3) Students who have taken 257 or 259 on the quarter system will not receive credit for 257. One 3-hour meeting per week. Prerequisites: Calculus and Intermediate microeconomics or consent of Instructor. This course discusses and criticizes the conceptual foundations of cost/benefit analysis and analyses some important policy issues such as endogenous prices of other commodities, methods to infer willingness to pay, valuation of life, uncertainty, and the rate of discount. (F) Scottcher

260. International Comparative Study of Science and Technology. (3) One 3-hour seminar per week. This course will analyze industrial and science policy from international perspectives. It will provide theoretical foundations to understanding public policy role in science and technology and assess case studies such as biotechnology and aerospace industries to help students understand the political debates regarding technological competitiveness. (Fall 1988 only) Yonehikawa

261. Policy in Higher Education. (3) One 3-hour seminar per week. This seminar will explore current problems and issues in American higher education, with special attention to the future of policy and the processes that shape public policy in this area. Topics will include the history and structure of higher education, its political context, finance, function, and governance. (SP) Trow

262. California Energy and Coastal Protection Policy Analyses. (3) One 3-hour seminar per week. This course will analyze the role of ideologies, the professions, the decision-making process, and analysis in decisions of the California Public Utilities Commission and Coastal Commission. Case materials familiarize students with the agencies and with useful analytical techniques. Content of the course will reflect the role of consultants, planners, public interest groups, and other professionals. We will be in a better position to assess the likelihood effectiveness of their advising. (F) Meilman

263. Methods of Policy Evaluation. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. This course covers several methods of evaluating public programs. The first part will cover the descriptive issues of whether programs have their intended effects; including both process evaluations and impact evaluation, concentrating on different evaluation designs. The second part of the course will cover formative approaches, especially cost-benefit analysis. The course will also examine the political influence of evaluation results. (F)

264. Organizational Analysis and Public Policy. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Examination of the application of static and dynamic models to allocation, organization and implementation problems in the public sector. In- stuctor and student interests will determine specific applications. Students will choose substantive issues for research and the nature of the course. (F,SP) Sinden

265. The Public Policy of Economic Stabilization and Growth. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. Application of economic models (supply-side economics, neo-Keynesian economics, and monetarism) to current public policy. A major theme is the role of government spending: controlling the money supply: lowering interest rates: stimulating capital investment. Includes the use of a large-scale, econometric model to analyze alternative economic policies. (F) Wilson

267. Implementation and the Policy Process. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. The process of implementing any new public policy is often attended by delay, the distortion of goals, and minimal results from maximal effort. This course examines the political and organizational factors producing these problems and considers strategies for counteracting them. (F) Scottcher

269. Cost-Benefit Analysis. (3) Students who have taken 258 or 259 on the quarter system will not receive credit for 259. One 3-hour meeting per week. Prerequisites: Calculus and Intermediate microeconomics or consent of Instructor. This course discusses and criticizes the conceptual foundations of cost/benefit analysis and analyses some important policy issues such as endogenous prices of other commodities, methods to infer willingness to pay, valuation of life, uncertainty, and the rate of discount. (F) Scottcher

270. International Comparative Study of Science and Technology. (3) One 3-hour seminar per week. This course will analyze industrial and science policy from international perspectives. It will provide theoretical foundations to understanding public policy role in science and technology and assess case studies such as biotechnology and aerospace industries to help students understand the political debates regarding technological competitiveness. (Fall 1988 only) Yonehikawa

271. Policy in Higher Education. (3) One 3-hour seminar per week. This seminar will explore current problems and issues in American higher education, with special attention to the future of policy and the processes that shape public policy in this area. Topics will include the history and structure of higher education, its political context, finance, function, and governance. (SP) Trow

272. California Energy and Coastal Protection Policy Analyses. (3) One 3-hour seminar per week. This course will analyze the role of ideologies, the professions, the decision-making process, and analysis in decisions of the California Public Utilities Commission and Coastal Commission. Case materials familiarize students with the agencies and with useful analytical techniques. Content of the course will reflect the role of consultants, planners, public interest groups, and other professionals. We will be in a better position to assess the likelihood effectiveness of their advising. (F) Meilman

278. On leave, spring

279. Recalled to active service

281. Recipient of Distinguished Teaching Award
263. Seminar in Mass Communication Policy. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Examination of selected public policy issues involved in the regulation and operation of the mass media. Particular attention will be directed at policy questions stemming from recent technological innovations.

265. Policies for Youth. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. This seminar deals with the transition between youth and adulthood in advanced industrial societies. The seminar will consider some of the problems associated with this transition and efforts to facilitate this transition or make it more acceptable by public and private agencies to deal with these problems in the U.S. and abroad.

268. Health Policy in the Public and Private Sectors. (3) One 3-hour session per week. Prerequisites: A course in microeconomics. Examination of how health economics. An examination of the government policy in health and the role of the private market. Topics include health care, public finance, and profit and nonprofit health professionals, and the adequacy of the supply of health care professionals. (F) Scheffler

269. Environmental Policy and Regulation. (3) One 3-hour seminar per week. Examination of diverse regulatory policies for enhancing environmental quality. The view point of both environmental economists and effective policy implementation. Special consideration given to the public choice issues raised in environmental regulatory processes and to alternatives to adversarial litigation, such as the mediation of environmental disputes. Topics will be drawn from such diverse fields as public education, wastewater disposal, and waste facility siting. (F) Delli Carpini

270. Scientific Evidence and Public Policy. (3) One 3-hour seminar per week. Examination of the role of scientific evidence in formulating and carrying out public health policies. Discussion of how uncertainties and differing interpretations of evidence affect perceptions of policy participants. Case studies include regulation of carcinogenic chemicals, toxic waste, and recombinant DNA. (F) Kripke

271. Law and Social Change. (3) One 3-hour seminar per week. Prerequisites: Limited to graduates or only those undergraduates who have taken Public Policy 187 and have consent of instructor. Examines the interrelationship of law (court decisions, legislation, administrative regulation) and policy making. Case studies, drawn from such diverse fields as public education, welfare, and environmental reform, will illustrate the role of law in generating, implementing, and thwarting political decisions. Specific topics to be covered will change from year to year; e.g., discretion, compliance, and the law and procedural justice. (F) Holder

272. Program Tasks and Political Environments in State Licensing Agencies. (3) New course. One 3-hour seminar per week. Prerequisites: Consent of Instructor. Governments issue licenses for a wide range of activities. Licensing creates a set of tasks and political dynamics that are similar across programs, despite the many distinctive programs of purposes, size, or complexity. This course explores how licensing tasks and political environment affect the performance of licensing organizations and develops strategies to anticipate and overcome problems that arise.

273. Moral Issues in Public Policy. (3) One 3-hour seminar per week. Prerequisites: Focuses on the ethics of public policy. Examinations of social science research in social policy making by government through case studies in the field of human resources as policy. Linkages between research and policy making. The ethics of research and application of research findings will be emphasized. Examples of relevant case material (the choice will depend on student interests) are the supported work experience, the negative income tax experiment, evaluation of the Job Corps, and the health financing and housing allowance demonstrations conducted by the federal government. (F) Friedman

274. Gender Policy. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. Explores a range of political, legal, and normative issues surrounding current public policy problems in the treatment of men and women. Issues to be considered include employment, social welfare, political participation, discrimination, education, contraception, and abortion. Will draw on the experiences of other industrial societies, including the U.S.S.R. Alternative analytic frameworks will be emphasized.

275. The Problem of Social Cooperation. (3) One 3-hour seminar per week. Exploration of the idea of enlightened self-interest from an ethical, instrumental policy, biological, and cultural point of view. Special consideration given to the concept of self-interest as a basis for social cooperation. (F) Friedman

276. Economic Analysis and Public Policy. (1-3) It will be possible for students to take modules of five or ten weeks on specific topics of their own choosing for course credit. One 3-hour lecture per week. Prerequisites: Economics 255A or consent of instructor. A consideration of selected topics in the economic analysis of urban issues and the relationship to public policy. Topics covered may include urban public finance, analyses of the housing, transport, nonresidential sectors, issues in service delivery and welfare, etc. This course can be repeated for credit. (F) Friedman

277. Knowing and Valuing in Public Policy. (3) One 3-hour seminar per week. Prerequisites: Consent of Instructor. This seminar confronts a series of fundamental policy problems. How does one position oneself in relation to the problems being analyzed? How does one choose among competing kinds of data—and competing models of individual and collective behavior? What role do normative judgments and ethical considerations play? How will link seminal readings to concrete policy issues. (F) Kripke

278. Organizational Decline and Cutoff Management. (3) One 3-hour meeting per week. An examination of how organizations are maintained and to receive resources and to face resource cutbacks. Differences in the response of public and private organizations to fiscal stress will be analyzed. Particular attention will be paid to the threat posed by organizational decline to traditional notions of pluralistic politics. Case studies will be drawn from a variety of sources, including the experiences of New York City's municipal agencies during the fiscal crisis of 1974-78 and the behavior of local government in California following the passage of Proposition 13. (F)

279. Financial Innovation and Public Policy. (3) One 3-hour seminar per week. An examination of the impact of public policy on the nation's rapidly changing financial markets. Selected cases of private markets under public regulation will be studied, including regulatory issues in the venture capital market, the development of alternative mortgage instruments, the investment of pension funds, and other areas of public intervention in the allocation of capital. (F) Friedman

280. Seminar in Energy Policy. (3) One 3-hour seminar per week. Prerequisites: Economics 100A or equivalent and consent of instructor. The nature of the energy problem. Formulation and implementation of energy policy. The theory and the quantitative aspects of energy policy. U.S. energy policy options. A history of energy policy in the U.S. and the Western world during the last four decades.

281. Scientific Evidence and Public Policy. (3) One 3-hour seminar per week. Examines applications of social science research in social policy making by government through case studies in the field of human resources as policy. Linkages between research and policy making. The ethics of research and application of research findings will be emphasized. Examples of relevant case material (the choice will depend on student interests) are the supported work experience, the negative income tax experiment, evaluation of the Job Corps, and the health financing and housing allowance demonstrations conducted by the federal government. (F) Friedman

282. Directed Advanced Study. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Must be third year or beyond. Ph.D. Students of Public Policy. Discussion and analysis of dissertation research projects, including conceptual and methodological problems of designing and conducting public policy research. (F,SP) Staff

283. Advanced Study in Preparation for the Master's Essay. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for Ph.D. Individual study in consultation with a dissertation advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-10) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for Ph.D. Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Related Courses in the Program in Public and Nonprofit Management

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3)

IDS 207. Managers and Management. (3)

IDS 208. Techniques of Management Control. (3)

IDS 209. Applied Microeconomics. (3)

IDS 210. Organizational Understanding for Managers. (3)

IDS 211. Public Sector Accounting. (3)

IDS 212. Financial Management. (3)

IDS 214. Organizational Skill for Managers. (3)

IDS 217. Technology, Tasks and Politics. (3)

IDS 218. Information Resource Management. (3)

IDS 219. Financing Tools for Public Managers. (3)

IDS 220. Management Professionals In Organizations. (3)

For information about these and other courses related to this program, see the section on Public and Nonprofit Management.

Range Management

(Graduate Program of Natural Resources, Interdepartmental Graduate Groups)

Office: 145 Mulford Hall, 642-3785

Professors: Hartley, Ph.D. (Botany)

Don C. Emran, Ph.D. (Forestry and Forest Resources Management)

Sally K. Fairman, Ph.D. (Conservation and Resource Studies, Environmental Science and Resource Economics, Landscape Architecture)

Robert E. Martin, Ph.D. (Forestry and Forest Resources Management)

Joe R. McDonald, Ph.D. (Forestry and Forest Resources Management)

Dale E. McCullough, Ph.D. (Forestry and Forest Resources Management)

James L. Persons, Ph.D. (Ecology)

Edward P. Smith, Ph.D. (Forest and Wildlife Resources Management)

Dale E. Tegeder, Ph.D. (Forestry and Forest Resources Management)

Henry F. Heads, Ph.D. (Emeritus) (Forest and Forest Resources Management)

Jimmy J. Vaux, Ph.D. (Emeritus) (Forest and Forest Resources Management)

John A. Zwicka, Ph.D. (Emeritus) (Forestry and Forest Resources Management)

Associate Professors:

Reginald H. Barrett, Rd. (Forest and Forest Resources Management)
offers a small number of courses sponsored by religious studies, including thematic topics of religion and the introductory courses (one of which surveys the world’s religions). To this latter, an introduction to the study of religious phenomena (see below).

The group major in religious studies is administered through the Division of Special Programs. Students are referred to that office for study list filing and other administrative matters.


Upper Division Requirements: Two methodological courses from the following: Anthropology 158 (Religion and Anthropology), History 104 (Sociology of Religion), Sociology 112 (Sociology of Religion), Religious Studies 190 (Topics in the Study of Religion) when topic is methodological.

Two thematic courses from the following: Classics 178 (Mythology) or Comparative Literature 185 (Myth and Literature), Religious Studies 115 (Mysticism) or Comparative Literature 125 (The Mystical Tradition in Literature), Religious Studies 190 (Topics in the Study of Religion) when topic is thematic.

Three courses in one of the fields of emphasis (see below).

Additional religious courses to make a total of at least 30 upper-division units. The selection of these courses must be approved in writing by a major adviser (see the religious studies secretary at the beginning of each semester for a current list of courses on topics in religion).


Hinduism: At least nine units from the following: South Asian 121, 127, 140, 141, 155. Additional courses: History of Art 130A-130B, South Asian 122, 129, 131, 160. Recommended: students intending to do graduate work in Hinduism should study Sanskrit.


Islam: At least nine units from the following list: Near Eastern Studies 140, 141, 142, 143A-143B, 144. Additional courses: History 109A, Near Eastern Studies 121A-121B, 145, 172. Recommended: students intending to do graduate work in Islamic studies should study Arabic.

Christianity: At least 11 units from the following: Religious Studies 120A, or History 185A, Religious Studies 120B or History 185A, History 185B or 156A, Religious Studies 115; additional courses: Classics 125 (Arabic), Religious Studies 121A-121B, Religious Studies 121A-121B, History 104A-104B, History 104A, 104B, (Hebrew) 102A-120B, Near Eastern Studies 130A-130B, Religious Studies 120A. Recommended: students intending to do graduate work in Christianity should study Latin, Greek, and German.

Honors Program. Students majoring in either Area Studies or General Studies may elect to attempt to complete the requirements for the honors program if they have done well in both general university work and the major courses at the beginning of their senior year. Required are upper division work in a language relevant to the student's academic program (with consent of adviser) and the submission of a bachelor's thesis as a culmination of one or two semesters of study. Religious Studies H195A-H195B, the thesis to be approved by both the adviser and the student's thesis director, if these are different.

Lower Division Courses
90A-90B. Introduction to Religious Studies (4/4) Three hours lecture per week. Two-semester sequence designed as a survey of major religious traditions and an introduction to major themes in the comparative study of religions. Methodological and topical issues in the history and study of religion will be interwoven with the exploration of intercultural religious phenomena such as ritual, myth, the concept of the sacred, religious community, and ethical guides. (FSP) Juengensmeyer

Upper Division Courses
115. Mysticism. (3) Three hours lecture per week. Studies in the literature and poetry of various mystical traditions, including readings of scripture, lyrical poetry, spiritual discourse, autobiography, etc. The relationship of various forms of mysticism to their religious traditions will be treated. (FSP) Juengensmeyer

120A. Origins of Christianity. (4) Three hours lecture per week plus one hour of discussion with extra preparation. The early Jesus movement in its social and historical setting. Particular attention to the transformations of various Jewish religious concepts; traditions about Jesus; political and religious eschatological themes and his interpreters. (FSP) Juengensmeyer

120B. Origins of Christianity. (4) Two hours of lecture and two hours of seminar per week. Varieties of Early Christianity. Conflict of interpretation of both Old Testament and Christian message; Gnosticism; gnostic; martyrdom; radical prophecy; the idea of heresy and its tradition. (FSP) Juengensmeyer

190. Topics in the Study of Religion. (3) Course may be repeated for credit. Three hours lecture per week. Selected topics or problems in the study of religion. (FSP) Juengensmeyer

H155A-H155B. Honors Course. (3) Independent study course. May take the option of the instructor and student with credit to be earned upon completion of a successful thesis. Successful completion of the course will normally, but not necessarily, mean the awarding of honors. (FSP) Juengensmeyer

199. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/credit basis. Independent study tutorial instruction in areas not covered by regularly scheduled courses. (FSP) Juengensmeyer

Rhetoric (College of Letters and Science)

Office Department: 2125 Dwinelle Hall, 642-1415

Professors:
Robert L. Beloff, Ph.D. Northwestern University, Prosody, modern poetry
Susan E. Clough, Ph.D. University of Michigan, Narrative structure, film, semiotics
Evelyn Fox Keller, Ph.D. Harvard University, Science, technology, bioethics, feminist philosophy
Leonard Nathan, Jr., Ph.D. University of California, Poetry, modern poetry
Arthur J. Quinlan, Ph.D. Princeton University, Nonfictional narrative
Janette L. Richardson, Ph.D. University of California, Poetry, modern poetry
Chaucer, Medieval rhetoric, Chaucerian, Middle English, Richard Lower, Ph.D. Harvard University, Early modern rhetoric
Thomas C. Sutcliff, Ph.D. Northwestern University, Renaissance literature, humanist rhetoric
Edward N. Barnhart, Ph.D. (Emeritus) University of California, Poetry, modern poetry
William J. Brandt, Ph.D. (Emeritus) University of California, Poetry, modern poetry

Associate Professors:
David Cohen, Ph.D., J.D. Cambridge University, U.K., University of California, Classics, law, rhetoric
Barbara Shapiro, Ph.D. University of California, Oral interpretation, oral literature
Lawrence Spalding, Doctor of Divinity, ordination, habilitation, University of Montpellier, I. Classical rhetoric, Roman law

On leave, spring
On leave, winter
On leave
On leave, winter
Major Advisers: Check department office.
Graduate Adviser: Mr. Cohen.

Rhetoric studies the communicative relationship between author and audience. This approach to written and spoken communication, of whatever type, necessitates the consideration of the author's intention to persuade, entertain, or inform his audience through the force of discourse. Modern rhetoric adopts classical theories of persuasion to all forms of discourse, and is also concerned with the extension and development of rhetorical theory itself. The aim of the department's undergraduate program is to educate majors who are sophisticated readers in a wide range of discourse, who can present and defend their interpretations persuasively, whether orally or in writing, and who are prepared to develop effective arguments in the areas studied, once they acquire the necessary knowledge. Students in the major program progress from the mastery of basic skills to the study of theory and history and complete their work with refinement of both in courses applying theory to the analysis of texts. Graduate courses deal with rhetorical theory, its history, and its application to special topics.

Major Program

Undergraduate courses in rhetoric are grouped into three categories: theory and history of rhetorical practice, the form of discourse, and argumentative and declarative discourse. For the major, students must fulfill the following requirements: Rhetoric 1A-1B (or 10); 30, 32, and 100, plus seven additional upper division courses, which must include at least one course from each of the three categories:

I. Theory and History of Rhetorical Practice. Theory courses explore the major efforts to establish a philosophical basis for rhetorical practice. History courses familiarize the student with rhetoric as a continuous part of Western intellectual tradition from the Classical period to our own time: Rhetoric 101, 105A, 105B, 105C, 105D, 105E, 121A, 126, 164, 165, 166, 168. 

II. Fictive Discourse. These courses examine the ways in which modes such as lyric poetry, the novel, and the epic achieve their special impact on audiences: Rhetoric 102, 121A, 122, 124, 125, 135, 142, 144, 156. 

III. Argumentative and Declarative Discourse. These courses provide methods for analyzing the persuasive strategies employed in various kinds of argument including legal, political, philosophic, historical, and religious: Rhetoric 110, 130, 131, 150, 152, 153, 154, 155, 160, 161, 162, 163, 172, 173, 175. 

Rhetoric 1A-1B (or 10), and 30 are prerequisites to all upper division courses unless otherwise specified. A grade of C- or better in courses 30, 32 and 100 is required to receive credit toward completion of the major program.

Passed or Not Passed. No course taken passed or not passed may be used to satisfy a requirement for the major.

Honors Program. A thesis is required of all majors seeking to earn the B.A. degree with honors. Three units of credit for Rhetoric 1H30 may be applied toward graduation for this project. To receive departmental honors the student must complete the honors course with a B- or better and have an overall grade-point average of 3.3 or better and a grade-point average of at least 3.3 in all rhetoric courses.

Minor Program

To receive a minor in rhetoric, students must complete the following: one lower division elective from Rhetoric 1A-1B, 10, 30 or 32; Rhetoric 100; and four upper division electives from courses numbered between 101 and 175.

Graduate Program

The Department of Rhetoric offers programs leading to both the M.A. and Ph.D. degrees. Students are admitted to the graduate program in the fall semester only. The first three or four semesters are spent preparing for the M.A. examination, a general three-hour examination covering the major areas of study within the department. Predoctoral students with an M.A. from another department or institution must also pass the M.A. examination with a recommendation for continued graduate work by the end of their second year of study. For the M.A. degree in Rhetoric, six semester courses are required of which at least five must be graduate courses in Rhetoric. They must include the following: Rhetoric 200 (The Classical Origins of the Rhetorical Tradition) and 205 (Contemporary Rhetorical Criticism). In addition, the M.A. or Ph.D. candidate must enroll in Rhetoric 302A, and either 300B or 300C (Problems in Teaching Rhetoric). Each M.A. or Ph.D. candidate is also required to serve as a graduate student instructor in the Rhetoric Department for one year. Opportunities for continued employment beyond the requirement are available. Individual programs for all graduate students are carefully planned in consultation with the graduate adviser.

Lower Division Courses

1A. The Craft of Writing. (4) Three 1-hour lecture and discussion meetings per week plus individual conferences. Prerequisites: Subject A or examination. Rhetorical approach to reading and writing argumentative discourse. Close reading of selected texts; written themes (minimum 10,000 words) developed from class discussion and analysis of rhetorical strategies. (F,SP) 

1A(L). Introduction to Language and the Craft of Writing. (5) New course. Three 1-hour lectures and discussion meetings weekly plus individual conferences. Prerequisites: Subject A. A Dept. approval. Rhetorical approach to reading and writing argumentative discourse. Close reading of selected texts, including those addressing the nature and functions of language. Written themes (minimum 10,000 words) developed from class discussion and analysis of language issues and rhetorical strategies. A grade of C or higher fulfills the Subject A requirement. Six workload units in computation of study list. (F,SP) 

1B. The Craft of Writing. (4) Three 1-hour lecture and discussion meetings per week plus individual conferences. Prerequisites: 1A or equivalent. Intensive argumentative writing drawn from controversy stimulated through selected readings and class discussion. (F,SP) 

2. Fundamentals of Public Speaking. (2) Must be taken on a passed/not passed basis. Two 1/2-hour meetings per week. Practice in the oral presentation of ideas. (F,SP) 

10. Principles of Argumentation. (4) Three 1-hour lecture and two 1/2-hour discussion/performance meetings per week plus individual conferences. The techniques of rhetorical analysis through close reading of assigned texts, with emphasis on problems of evidence, inference, induction, deduction, semantic arguments, arguments from authority, and rhetorical terms. Students will be required to analyze as well as create argumentative prose, writing five to six papers for a total of approximately 8,000 words. Required for the major for students who did not take Rhetoric 1A-1B. (F,SP) 

30. Rhetorical Theory and Oral Argument. (4) One 1-hour lecture and two 1/2-hour discussion/performance meetings per week. Prerequisites: 1A-1B or 10. Examination of basic principles of rhetoric and strategies of argumentation, with practice in oral argument. (F,SP) 

32. Fundamentals of Oral Interpretation. (4) Students who have taken 32A may not receive credit for 32. Three 1-hour meetings per week. Use of oral performance as a critical tool in the rhetorical analysis of literature, primarily lyric poetry. (F,SP) 

Upper Division Courses

100. The Rhetorical Tradition. (4) Three 1-hour lectures and one 1-hour of discussion/performance meeting on the major texts of rhetorical theory in Classical antiquity, with consideration of various modern extensions of the theory. (F,SP) 

Mayall

101. Modern Rhetorical Theory. (4) Three 1-hour lectures per week. Prerequisites: Rhetoric 30. Close reading of a contemporary American or European writer. The point of view can be described as rhetorical: Richards, Burke, Cassirer, and others. (F,SP) 

102. Intermediate Oral Interpretation. (4) Students who have taken 32B may not receive credit for 102. Three 1-hour meetings per week. Prerequisites: 32. Use of oral performance as a tool for rhetorical analysis of narrative and dramatic genres. (F,SP) 

Beldof

105. Rhetorical Theory and Practice In Historical Eras. (4) Three 1-hour lectures per week. Examination of how rhetorical principles and patterns operate in an author's or speaker's presentation of self in relation to the character of an intended audience. (F,SP) 

Richardson

105A. Middle Ages. (3) Formerly 101. (SP) Shapiro

105B. Renaissance. (3) Formerly 102. (F) Shapiro

105C. Seventeenth Century. (3) Formerly 103. (SP) Shapiro

105D. Enlightenment. (3) Formerly 104. (SP)

110. Advanced Argumentative Writing. (4) Three 1-hour meetings per week plus individual conferences. Prerequisites: Any 1A-1B sequence or upper division standing. Intensive practice in argumentative writing, mainly on topics of current concern. (F,SP) 

Chattam

121A-121B. Rhetoric of Fiction. (4) Three 1-hour lectures per week. Prerequisites: A is prerequisite to B. 

A. Form: Definition and techniques of narrative, including voice, point of view, time orders, and related matters. (F) 

Chattam 

B. Content and Context: Interpretation of authorial intentionality in selected works of modern fiction, in terms of their cultural and historical contexts. (SP) 

Willy

122. Rhetoric of Drama. (4) Three 1-hour lectures per week plus individual conferences. Examination of the way character is created in drama by repetitive rhetorical patterns and the ways themes are defined by manipulation of such patterns. (F) 

124. Rhetoric of Poetry. (4) Three 1-hour lectures per week. Prerequisites: 30. Consideration of the relationship between the texture of poetic discourse and the formal figure patterns defined by figures of speech and overall poetic structures. (SP) 

Connely

125. Rhetoric of Modern Poetry. (4) Three 1-hour lectures per week. A rhetorical approach to a broad selection of important twentieth-century poems from Yeats to such contemporary poets as Ashbery and Stafford, and including works from such European poets as Rimbaud, Vorak, Ekelof, and Milosz. (SP) 

126. Rhetoric of Symbolism. (4) Three 1-hour lectures per week. Prerequisites: 30. The functions of language in literature, especially poetry: the literal symbol; the nature and function of figures of speech. (F) 

Belof 

128. Novel into Film. (4) Three 1-hour lectures per week plus viewing sessions. Close examination of the adaptation of written fiction to the cinema. Focus on problems arising from the transformation of five novels which have been rewritten into their filmed versions. (SP) 

Chattam

130. Political Oratory. (4) Three 1-hour lectures per week. Theory and practice of deliberative oratory, with emphasis on the study of actual speeches from American, English, French, Italian, and 18th and 19th centuries British and American parliaments. (SP)
131. Rhetoric of Religious Discourse. (4) Three 1-hour lectures per week. Consideration of the rhetoric of hermeneutics or biblical interpretation with special emphasis on the mythical, symbolic, and allegorical language as the bearer of prescriptive intention.

132. Rhetoric of Narrative Genres in Nonliterature Societies. (4) Three 1-hour lectures per week. Investigation of the roles played by narratives common to various genres of narrative, both prose and poetic, in nonliterature societies. Mythic, epic and folk narratives considered as well as written works from cultures in transition. (SP)

142. The Lyric Mode. (4) Three 1-hour meetings per week. Prerequisites: 32A and 32B. Understanding of literary genres through group performances. (SP)

150. Rhetoric of Contemporary Politics. (4) Three 1-hour lectures per week. Examination of the characteristic rhetoric of a variety of publications on political and social issues. Emphasis on building a theoretical foundation for critically observing and participating in the contemporary political process.

152. Rhetoric of Constitutional Discourse. (4) Three 1-hour meetings per week. The rhetorical context of the Federalist Examine the tradition of Anglo-American constitutional argumentation in the eighteenth century, its sources, and its implications. Readings include Locke, Hume, Montesquieu, philosophers of the American Revolution, Antifederalists, and Federalists. (SP)

153. American Political Rhetoric. (4) Three 1-hour lectures per week. A survey of the ways in which Americans have discussed their existence as a distinct nation and their public political rights and obligations. Readings cover the seventeenth to the twentieth centuries and include pamphlets, novels, philosophy, social theory, autobiographies.


155. Rhetoric of Imperialism. (4) Three 1-hour lectures per week. Analysis of rhetorical patterns in official and public documents relating to English, French, and German imperial expansion policies in the 19th century; special attention to Middle Eastern and African spheres of interest. (F)

156. Rhetoric of the Political Novel. (4) Three 1-hour lectures per week. The political-theoretical significance of 20th century works of fiction in which political stances are exploited as dominant themes; close reading of authorial viewpoints and rhetorical strategies. (SP)

160. Introduction to the Rhetoric of Legal Discourse. (4) Three 1-hour lectures per week. The application of rhetorical methodology to all categories of legal texts. (F)

161. Rhetoric of Legal Argumentation. (4) Three 1-hour lectures per week. Analysis of the special function of rules and values in legal argumentation; emphasis on the interplay of legal theory and policy in the operation of social values through legal persuasion. (F)

162. Rhetoric of Legal Proof. (4) Three 1-hour lectures per week. Examination of major 19th and 20th century works of fiction in which political stances are exploited as dominant themes; close reading of authorial viewpoints and rhetorical strategies. (SP)

163. Rhetoric of Legal Advocacy. (4) Three 1-hour lectures per week. Exploration of how major rhetorical strategies are used in legal practice to transform social conflicts into legal disputes which can be resolved by the judiciary. (SP)

164. Rhetoric of Legal Theory. (4) Three 1-hour lectures per week. Rhetorical methodology applied to close analysis of the argumentative framework of important works in modern legal theory. (SP)

165. Rhetoric of Legal Philosophy. (4) Three 1-hour lectures per week. Consideration of basic philosophical issues related to the political and moral foundations of the law. (F)

166. Rhetoric, Law, and Politics in Ancient Greece. (4) Three 1-hour lectures per week. Examination of the role of rhetoric in Greek legal and political thought. (SP)

168. Rhetoric, Law, and Political Theory, 1500-1700. (4) Three 1-hour lectures per week. Examination of European political and legal discourse from 1450 to 1700.

172. Rhetoric of Social Theory. (4) Three 1-hour lectures per week. Rhetorical analysis of theorists from Durkheim and Weber, as well as Marx, Ricardo, and Bentham, to contemporary representatives of social and economic thought.

173. Rhetoric of Historical Discourse. (4) Three 1-hour lectures per week. Examination of the rhetorical practices of selected narrative historians such as Gibbon and Carlyle; historical discourse considered as a subversive act.

175. Rhetoric of Philosophical Discourse. (4) Three 1-hour lectures per week. Introduction to theoretical issues involved in applying rhetorical analysis to philosophical discourse; intensive analysis of selected philosophical works.

176. The Problem of Evil and the Rhetoric of the Modern Novel. (4) New course. Three hours of lecture per week. This course will focus upon the problem of evil as one of the central concerns of 19th-century philosophical fiction. With the post-Enlightenment breakdown of traditional theologicalphilosophical justifications, the search for new strategies of explanation of the sources of evil emerges as a significant motif in the late 18th and 19th-century novel. (F)

190. Senior Thesis. (3) Tutorial. Prerequisites: Senior standing and consent of adviser. Independent study under guidance of a faculty director culminating in a written thesis. (F,SP)

198. Supervised Group Study. (1-3) Course may be repeated for credit. Individual tutorial. Open to qualified graduate students wishing to do special research under the guidance of a faculty director. (F,SP)

200. Classical Origins of the Rhetorical Tradition. (4) Formerly 200A-F. Students who have taken 200A-200B may not receive credit for 200. Three hours of seminar per week. Prerequisites: Graduate status. A detailed examination of the development of the Western rhetorical tradition in ancient Greece and Rome. This course is normally required of all graduate students. (F,SP)

205. Contemporary Rhetorical Theory and Criticism. (4) Three hours of seminar per week. Prerequisites: Graduate status. Intensive examination of the issues confronting rhetorical criticism in the 20th century. Normally required of all graduate students. (F)

215. Research Methodology for Doctoral Study in Rhetoric. (2) Two hours of seminar per week. Prerequisites: M.A. degree. An introduction to research methodology, bibliography, and scholarly writing in the field of rhetoric.

230. Advanced Studies in the History of Rhetoric. (4) Course may be repeated for credit with different topic. Three hours of seminar per week. Prerequisites: Graduate status. Rhetoric in the specified historical era, both as expounded by theorists and as it permeated various forms of discourse. Special topics to be announced.

240A. Ancient Greece.
240B. Ancient Rome.
240C. The Middle Ages.
240D. The Renaissance.
240E. The Seventeenth Century.
240F. The Enlightenment.
240G. The Nineteenth Century.

240A. Rhetorical Theory and Criticism. (4) Course may be repeated for credit with different topic. Three hours of seminar per week. Prerequisites: Graduate status. Advanced investigation of the rhetorical dimensions of various models of discourse. Specific topics to be announced.

240A. Poetry. (F)
240B. Novel. (SP)
240C. Oral Literature. (F)
240D. Nonfictional Prose.
240E. Political Discourse.
240F. Legal Rhetoric and Philosophy. (SP)
240G. Rhetorical Theory.

270. Senior Thesis. (3) Tutorial. Prerequisites: Senior standing and consent of adviser. Independent study under guidance of a faculty director culminating in a written thesis. (F,SP)

280. Special Study. (1-3) Course may be repeated for credit up to a total of 6 units. Individual tutorial. Prerequisites: Approval of graduate adviser. Open to qualified graduate students wishing to do special research under the direction of the faculty. (F,SP)

601. Individual Study for Master's Students. (1-5) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual arrangement. Prerequisites: Graduate status. Individual study for degree or language examinations in consultation with faculty director as preparation for degree examinations. (F,SP)

602. Individual Study for Doctoral Students. (1-5) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual arrangement. Prerequisites: Graduate status. Individual study in consultation with faculty director as preparation for degree examinations. (F,SP)

Professional Courses

300. Problems in Teaching Rhetoric. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Appointment as a graduate student instructor.

300A. Instruction in Teaching Argumentative Writing and Rhetorical Analysis. Course may be repeated for credit. (F,SP)
300B. Instruction in Teaching Public Speaking. Course may be repeated for credit. (F,SP)
300C. Instruction in Teaching Oral Interpretation. Course may be repeated for credit. (F,SP)

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award
301A-301B. Pedagogical Practice. (4/4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three 1-hour discussions per week plus individual conferences. Prerequisites: Appointment as a graduate student instructor. Supervised classroom teaching. (F,SP)

Romance Philology
(College of Letters and Science)

Program Office: 4315 Dwinelle Hall, 642-2107 or 642-0471

Professors:
Jerry C. Redcrock, Ph.D. University of California at Berkeley, Modern Romance languages, literature
Joseph J. Duggan, Ph.D. Ohio State University, Medieval French literature
Charles B. Faulhaber, Ph.D. Yale University, Medieval Spanish literature
Suzanne Fleischman, Ph.D. University at California at Berkeley, Historical Romance linguistics
Ruggiero Steffani, Dottore in Lettere University of Florence, Italian philology, dialectology
Yakov Malcol, Ph.D. (Emen^irs) University of Berlin, Romance, comparative, historical linguistics

Associate Professor:
Denuta Shanzer, D. Phil. Oxon. Late Latin literature

Graduate Adviser: Charles B. Faulhaber.

The Ph.D. Program. The Group in Romance Philology administers a program designed to train graduate school teachers and research scholars in the fundamental disciplines of Romance Philology, Romance historical linguistics, and the medieval Romance literatures. Prerequisites are an M.A. or its equivalent in a relevant discipline (e.g., one of the modern Romance languages, linguistics, classics, comparative literature) and a good knowledge of at least one modern Romance language. Once admitted the student must pass reading examinations in French, Italian, Spanish, Latin, and German. There are no formal course or unit requirements. The program is tailored to the needs and interests of the individual student; courses may be taken in a variety of departments but especially French, Italian, Spanish and Portuguese, Linguistics, Comparative Literature, Classics, and Medieval Studies.

The student's progress in the program will be evaluated by the faculty of the group ata the end of the second term in the program. Permission to proceed will be granted only if the group believes that the student shows promise of completing the degree within a reasonable length of time.

In the qualifying examination (three hours, oral) the student is held responsible for seven fields of interest, four of which are obligatory (history of French and Spanish literature, 1503, of Italian literature to 1400; traditional historical and philological criticism as applied to medieval texts; comparative Romance linguistics, with emphasis on the historical grammar of French, Italian, and Spanish; highlights in the History of Romance linguistics). The other three might deal with the dialectology of a particular language, the history or literature of one of the minor Romance languages, a field in general linguistics, or other relevant areas.

Nominal time for completion of the degree is five years, though for preparation of the qualifying examination, two for the dissertation.

Graduate Courses

200. Linguistic History of the Roman Empire. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The spread of Latin over the Western Mediterranean area and its gradual change into the Romance dialects, with emphasis on substrata and superstrata. (F,SP)

201. Late Latin Language and Literature. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The internal history of colloquial Latin and Late Latin, down to the Carolingian period, on the basis of original sources. Shanzer

202. General Romance Linguistics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Problems of methodology in historical linguistics applied to the major and minor Romance languages. (F,SP)

203. Old Provençal. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. A history of the Old Provençal (or Ocitan) literary language and its component dialects combining historical grammar and reading of texts. (F,SP)

204. Problems in Romance Morphology and Syntax. (3) Course may be repeated for credit. Three hours of seminars per week. Prerequisites: Consent of instructor. Problems and methods in diachronic morphology and syntax and their interrelations. (SP)

205. From Romance Dialect Geography to Sociolinguistics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Classical and experimental methods of eliciting, recording, and interpreting dialect data, with equal attention to regional and social dialects.

207. Hispano-Romance Dialectology. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. General survey and specific research projects in the field of italien dialectology following diachronic, synchronic, and sociolinguistic approaches. Attention will be given to connections with surrounding Romance areas such as Friulian, Rhaeto-Romance, Sardian. (F,SP)

211. Highlights in the History of Romance Linguistics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The major schools and scholars that dominated the course over a century and a half (1800-1950) and the vital problems they raised.

212. The Romance Epic. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Reading and analysis of selected texts from the first documents of the Catalan language to the works of the major authors of the 15th century. Faulhaber

220. Seminar in Romance Philology. (3) New course. Course may be repeated for credit when topic changes. One 3-hour seminar per week. Selected topics in the history of the Romance languages. (F,SP)

299. Special Advanced Study. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Variable. Individual research (F,SP)

602. Individual Study for Doctoral Students. (1-6) May not be used for unit or residence requirements for the doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Variable. Prerequisites: For candidates for doctoral degree. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP)

Related Courses in Other Departments


Latin 140, Medieval Latin; Latin 155A-155B, Latin of the fourth and fifth centuries.

Comparative Literature. 152, The Middle Ages; 202A, Approaches to Genre: Epic and Saga; 212, Studies in Medieval Literature.

English. 110A-110B, Medieval Literature; 111, Chaucer; 112, Middle English Literature; 207A, Readings in Medieval Latin; 211, Chaucer; 212, Readings in Middle English; 246A-246B, Graduate Proseminars: Medieval.


German. 273, Gothic.

Italian. 109A-109B, Dante's Divine Comedy; 110A-110B, Literature of the 13th and 14th Centuries; 201, Historical Grammar; 206, Minor Medieval Authors; 209, Seminar on Dante; 210, Seminar on Petrarca; 213, Seminar on Boccaccio.

Linguistics. 110, Introduction to Phonetics and Phonology; 115, Morphology; 120A-120B, Introduction to Syntax and Semantics; 122, Language and Typology and Linguistic Universals; 130, Comparative and Historical Linguistics; 131, Indo-European Comparative Linguistics; 150, Historical Linguistics; 151, Language Variation; 200, Graduate Proseminar in Linguistics I; 201, Graduate Proseminar in Linguistics II; 216, Word Formation; 217, Linguistic Implications of Lexicology and Lexicography; 230, Historical Linguistics; 231, Historical Semantics; 235, History of Linguistics; 236, Major Schools of Structural Linguistics.


250, Studies in Medieval Culture.

Spanish and Portuguese. 108, Spanish Ballads; 126, Medieval Spanish Literature; 179, Advanced Course in Hispanic Linguistics; 202A-202B, History of Ibero-Romance; 209, Seminar in Hispanic Linguistics; 230, Introduction to Medieval Hispanic Literature; 246, Hispanic Paleography

Portuguese 150, Introduction to Portuguese Linguistics.

Catalan 101, Catalan for Advanced Students; 102, Readings in Catalan.

Scandinavian
(College of Letters and Science)

Department Office: 1314 Dwinelle Hall, 642-4484

Professors:
Carol J. Clover, Ph.D. Medieval culture, film history
Eric C. Johansen, Ph.D. Modern Scandinavian literature, Strindberg
Jan L. Larsson, Ph.D. Lyric, history, learning
John Lindow, Ph.D. Philology, folklife, medieval literature

Associate Professors:
Birgir Gudlaugsdottir, Ph.D. (Emen^irs) Danish literature, ecclesiastical drama
Gregory P. Nybo, Ph.D. Norwegian literature, narrative, drama

The Department of Scandinavian offers undergraduate majors in three Scandinavian languages, Danish, Norwegian, and Swedish, and courses in English in Scandinavian literature and culture, ancient and modern.

The Major

Lower Division. Three courses from the following course sequences: Scandinavian 1A-1B, 11; 3A-9B, 13; 4A-4B, 14; or the equivalents.
The Minor

Required courses: Five upper division courses.
1) Minimum of one course in Scandinavian history; Scandinavian 123, 127, 128.
2) Four electives.

Graduate Program

Aims of the Program. The graduate program in Scandinavian is designed for future scholars and teachers of the fields of Scandinavian language and literature. The program leads to the Master of Arts and Doctor of Philosophy in Scandinavian. The department is ready to entertain proposals for alternate or interdisciplinary programs from students with special interests in areas such as art, folklore, history, and linguistics. Interested students should submit detailed written proposals for such programs to the Director for action.

Preparation. The A.B. in Scandinavian, or its equivalent, is ordinarily prerequisite to admission. Preparation should include comprehensive knowledge of one Scandinavian language and good reading ability in at least one other, as well as knowledge of the broad outlines of Scandinavian culture and history. Students with less preparation may be admitted under the stipulation that deficiencies be corrected.

Master of Arts. General requirements: 24 units in Scandinavian, including at least 12 graduate units. Courses from other departments may be accepted with the consent of the graduate advisor. Students will prepare a major and a minor field, the major field to be studied comprehensively. Students will present a Scandinavian literature as a major field, for example, must work in three periods: Middle Ages, Reformation to Romanticism, and Realism to the 20th Century. Art in the Scandinavian countries will be taught in this program, students will be given the knowledge of both the major and the minor fields with emphasis upon the literature in the major language.

The Ph.D. in Scandinavian. General requirements: an M.A. in Scandinavian, or the equivalent. Students must complete two semesters of work in Old Norse, pass the departmental requirements in two foreign languages, and submit three field papers as examples of their scholarly ability. Much of the course work at the Ph.D. level will be advanced tutorial, stressing independent work and scholarly skills. Students will present three subjects at their qualifying examinations, a major and two minors. Upon passing the qualifying examination the student is advanced to candidacy and begins dissertation research.

Lower Division Courses

The College of Letters and Science is planning to implement the following policy beginning fall semester 1980:

Duplication of credit: All students first admitted to the College of Letters and Science in fall semester 1980 and thereafter will not be allowed baccalaureate credit (unit credit) for Letters and Science courses in lower division foreign language that duplicate material completed previously in high school or at another collegiate institution. (Students will, however, be allowed study-list credit in the semester in which they take a course that duplicates such work.)

High school equivalencies are evaluated as follows: the first two years of high school foreign language are considered equivalent to an additional semester in college. College-level equivalencies are determined on a course-by-course basis.

1A. Elementary Swedish. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (F) Staff
1B. Elementary Swedish. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (SP) Staff
3A. Elementary Norwegian. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (SP) Staff
3B. Elementary Norwegian. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (SP) Staff
4A. Elementary Danish. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (SP) Staff
4B. Elementary Danish. (5) Five 1-hour sessions per week. Emphasis on tenses and stories. (SP) Staff
11. Intermediate Swedish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 1A. Intermediate grammar, easy reading, composition. (F) Staff
12. Intermediate Norwegian. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 3B. Intermediate grammar, easy reading, composition. (F) Staff
75. Scandinavian Culture and Society. (3) Three 2-hour lectures per week. Course to concentrate upon such historical periods as the Viking Age, the Baroque (emphasis on scientific and political developments), the late nineteenth century (emphasis on literature and art), and the twentieth century (emphasis on the politics and culture of the welfare state). (SP) Staff
101. Advanced Swedish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 11 or the equivalent. Grammar review, reading, composition. (SP) Staff
103. Advanced Norwegian. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 13 or the equivalent. Grammar review, reading, composition. (SP) Staff
104. Advanced Danish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 14 or the equivalent. Grammar review, reading, composition. (SP) Staff
107. Plays of Ibsen. (3) Three 1-hour lectures/discussions per week. Reading and discussion of Ibsen's works. (F) Nybo
108. Strindberg. (3) Three 1-hour lectures per week. Reading and discussion of Strindberg's major works; emphasis on his dramas and their significance. (F) Staff
109. 20th Century Scandinavian Drama. (3) Three 1-hour lectures per week. Reading of modern Scandinavian dramas in translation. (SP) Staff
110. H.C. Andersen. (3) Three 1-hour lectures per week. Reading of Andersen's works, but some attention will be given to Andersen's novels, travel accounts, and autobiographies. (SP) Staff
112. Hamsun and the Modern Novel. (3) Three 1-hour lectures/discussions per week. The best of Ham- sun's literature and those of England and Germany. Emphasis is on the cultural and social background. (SP) Nybo
114. Isak Dinesen. (3) Three 1-hour lectures/discussions per week. Readings and discussion of Dinesen's best works and stories. (F) Johannessen
120. The Novel in Scandinavian. (3) Course may be repeated for credit. Three 1-hour lectures/discussions per week. Readings and discussion of the great Scand-

Upper Division Courses

123. Viking and Medieval Scandinavia. (3) Three 1-hour lectures/discussions per week. Internal and external history of Scandinavian culture and civilization from the late 8th century through the 16th century. (SP) Lindow
125. Old Norse Literature. (3) Three 1-hour lectures/discussions per week. Reading and discussion of some of the Icelandic sagas and selections from the Eddas and skaldic verse. (SP) Staff
127. Scandinavian From 1520-1800. (3) Three 1-hour lectures per week. Scandinavian society, history, and culture from the Reformation through the Enlightenment. (SP) Staff
128. Scandinavian From 1800-1950. (3) Three 1-hour lectures per week. Scandinavian society, history, and culture from the Napoleonic Era to the years after World War II. (SP) Staff
141A. Introduction to Swedish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Swedish or equivalent. Reading and analysis of representative works from 1700-1870. (SP) Staff
141B. Introduction to Swedish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Swedish or equivalent. Reading and analysis of representative works from 1870 to World War II. (SP) Staff
143A. Introduction to Norwegian Literature. (3) Three 1-hour lectures/discussion per week. Prerequisites: 15 units lower division Norwegian or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
144A. Introduction to Danish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Danish or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
144B. Introduction to Danish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Danish or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
145. Senior Seminar. (2) Course may be repeated for credit. Three 2-hour lectures per week. Scandinavian fiction of the late 20th century. (SP) Staff
147. The Heroic Tradition in Northern Europe. (3) Three 1-hour lectures per week. Reading and analysis of representative works from the Viking Age in Scandinavia and their manifestations in later recordings. (SP) Staff
156. Scandinavian Myth and Religion. (3) Three 1-hour lectures per week. Religious beliefs and practices during the Viking Age in Scandinavia and their manifestations in later recordings. (SP) Staff
162. The Heroic Tradition in Northern Europe. (3) Three 1-hour lectures per week. Reading and analysis of representative works from the Viking Age in Scandinavia and their manifestations in later recordings. (SP) Staff
175. Kierkegaard. (3) Two 1-hour lectures per week. Emphasis on the development of the novel. (SP) Nybo

Scandinavian novels; the development of the novel. (SP) Nybo

123. Viking and Medieval Scandinavia. (3) Three 1-hour lectures/discussions per week. Internal and external history of Scandinavian culture and civilization from the late 8th century through the 16th century. (SP) Lindow
125. Old Norse Literature. (3) Three 1-hour lectures/discussions per week. Reading and discussion of some of the Icelandic sagas and selections from the Eddas and skaldic verse. (SP) Staff
127. Scandinavian From 1520-1800. (3) Three 1-hour lectures per week. Scandinavian society, history, and culture from the Reformation through the Enlightenment. (SP) Staff
128. Scandinavian From 1800-1950. (3) Three 1-hour lectures per week. Scandinavian society, history, and culture from the Napoleonic Era to the years after World War II. (SP) Staff
141A. Introduction to Swedish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Swedish or equivalent. Reading and analysis of representative works from 1700-1870. (SP) Staff
141B. Introduction to Swedish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Swedish or equivalent. Reading and analysis of representative works from 1870 to World War II. (SP) Staff
143A. Introduction to Norwegian Literature. (3) Three 1-hour lectures/discussion per week. Prerequisites: 15 units lower division Norwegian or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
144A. Introduction to Danish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Danish or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
144B. Introduction to Danish Literature. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division Danish or equivalent. Reading and analysis of representative works from 1700 to the present. (SP) Staff
145. Senior Seminar. (2) Course may be repeated for credit. Three 2-hour lectures per week. Scandinavian fiction of the late 20th century. (SP) Staff
147. The Heroic Tradition in Northern Europe. (3) Three 1-hour lectures per week. Reading and analysis of representative works from the Viking Age in Scandinavia and their manifestations in later recordings. (SP) Staff
156. Scandinavian Myth and Religion. (3) Three 1-hour lectures per week. Religious beliefs and practices during the Viking Age in Scandinavia and their manifestations in later recordings. (SP) Staff
162. The Heroic Tradition in Northern Europe. (3) Three 1-hour lectures per week. History, mythology, and literature of the late Viking Age, relating Norse epic traditions to those of England and Germany. Emphasis is on the cult of the hero. (F) Staff
165. Scandinavian Folklore. (3) Three 1-hour lectures per week. Scandinavian folklore, emphasizing oral narrative traditions (ballads, folktales, legends). Proverbs, riddles, folk belief and custom, music, et cetera. (F) Staff

Nybo

On leave, spring

Nybo

On leave, spring

Nybo
240. Lyiodem Scandinavian LHeratuia. (3) Course may be repeated for credit. Three 1-hour lectures/discussions per week. Reading and analysis of representative works. (F,SP) Staff

198. Group Study for Advanced Undergraduates. (2-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Directed study. Prerequisites: Two years of study of one Scandinavian language. Advanced readings and interpretation of Scandinavian literature. (F,SP)

199. Independent Study and Research. (2-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Directed study. Prerequisites: Two years study of one Scandinavian language. Courses in Scandinavian literature, culture, or history. Supervised study. See pages 81 and 82 for enrollment restrictions. (F,SP)

Graduate Courses

200. Introduction to Graduate Study in Scandinavian. (3) Two 1 1/2-hour sessions per week. A problem-oriented course concerned with major areas of graduate study in Scandinavian literature, linguistics and philology, folklore, history, literary criticism. (F)

201A. Old Norse. (3) Three 1-hour lectures per week. An introduction to the language of medieval Iceland and Norway. Grammar, historical phonology, and texts. (F) Clover, Lindow

201B. Norse Literature. (3) Three 1-hour lectures. Prerequisites: 201A or equivalent. Literature of the period of high and early medieval Iceland and Norway. Reading of representative texts in the original. (SP) Clover, Lindow

202. Medieval Scandinavian Literature. (3) Two 1 1/2-hour lectures per week. Laws, historical writings, courtly works, Saao Grammaticae, ballads. Emphasis on Denmark and Sweden. (SP) Clover, Lindow

205. Runology. (3) Course may be repeated for credit with consent of the instructor. Three 1-hour lectures per week. Prerequisites: 201A or 201B. Interpretation and discussion of inscriptions in the elder and younger futharks. Some attention will be paid to English runes. (F)

208. Norse Poetry. (3) Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: 201A or the equivalent. Reading and discussion of major works from the Eddic and skaldic traditions. Investigation of selected topics. (F) Clover, Lindow

210. Graduate Reading. (2-4) Course may be repeated for credit. Lecture, Group Reading course, course on broad areas and directing students in wide reading. May be offered by any faculty member either semester. (F,SP) Staff

220. Seminar on Norse Sagas. (3) Course may be repeated for credit. Three 1-hour seminars per week. Reading and discussion of major prose texts. Course will normally focus on one or two of the main saga genres (royal, family, legendary, courtly, epicopeal). (SP) Clover, Lindow

221. Early Scandinavian History and Culture. (3) Course may be repeated for credit. One 3-hour seminar per week. Historical topics from the Viking Age to the Reformation; emphasis is on extracurricular sources. (F) Clover, Lindow

220. Reformation Through the 18th Century. (3) Two 1 1/4-hour lectures per week. Reading and analysis of representative literary and cultural works. (F) Larson

221. Romanticism In Scandinavia. (3) One 3-hour lecture per week. Reading and analysis of representative works. (SP)

235. Realism In Scandinavia. (3) Course may be repeated for credit. One 3-hour meeting per week. Reading and discussion of major texts from the period 1870-1900. Several oral reports and one substantial paper. (SP) Johannehson

240. Modern Scandinavian Literature. (3) Course may be repeated for credit. Three 1-hour lectures/discussions per week. Reading and analysis of representative works. (SP) Johannehson

Science and Mathematics Education (College of Letters and Science)
602. Individual Study for Qualifying Examination. (1-4) Course may be repeated for credit. Course may not be used to meet unit or residence requirements for the degree. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: Consent of instructor. May be repeated for credit under the supervision of a faculty member, designed to prepare the student for Ph.D. qualifying examination. (F,SP)

Slavic Languages and Literatures (College of Letters and Science)

Department Office: 5416 Dwinelle Hall, 642-2979

Professors:
Ronelle Alexander, Ph.D., Harvard University. Yugoslav literature, Slavic linguistics
Boris Gasparyan, Ph.D., Academy of Science, Minsk. Semiotics, Slavic linguistics
Jose Grossman, Ph.D., Harvard University. 19th century literature, symbolism
Olga Pavlenko-Noakes, Ph.D., University of California. Russian literature
Robert P. Hughes, Ph.D., University of California. Russian and European literature
Simon Karlinsky, Ph.D., University of California. Russian and Soviet linguistics
Walter Schamschula, Ph.D., University of Manitoba. Czech language and literature
Alan Timfierlade, Ph.D., Harvard University. Slavic linguistics
Czeslaw Michalski, Ph.D., Warsaw University. Polish, Romanian
Francis J. Whitteld, Ph.D. (Emeritus)

Senior Lecturers:
Olga Astromoff, M.A., University of California. Russian language, literature
Serge Kassianoff, M.A. (Emeritus)
Olga Golovkina, Ph.D. (Emeritus)
Henryka Yakushev, Ph.D., Moscow State University. Russian, Polish, teaching methodology

Lecturers:
Arkady Alexiev, Ph.D., University of California. Russian language, literature
Agnes Stolbyne-Mihalk, Diplomat. Debrecen, Hungary. Hungarian language

Major Advisers: O. Hughes, R. Alexander.

Graduate Advisers: R. Hughes (Literature), B. Gasparyan (Linguistics).

The Department of Slavic Languages and Literatures offers courses in Slavic languages and literatures and in Slavic linguistics, both for those pursuing the department's own degree programs and for interested students from other disciplines. Many of its course offerings require knowledge of another foreign language. Courses in non-Slavic languages of Eastern Europe, specifically Georgian, Hungarian, and Lithuanian, are available as staffing permits. Course descriptions with reading lists are posted inside the departmental office.

Slavic House is a campus residence for 18 undergraduate and graduate students who are studying a Slavic language (though their major need not be in the Slavic Department). Preference for residence is given to those who have completed one year of study of a Slavic language. A program of lectures, films, field trips, and discussions on Slavic culture is conducted throughout the year. Information about Slavic House residence and activities is available in the department office.

Major Programs

Most undergraduate programs emphasize Russian, but students may choose Czech, Polish, or Serbo-Croatian as a major or minor. There is one major, the Slavic major, which includes an introduction to the cultural history and the literatures of other Slavic peoples and requires at least an elementary knowledge of Russian. Prospective majors normally complete at least one year of language study and two literature courses in (the case of Russian-English majors, the Slavic 45-46 sequence) before declaring the Slavic major.

Lower Division. 26 units. Emphasis on Russian: courses 1, 2, 3, 4 or their equivalents; courses 45 and 46 or their equivalents. Recommended on Czech, Polish, or Serbo-Croatian: courses 1 and 2 or their equivalents; 10 units of the relevant Slavic language (25A-25B, 26A-26B, or 27A-27B); two of the following courses: 39, 39, 45, 46. A 3.0 grade-point average is required in the four Slavic courses completed for declaration of major.

Upper Division. 27 units. Emphasis on Russian: course sequence 103AB, courses 120, 130, 181 and one other course in the 180-series; one course numbered from 133 through 149; one course from the 150, 160, or 170 series. Courses 103A-103B and 120 will ordinarily be waived for native speakers; the waiver requires a proficiency test. Emphasis on Czech, Polish, or Serbo-Croatian: the relevant advanced language course sequence (115AB, 115AB, or 115AB); the relevant literature, readings, and topics courses (150-151-152, 160-161-162, or 170-171-172). Two 3-unit courses in the emphasized field; one 3-unit Slavic elective; one 3-unit course on the literature of another Slavic area.

Honors Program. With the approval of the major adviser, Slavic students with an overall grade-point average of 3.3 or higher and an average of 3.3 or higher in courses completed in the major may apply for admission to the honors program. This program includes course H195, in which a thesis is written, and 4 units, beyond those required for the major, in a Slavic language or in a literature course conducted in the language of study. Successful completion of the honors program requires a minimum grade of B+ in both of these endeavors and a 3.3 grade-point average or higher in the major. Interested students should first discuss their honors course options and thesis proposal with both the major adviser, to whom the application for the honors program is to be submitted, and the faculty member selected to direct the thesis. The application will include a preliminary statement of the topic to be investigated and the names of the members of the student's honors committee. The honors committee consists of the director of the thesis and one additional faculty member invited by the student in conjunction with the director.

Minor Programs

Students should pick up a petition for declaration of the minor during their first year. Earlier consultation with a departmental major adviser concerning completion of the minor is advised.

Minor in Russian Language. Slavic 103A-103B, 104, 120*. 102* or any course in the Slavic 180 series. The minor in Russian language is not open to native speakers of Russian.

Minor in Russian Literature. Prerequisite: Slavic 45-46. Four of the following courses: Slavic 134A, 134B, 134C, 134D, 134E, 134N, 135, 140; and Slavic 130. Minor in Slavic Language and Literature. Two advanced language courses (Slavic 115A-115B, 116A-116B, or 117A-117B); one relevant literature survey (Slavic 150, 160, or 170); two of the following: 130, 131, 137, 140, 151, 161, 171, 152, 162, 172.

*These courses are not repeatable for credit in the minor program.

Certificate in Russian and East European Studies

Slavic students who wish to enroll for a certificate must be concurrently enrolled in this department's M.A. or Ph.D. program. See the index and the graduate secretary for additional information.
Admission to Graduate Study

Candidates for higher degrees must have completed the undergraduate major program in Slavic languages and literature or received equivalent training. Prospective and current students are encouraged to acquire a background in other related fields: European languages and literatures (especially French, German, or Russian), Latin, computer science, and general and comparative linguistics is desirable.

New students admitted to the Ph.D. program with an M.A. in Slavic or a related field from another institution are required to pass this department's M.A. comprehensive examinations for permission to proceed to the Ph.D. program. Continuing students who have earned the M.A. degree from this department may be recommended for admission to the Ph.D. program following successful performance on the M.A. comprehensive examinations and demonstrated aptitude for advanced work.

Graduate Programs

M.A. and Ph.D. programs are offered in Russian, Polish, Czech, and Serbo-Croatian, each with an emphasis in literature or linguistics. Detailed descriptions of requirements are available from the department. M.A. and Ph.D. degrees prepare students to work in two Slavic languages or literatures, of which one must be Russian. Three Slavic languages are required of students in the Ph.D. program.

M.A. Course Requirements. Literature Program: A proseminar in literary scholarship, a graduate course in composition and style in major language, introductory descriptive grammar of major language, history of the literary language (or for Russian majors) 18th-century Russian literature, Old Church Slavonic, one year of a second Slavic language, and three literature courses in the major field, at least one of which must be a seminar.

Linguistics Program: A proseminar in linguistic scholarship, a graduate course in composition and style in major language, introductory descriptive grammar of major language, history of the literary language or (for Russian majors) 18th-century Russian literature, Old Church Slavonic, introductory comparative Slavic linguistics, three semesters of a second Slavic language, and one literature course.

All candidates for the M.A. must demonstrate advanced proficiency in their major language, pass the department's French, German, or Russian reading examination, and two written and one oral comprehensive M.A. examinations.

Ph.D. Requirements. Literature Program: In consultation with the graduate adviser, students will plan a course of study (including a minimum of one graduate seminar) to prepare for the Ph.D. written and oral qualifying examinations on the history of the major Slavic literature, the history of the major Slavic literature, and the history of the major Slavic literature. In addition, students will take one 12-hour seminar in second Slavic language at the advanced level.

Linguistics Program: In consultation with the graduate adviser, students will plan a course of study (including a minimum of one graduate seminar) to prepare for the Ph.D. written and oral qualifying examinations on the structure of the major language, its history, including the history of the literary language, and general Slavic and Indo-European linguistics. In addition, the students will undertake course work in advanced descriptive grammar in their major language, advanced comparative Slavic linguistics, and two semesters of a third Slavic language.

All candidates for the Ph.D. must pass the department's five oral qualifying examinations, three comprehensive written examinations, and an oral qualifying examination.

Instruction in teaching methodology is provided for graduate student instructors and prospective teachers of Russian, Polish, Czech, and Serbo-Croatian.

Czech

Lower Division Courses

26A-26B. Introductory Czech. (5,6) Five hours of class per week. Prerequisites: 26A is prerequisite to 26B. The sequence begins fall. (F,SP) Staff

Upper Division Courses

116A-116B. Advanced Czech. (4,4) Three hours of class per week. Prerequisites: 116A is prerequisite to 116B. The sequence begins fall. (F,SP) Staff

160. Survey of Czech Literature. (3) Three hours of class per week. Outline history of Czech literature from the tenth century to the present, including medieval literature of the fourteenth century, the National Revival of the nineteenth century, and the modern period. No knowledge of Czech required. (SP) Staff

161. Readings in Czech Literature. (4) Three hours of meeting per week. Prerequisites: 116A. Selected readings in Czech, tailored to the academic interests of students enrolled. (F) Staff

162. Topics in Czech Language and Literature. (3) Three hours of meeting per week. Prerequisites: 116A (may be taken concurrently). Studies in Czech literature or linguistics, or a combination thereof, depending on the needs of the students enrolled. (SP) Scharmschulte

166. Czech Poetry. (3) Three hours of lecture per week. Selected topics in Czech poetry.

Polish

Lower Division Courses

25A-25B. Introductory Polish. (5,5) Five hours of class per week. Prerequisites: 25A is prerequisite to 25B. The sequence begins fall. (F,SP) Staff

Upper Division Courses

115A-115B. Advanced Polish. (4,4) Three hours of meeting per week. Prerequisites: 25A is prerequisite to 115A; 115A is prerequisite to 115B. The sequence begins fall. (F,SP) Staff

150. Polish Literature and Intellectual Trends. (3) Three hours of lecture per week. A survey of the major writers, works and trends of the Polish literary tradition from the Middle Ages to the present. Special attention devoted to the Renaissance, the age of Romanticism, and the modern period. No knowledge of Polish required. (F,SP) Frick

151. Readings in Polish Literature. (4) Three hours of meeting per week. Prerequisites: 115A. Selected readings in Polish tailored to the academic interests of students enrolled.

152. Topics in Polish Language and Literature. (3) Three hours of meeting per week. Prerequisites: 115A (may be taken concurrently). Studies in Polish literature or linguistics, or a combination thereof, depending on the needs of the students enrolled.

154. Polish Literature of the Twentieth Century. (3) Three hours of lecture per week. An investigation of Polish poetry, prose and drama in the 20th century. The course will discuss the following topics: Polish modernism of the turn of the century, the literature of independent Poland, Polish literature during World War II and in People's Poland, as well as Polish literature in emigration. No knowledge of Polish required.

156. The Polish Theater. (3) Three hours of lecture per week. Readings in Polish drama drawn from the Renaissance to the present. No knowledge of Polish required.

Russian Language

The college is planning to implement the following policy beginning fall semester 1990:

Duplication of credit: Students first admitted to the College of Letters and Science in fall semester 1989 and thereafter will not be allowed to duplicate credit (unit credit) for Letters and Science courses in lower division foreign language that duplicate courses completed previously in high school or at another college or institution. Students will, however, be allowed to replicate course credit in the semester in which they take a course that duplicates such work. High school equivalences are evaluated as follows: the first two years of high school foreign language are considered equivalent to one semester in college; each successive year in high school is equivalent to an additional semester in college. College-level equivalences are determined on a course-by-course basis.

Lower Division Courses

1. Elementary Russian. (5) Five hours of meeting and 2 hours of language laboratory per week. Beginner's course. (F,SP) Yekushev

2. Elementary Russian. (5) Five hours of meeting and 2 hours of language laboratory per week. Prerequisites: 1, 14A, or equivalent. (F,SP) Yekushev

3. Intermediate Russian. (5) Five hours of meeting and 1 hour of language laboratory per week. Prerequisites: 2, 14D, or equivalent. (F,SP) Yekushev

4. Intermediate Russian. (5) Five hours of meeting and 1 hour of language laboratory per week. Prerequisites: 3, 14C, or equivalent. (F,SP) Yekushev

13. Russian Conversation. (2) Course may be repeated for credit once, up to a total of 4.0 units. Two hours of meeting and 1 hour of language laboratory per week. Prerequisite: 3 (may be taken concurrently). Life and language in the Russian's world. (F,SP) Astromoff

14A. Self-Paced Russian. (1-5) Individual conferences and language laboratory. Self-paced course equivalent to Slavic 1 through 4. Students may enter or leave at any level. Any level may be repeated up to a total of five units. The student's program, including this course, must meet the minimum study-list requirement. If units beyond those contracted for are completed, credit will be given. (F,SP) Yekushev

14B. Self-Paced Russian. (1-5) (F,SP) Yekushev

14C. Self-Paced Russian. (1-5) Prerequisites: 14A or equivalent. (F,SP) Yekushev

14D. Self-Paced Russian. (1-5) Prerequisites: 14C or equivalent. (F,SP) Yekushev

15. Russian Pronunciation. (2) (F) Staff

40. Reading in Russian. First Course. (3) Three hours of meeting per week. Prerequisites: 2. Selected texts in contemporary Russian to develop practical vocabulary, knowledge of idioms, use of bilingual dictionary, other reading skills.

Upper Division Courses

101. Practical Russian Phonetics. (2) New course. Three hours of meeting per week. Prerequisites: Slavic 4, 14D, 20 or equivalent. For advanced students to improve their pronunciation of Russian and bring it closer to native level (superior proficiency level). Course work covers standard pronunciation of educated Russians and makes wide use of remedial methodology to correct ingrained phonetic mistakes and develop stable articulation habits necessary for correct Russian pronunciation and intonation. Various types of oral and written exercises, reading of literary texts, dialogue of neutral and emphatic international coloring, and extensive use of audio tapes. (F,SP) Yekushev

102. Readings in Specialized Russian. (3) Course may be repeated for credit up to a maximum of 6 units. May be taken on a passed/not passed or satisfactory/unsatisfactory basis. Three hours of class meeting per week. Prerequisites: 4, 14D, or equivalent. Selected
readings in scholarly (scientific and technical), journalistic and business styles to familiarize the student with the peculiarities of vocabulary, grammar, and phraseology. (F,SP) Kassatkin

103A-103B. Advanced Russian. (4-4) Four hours of meeting per week. Prerequisites: 4, 14D, or equivalent. Sequence begins fall. (F,SP) Staff

104. Advanced Russian Composition. (3) Three hours of class per week. Prerequisites: 103B or equivalent. Emphasis on writing, translation, and lexical analysis. (F) Astromoff

120. Advanced Russian Conversation. (2) Course may be repeated for a total of four units. Three hours of meeting per week. Prerequisites: 4, 14D, or equivalent. Exploring Russian culture through oral communication. (F,SP) Staff

201. Advanced Russian Profriciency Maintenance. (2) New course. Course may be repeated for credit. Three hours of meeting per week. Prerequisites: Graduate standing; 103B or equivalent; consent of instructor. Advanced work in speaking, writing, and comprehension in order to develop and maintain superior proficiency. Discussion and readings will focus on current cultural and political trends and other topics pertaining to Slavic studies. Special attention to the details of contemporary Soviet life and its changing colloquial speech. Conducted in Russian. (F,SP)

Russian Literature

Lower Division Courses

39. Great Writers of Russian Literature. (3) Three hours of lecture per week. Readings in English of representative texts from the Russian literary tradition. (F) Grossman

45. Nineteenth-Century Russian Literature. (3) Three hours of lecture per week. Development of Russian literature from Pushkin to Chekhov. No knowledge of Russian required. Prerequisite to admission to the Slavic major and recommended for prospective graduate students. (F) McLean

46. Twentieth-Century Russian Literature. (3) Three hours of lecture per week. Development of Russian literature from 1900 to the present, modernism, Soviet and émigré literature. No knowledge of Russian required. Prerequisite to admission to the Slavic major and recommended for prospective graduate students. (SP) R. Hughes

Upper Division Courses

130. Medieval Russian Culture. (3) Three hours of lecture per week. Introduction to Eastern Orthodox culture of Old Russia, including literature, painting, and other visual arts. (SP) O. Hughes

133. The Foreign Contexts of Russian Literature. (3) Course may be repeated once for credit with permission of the instructor. Three hours of lecture per week. Survey of the cultural and political connections between Russian and other European literatures in the late 19th and early 20th centuries. See departmental announcement for description. (F,SP) Staff

134A. Gogol. (3) Three hours of lecture per week. Gogol's complete fiction and plays. (F,SP) Staff

134B. Turgenev and Gončarov. (3) Three hours of lecture per week. The heyday of Russian Realism in two of Russia's most important Russian novelists: Turgenev and Gončarov. In critical approaches. (F,SP) Grossman

134C. Dostoевский. (3) Three hours of lecture per week. A survey of the writer's principal artistic works, treated in relation to his life and to developments in Russian and European literature. (SP) Staff

134D. Tolstoy. (3) Three hours of lecture per week. A survey of the writer's principal artistic works, treated in relation to his life and to developments in Russian and European literature. (F,SP) Staff

134E. Chekhov. (3) Three hours of lecture per week. Studies in the great master of the modern short story and drama. (F,SP) Hughes

134N. Studies in Russian Literature. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Variable subject matter; see departmental announcement for description. (F) R. Hughes

135. Masterworks of Russian Drama. (3) Three hours of lecture per week. Development of Russian drama from its pre-literary forms through seventeenth-century religious drama, chivalric and neoclassical plays of the eighteenth-century, nineteenth-century romantic and realistic drama, and symbolist and absurdist plays of the twentieth-century.

Courses Requiring Knowledge of Russian

180. Studies in Russian Literature. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 103A (may be taken concurrently). Variable subject matter; see departmental announcement for description. (F,SP) Staff

181. Readings in Russian Literature. (4) Three hours of lecture per week. Prerequisites: 103A (may be taken concurrently). Study and analysis of the development of the Russian literary language and short fiction from the eighteenth century to the present. Required for Russian-emphasis majors. (F) Karlinsky

182. Pushkin. (4) Three hours of lecture per week. Prerequisites: 103A (may be taken concurrently). A survey of the writer's principal artistic works, treated in relation to his life and to developments in Russian and European literature.

186. Nineteenth-Century Russian Literary Criticism. (4) Three hours of lecture per week. Prerequisites: 103A (may be taken concurrently). From Pushkin and the Romantic Age, through Belinsky, the radical critics (Chernyshovsky, Dobrolyubov, Pisarev), and the conservatives.

188. Russian Prose. (4) Course may be repeated once for credit. Three hours of lecture per week. Prerequisites: 103B (may be taken concurrently). Course conducted in Russian. Reading, analysis, and interpretation of representative authors from the nineteenth century to the present. (F,SP) O. Hughes, Karlinsky

Serbo-Croatian

Lower Division Courses

27A-27B. Introductory Serbo-Croatian. (5-4) 27A: Three 2-hour meeting per week. 27B: Two 2-hour meeting per week. Prerequisites: 27A is prerequisite to 27B. Beginner's course. Séquence begins fall. (F,SP) Staff

Upper Division Courses

117A-117B. Advanced Serbo-Croatian. (4-4) Three hours of meeting per week. Prerequisites: 27B is prerequisite to 117A; 117A is prerequisite to 117B. Séquence begins fall. (F,SP) Staff

170. Survey of Yugoslav Literatures. (3) Three hours of lecture per week. Outline of major developments in Serbian (including Montenegro) and Croatian (including Dalmatian) literatures from the beginnings to the present. No knowledge of Serbo-Croatian required. (F,SP) Hughes

172. Readings in Yugoslav Literatures. (4) Three hours of lecture per week. Concurrently. Study in Serbo-Croatian literatures or linguistics, or conversation, depending on the needs of the students enrolled. (F) Hughes

177. Folk Tradition in Contemporary Yugoslav Poetry and Fiction. (3) Three hours of lecture per week. Serbo-Croatian heroic epic tradition and its integration into modern Yugoslav literature. No knowledge of Serbo-Croatian required.

179. Contemporary Yugoslav Short Story and Novel. (3) Three hours of lecture per week. Close reading of the prose works of selected contemporary Yugoslav authors such as Andrić and Kršelj.

General and Other Slavic

Lower Division Courses

111A-111B-111C-111D. Self-Paced Bulgarian. (1-5;1-5;1-5;1-5) Staff

176. Survey of Yugoslav Literatures. (3) Three hours of lecture per week. Introduction to Eastern Europe (including the USSR), its languages and language families, and cultures. No knowledge of a foreign language required.

38. Seminar for Lower Division Students. (3) Course may be repeated once for credit. Three hours of lecture per week. Variable topics involving the cultural histories, languages, or literatures of Slavic coursework. No prerequisites. (F,SP) Staff

99. Individual Study. (1-4) Course may be repeated once for credit. Must be taken on a pass/d Not passed basis. Individual conferences. Prerequisites: 3.0 GPA. Students who have taken Slavic 220 may not receive credit for 137. Three hours of lecture per week. Prerequisites: Two years of a Slavic language or consent of instructor. An introduction to the Slavic language and their structures and histories, and descriptive and theoretical principles for their analysis. The origin and ancient history of the Slav's. (SP)

131. The Eastern Orthodox World. (3) Course may be taken once for credit. Three hours of lecture per week. An introduction to the formative religious tradition of Eastern Christianity through a survey of its history and culture. Special attention given to analysis of the spirituality and theology of the Orthodox Church as contrasted with Western churches.

137. Introduction to Slavic Linguistics. (3) Students who have taken Slavic 220 may not receive credit for 137. Three hours of lecture per week. Prerequisites: Two years of a Slavic language or consent of instructor. An introduction to the Slavic language and their structures and histories, and descriptive and theoretical principles for their analysis. The origin and ancient history of the Slavs. (SP)

140. Twentieth Century Slavic Literary Criticism. (3) Three hours of lecture per week. Symbolism and Aestheticism, Russian Formalism, the Prague School, Structuralism, and Marxist literary theory.

147. Slavic Folklore. (3) Course may be repeated for credit once with permission of instructor. Three hours of lecture per week. Oral traditional literature (tale, epic, folklore, proverb) of one or more Slavic countries. Customs, beliefs, and other forms of folklore may also be discussed. No knowledge of a foreign language required.

149. Theory and Practice of Translation. (3) Three hours of lecture per week. Prerequisites: Reading knowledge of at least one foreign language. Lectures and assigned readings in translation theory. Critical discussions of translation prepared by members of the class.

Discussions of translation prepared by members of the class.
Slavic Graduate Courses

Graduate Courses

200. Graduate Colloquium. (0) Must be taken on a satisfactory/unsatisfactory basis. Reports on current scholarly work by faculty and graduate students. (F,SP) Staff

204. Russian Composition and Style. (3) Three hours of lecture per week. Prerequisites: 102 or 103B, or equivalent; Russian (Czech, Polish, or Serbo-Croatian). Some phonetics, phonology, morphology, and syntax of a modem Slavic language: Czech, Polish, Russian, or Serbo-Croatian. Some phonetic and phonological methods. See departmental announcement for topic. (F,SP) Staff

209. Supervised Study for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Students who have taken 10 hours of fieldwork per week. Prerequisite: Consent of instructor. Supervised field programs involving experiences in schools and school-related activities. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

210. Old Church Slavonic. (3) Three hours of lecture per week. Prerequisites: Knowledge of a modern Slavic language or consent of instructor. Introduction to Old Church Slavonic, with special attention to inflexional morphology. Assigned translations and sight-reading of selected texts. (F,SP) Frick

214. Readings in Old Russian. (3) Three hours of lecture per week. Prerequisites: 212C. Assigned translations and sight-reading of selected Old Russian literary texts. (F,SP) Frick

220. Introductory Comparative Slavic Linguistics. (3) Three hours of lecture per week. Prerequisites: 210. Introduction to Proto-Slavic, sound correspondences, sound changes, cognates, prosody. Overview of Common Slavic historical phonology and prosody; Introduction to Common Slavic historical morphology. (F,SP) Staff

222. Introductory Descriptive Grammar of Slav Languages. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Knowledge of the language, Phonetics, phonology, morphology, and syntax of a modern Slavic language: Czech, Polish, Russian, or Serbo-Croatian; see departmental announcement for topic. Recommended for prospective teachers. (SP) Gasparov

230. Historical Grammar of Slavic Languages. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 210. Historical phonology, morphology, and syntax of a Slavic language (Czech, Polish, Russian, or Serbo-Croatian). Some phonetic and phonological methods. See departmental announcement for topic. (F,SP) Staff

231. History of Slavic Literary Languages. (3) Three hours of lecture per week. Prerequisites: Advanced knowledge of the modern language; 210. Analysis of language and styie of a Slavic literary language (Czech, Polish, Russian, or Serbo-Croatian) from the beginning to the present, with emphasis on periods of particular significance. See departmental announcement for topic. (F,SP) Staff

233. West Slavic Linguistics. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 200. Linguistic history and dialectology of Czech, Polish, and lesser-known West Slavic languages (Slovak, Sorbian, Kashubian, Polabian). (SP) Timberlake

240. Roman Oral Tradition. (3) Three hours of lecture per week. Prerequisites: Much of the reading is in non-standard Russian and requires a good command of the language. Major emphasis will be placed on the epis (byliny), but other forms of orally transmitted literature will also be discussed. (3) Three hours of lecture per week. Prerequisites: Reading knowledge of Old Russian. Early Russian literature from the beginnings to 1700. (SP) McLean

241-A241B. Old Russian Literature. (3) Three hours of lecture per week. Prerequisites: 240. Russian Composition and Style. A brief survey of selected Old Russian literary texts. (SP) Staff

242. Eighteenth-Century Russian Literature. (3) Three hours of lecture per week. Studies in poetry, drama, and fiction, covering major figures between 1730 and the end of the century. (SP) Staff

243. The Russian Novel and Literatures of Western Europe. (3) Three hours of lecture per week. The development of the nineteenth-century Russian novel and its links with Western literary works and movements. (SP) Staff

250. Studies in Slavic Literature and Linguistics. (3) Course may be repeated for credit. One 2-hour seminar per week. Advanced studies in the several fields of Slavic literatures and linguistics. Content varies. (F,SP) Staff

258. Proseminar: Alms and Methods of Literary Scholarship. (3) Three hours of seminar per week. Course designed for new graduate students in Slavic linguistics. A survey of general and Slavic linguistics, Slavic philology, semiotics, and the relation of linguistic to literary studies. Methods of research and critical analysis. Current issues and goals of research. (F,SP) Hughes

278. Russian Poetry. (4) New course. Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: Open to qualified undergraduates. Class conducted in Russian. Russian poetry and versification (eighteenth, nineteenth and twentieth centuries): close readings of texts. Variable topics. (SP) Hughes

280. Studies in Slavic Literature and Linguistics. (3) Course may be repeated for credit. One 2-hour seminar per week. Advanced studies in the several fields of Slavic literatures and linguistics. Content varies. (F,SP) Staff

285. Proseminar: Alms and Methods of Linguistic Scholarship. (3) Three hours of seminar per week. Course designed for new graduate students in Slavic linguistics. A survey of general and Slavic linguistics, Slavic philology, semiotics, and the relation of linguistic to literary studies. Methods of research and critical analysis. Current issues and goals of research. (F,SP) Hughes

Social and Administrative Health Sciences

Department Office: 513 Earl Warren Hall, 842-8441 Chair: Thomas B. Rustall, Ph.D.

Professors:
Richard M. Bailey, D.B.A., Indiana University, Economics; medical services organization, health systems analysis; (School of Public Health) Social and Administrative Health Sciences
Joan R. Bloom, Ph.D., Stanford University, Health organization; program evaluation; (School of Public Health) Social and Administrative Health Sciences
Frank Falkner, M.D., F.R.C.P., Cambridge and Royal College of Physicians, Epidemiology, nutritional epidemiology, genetic counseling; (School of Public Health) Social and Administrative Health Sciences
William H. Bruvold, Ph.D., University of Denver, Health policy analysis, Chint; (School of Public Health) Social and Administrative Health Sciences
Richard M. Scheffler, Ph.D., University of Wisconsin, Health economics and financing; (School of Public Health) Social and Administrative Health Sciences

East European Studies

Lower Division Courses

1A-1B. Introductory Hungarian. (5-6) Students who have taken 5 units of 1A will receive no credit for 1A. Students who have taken 10 units of 1A will receive no credit for 1B. Five hours of class meeting per week plus language laboratory. Prerequisites: 1A or prerequisite to 1B. (F,SP) Stebleyne-Mihalik

Upper Division Courses

100. Readings in Hungarian. (2) Two hours of class meeting per week. Prerequisites: 1B or equivalent. (F,SP) Stebleyne-Mihalik

Related Courses in Other Departments

For linguistics courses, please see the graduate adviser in Slavic linguistics. For literature courses, please check with the appropriate department in addition to the graduate adviser in Slavic literature.
Because of the breadth of health subject interests, graduate students are expected to make extensive use of related departments on the Berkeley campus such as the School of Public Health, business administration, city and regional planning, economics, education, genetics, nutritional sciences, psychology, public policy, and social welfare. Opportunities for supervised field experiences are available in many health agencies in nearby communities, the state, and the nation. For physicians, certain training programs are devised to meet certification requirements for medical board specializations such as preventive medicine, pediatrics, and obstetrics and gynecology. Both the Master of Public Health and the Doctor of Public Health degree programs are offered.

Sequence of Course Offerings

00-39 Health Policy and Administration
40-49 Health Behavior, Social Change, Health Education and Working with People
50-59 Nutrition
60-69 Maternal and Child Health
70-79 Special Population Groups and Problems
80-89 Research and Evaluation
90-99 Experimental Seminars, Independent Study, etc.

The following sections have been established for courses 197, 198, 199, 295, 297, 298, 299, 601, and 602. The courses may be repeated for credit, but some sections may not be given every semester.

A. Health Policy and Administration
F. Maternal and Child Health
G. Public Health Education
H. Behavioral Sciences
J. Public Health Nutrition

Lower Division Courses

76. Healthy People: Introduction to Health Promotion. (4) Three hours of lectures and one hour of discussion per week. Introduction to personal and community health drawing on physical and social sciences. Specific areas include stress, alcohol and drugs, nutrition, exercise, the environment, communication and sexuality. Readings, lectures, and discussions explore key issues for students and examine those issues in the context of contemporary American society. Public health approaches to disease prevention and health promotion are explored for each topic. (F) Roe

Upper Division Courses

150. Introduction to Community Nutrition. (3) Two 1½-hour lectures per week. Prerequisites: NS 100 and enrollment. Topics included are: Nutrition services and the U.S. health care system, nutrition problems in U.S. populations, community nutrition programs, the legislative process and the role of the community nutritionist. (F) D'Onofrio

175A-175B. Health Promotion in a College Setting. (22) Course may be repeated for credit. Credit and grade to be awarded upon completion of the sequence. One 1½-hour lecture per week and one hour of seminar every other week. Prerequisites: Consent of Instructor. Topics include health promotion, medical self care, and delivery of health care service. Through a combined theory and practice approach, topics are covered as they apply to the campus community. The course is divided into three sections corresponding to particular campus health field experiences in which students may be involved. (F,SP) Bloom

176. Issues in Personal and Community Health Promotion. (3) Two 1½-hour lectures per week. Prerequisites: D'Onofrio, Crinne, and one prerequisite from the Department of Social and Administrative Health Sciences. (F) D'Onofrio

Both the definition of health and actual health status. (SP) Roe

178. Policy, Planning, and Evaluation of Health Promotion in a College Setting. One 3-hour lecture/discussion per week. Prerequisites: 76; 175 or 176, and consent of instructor. Theory and practice of planning, implementation, and evaluation of health promotion programs. (SP) Roe

191. Drugs, Health and Society. (2) Two 1-hour lectures and one 1-hour discussion per week. Introduces undergraduates to concepts basic to understanding and analyzing relationships between drugs, health and society. Using a broad multidisciplinary perspective, examines legal and illegal drugs and their effects on personal and community health. Prevention of drug problems at the policy, community, organizational, and individual levels will be examined. (SP) Roe

197. Field Study in Public Health. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual, variable. Supervised experience relevant to specific aspects of public health in off-campus settings. Regular individual meetings with faculty advisor and written reports required. (F,SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual, variable. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual, variable. Prerequisites: Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

200. Introduction to Health and Health Care Systems. (1-3) Two 1-hour lectures and one 2-hour discussion per week. An introduction to basic theoretical perspectives of health, to societal forces shaping health care policy, and to fundamental components of organized health care systems as they are influenced by ethical, technological, and economic dimensions. (F) Bailey, Brovold

201. Health Paradigms and Deliberate Social Change. (3) Formerly 205. Two 1½-hour lecture-discussions per week. Part I: General introduction and definition of paradigms and practices. Part II: Underlying theory and techniques of social change. (SP) Duhl

202. Health Policy and Planning. (3) Formerly 206. Two 1½-hour lecture-discussions per week. Use of planning as a means of social change: Presentative theories and alternative methods of planning for health and health care. (SP) Duhl

203. Program Planning, Development, and Evaluation. (3) Formerly 209. Two 1½-hour lectures per week. Prerequisites: Public Health students. Basic elements and considerations in planning health programs. Case material will be drawn from health settings, with emphasis on multidisciplinary planning. Assessment of problems, setting goals and objectives, designing activities, implementation and evaluation. (F,SP) Bloom, D'Onofrio, Wallack

204. Health Policy Analysis and Formulation. (4) Formerly 210. Two 2-hour lecture-discussions per week. Prerequisites: Field work in health policy and administration. Concepts and tools of policy analysis and formulation. (SP) Duhl

205. Occupational and Environmental Health Policy. (3) Two 1½-hour lectures per week. Analysis of the principles underlying governmental policy in occupational and environmental health; drawing on diverse perspectives from the health sciences, environmental science, economics, and industrial relations. Topics include regulatory and market-oriented approaches to policy; occupational cancer; cost-benefit analysis; worker and labor union responses to hazard; the right to know; workers' compensation. (SP) Robinson
206. Health Care Organization and Policy: An International Perspective. Two 1/2-hour lecture-discussions per week. An introduction to health care organization, policy, and regulation in nations through the world—rich and poor, capitalist and socialist, centralized and decentralized. Health systems will be analyzed within the context of the cultural, social, economic, and political forces affecting them. (F) Duhl

207. Health and Social Policy in Mexico and Latin America. (3) One 2-hour lecture per week. Critical issues in health and social welfare policies and structures in Latin America. Various theories of development are considered and related to health and social well being. Themes are examined from a multidisciplinary perspective including demographics, epidemiology, family structure, environmental influences, occupational health, and migration. (SP) Guendeiman

208. Advanced Medical Care Organization. (2) Formerly 225. Two 1/2-hour lectures per week. Prerequisites: 200; a graduate course in medical care organization, or consent of instructor. An in-depth analysis and evaluation of the health and medical care delivery systems. Alternative methods for organizing and financing are discussed. Lecture and case materials on selected topics will be presented. (SP) Bloom, Scheffler

210. The Hospital As a Social and Economic Enterprise. (3) Formerly 235. Two 1-lecture hours per week. Development of the hospital as a social and economic enterprise. The role of health care delivery organization patterns, governance, and medical and administrative structures and operations, quality controls, financing. (SP) Starvwather

211. Health Policies, Policy, Law. (3) Two 1/2-hour lectures per week. A multidisciplinary treatment given to the major themes contained in the course title. Major emphasis is placed on social, scientific, and legal perspectives. Current California community health realities serve as the focus in attempting to develop ethical, organizational, service funding, legislative, and legal care dimensions and issues. (F) Garcia

212. Legislation and Organization for Health and Social Services. (2) Formerly 214. Two 1-hour lectures per week. Description and analysis of the principal federal health and social legislation, translation of legislation into organizational policy, and implications for planning service delivery systems. (SP) Garcia

213. Legal Basis for Health Facility Administration. (3) Formerly 215. One 3-hour lecture-discussion per week. Case studies in the legal basis for public health, medical care administration, and related to hospitals. (SP) Garcia

216. Introduction to Health Economics. (3) Formerly 220. Three 1-hour lecture-discussions per week. Prerequisites: Principles of economics (macro or micro), or consent of instructor. A survey of health economics designed to provide an overview of the economic factors affecting health services, distributional equity, production and utilization of medical services, role of profit and nonprofit institutions, health manpower, and issues of competition or regulation. (F) Bailey

217. Health Care Competition and Regulation. (2) One 2-hour seminar per week. Focuses on competition and regulation as alternative approaches to influencing the health care system. Particular emphasis is placed on price and nonprice competition, HCMPs, selective contracting, managed care organizations, rate regulations, and Medicare's Prospective Payment System. (F) Robinson

218. Macroeconomics of Health. (3) Formerly 222. Two 1/2-hour lecture-discussions per week. Prerequisites: 216 or consent of instructor. Application of basic concepts of macroeconomics to public finance to the financial organization of health services. Alternative methods of financing health services from public and private sources are examined. (SP) Bailey

219. Advanced Health Economics. (2) Formerly 223. Two 1/2-hour lecture-discussions per week. Prerequisites: 216 or a related course in microeconomics. An economic analysis of the production and distribution of health care. The impact of competition and regulation of the health care industry on providers and consumers is analyzed. Economic models of health care are compared to the empirical evidence. (SP) Scheffler

220. Health Information Systems. (2) Two 1-hour lecture-discussions per week. Current and future trends in health information technology for hospitals, clinics, and HMOs. Laboratory sessions on use of microcomputer techniques in health service management. (F) Grazer

221. Managerial Accounting in Health Care. (3) Formerly 225A. Two 1-hour lecture-discussions per week. Principles of managerial accounting in health care organizations, with emphasis on government and community service agencies. (SP) Grazer

222. Financial Management in Health Care. (3) Formerly 225B. Two 1/2-hour lectures-discussions per week. Prerequisites: 221 or consent of instructor: Methods of financial analysis and management in health care organizations. Use of case topics, budgeting, planning, and control of systems, cost-volume-profit analysis, cash flow, reimbursement, and financial statement analysis. (F) Grazer

223. Advanced Financial Management and Regulation of Health Care Institutions. (3) Formerly 224. Two 1/2-hour lecture-discussions per week. Prerequisites: 222 or Business Administration 203, or (2) 204 and 230. Students emphasizing management must meet prerequisites: Principles of managerial accounting and must also meet prerequisites: Financial management and regulation of health care institutions, including relationship between institutional and national policies with regard to reimbursement, incentives systems, public regulation, and control of health care costs. Course is based on a computer game simulation. (SP) Starvwather

225. Health Care Organizations and Environments. (3) Formerly 224A. Two 1/2-hour lecture-discussions per week. Introduction to health administration focusing on theories of management, organizations, and environments as they relate to the administration of health services. Concepts and structured experiences will be used to tie theory to practice. (F) Bloom

226. Advanced Organization Theory and Health Institutions. (3) Formerly 228. Two 1/2-hour lecture-discussions per week. Prerequisites: An introductory graduate level course in organization theory or behavior, or consent of instructor: Bridging theory and practice in understanding and administering and medical health care organizations: inter and intra-organizational relationships: power and control; conflict and change. (SP) Starvwather

227. Advanced Health Organizations and Environments. (2) Formerly 219B. One 1/2-hour lecture-discussion per week. Prerequisites: 226 or 228 or consent of instructor. Study of current approaches to the theories of innovation and change as they relate to theories of complex organizations, organizational relationships in health administration. (F) Bloom

230. Quantitative Analysis for Health Policy and Administration. (4) Formerly 233. Two 1/2-hour lectures and one 2-hour discussion per week. Prerequisites: BEHS 130 or consent of instructor: Application of quantitative methods and decision-making in health service systems and facilities; introduction of selected quantitative techniques; emphasis on identifying and formulating system problems that are amenable to solution through use of quantitative techniques. (SP) Grazer, Hu

231. Advanced Quantitative Methods for Health Policy and Administration. (2) Formerly 233B. Two 1/2-hour lectures and one 2-hour discussion per week. Prerequisites: Business Administration 204B, or SAHS 230 or equivalent. Selected advanced operations research methods suitable to analyzing decisions with random or stochastic elements. Applications will be made to evaluating budgets, planning, and control of systems, cost-volume-profit analysis, cash flow, reimbursement, and financial statement analysis. (SP) Grazer

232. Research Issues in Health Services. (3) One 3-hour seminar per week. Critical analysis of selected topics in health services research methodology. An approach to conceptualizing research issues on particular problems, methodological problems in planning and conducting research, and management of large-scale research projects. A major focus will be on the interaction between health services research and health policy. (F) Bloom

233. Research Methods for Health Services. (3) Two 1-hour lectures per week. Prerequisites: SAHS 217, 222, or equivalent. Review of multivariate statistical methods including time series for analyzing health services. Includes regression analysis, empirical applications, and model building. (SP) Hu

240. General Theories of Social Change. (3) Two 1/2-hour lectures-discussions per week. A general introduction to the major theories of behavioral change and practice: positivist theories of change, interpretive cultural theories of change, and ideological theories of change, as these relate to health and human behavior. (SP) Romano

241. Social Theory in Public Health. (3) Two 1/2-hour lectures-discussions per week. A presentation of the current theoretical and empirical analyses of the relationships among social factors and health. Major theoretical perspectives are presented as frameworks in which major substantive issues are discussed, including socioeconomic factors, lifestyle factors, and health system factors and their impacts on health status. (F) Rundall

242. Behavioral Theory in Public Health. (3) One 3-hour lecture-discussion per week. Behavioral theories and analysis of recent developments in health-relevant psychological theories as they relate to the implementation, design, and evaluation of programs planned to improve health status of designated groups. (SP) Bravou

243. Advanced Health Education: Theory. (3) Three hours of lecture-discussion per week. Prerequisites: Public Health Education major. The course is designed to provide a basic understanding of the theory, vocabulary, concepts, and approach to the practice that underlie the health education process. (F) Staff

244. Advanced Health Education: Group Work. (3) Must be taken on a satisfactory/unsatisfactory basis. Three hours of discussion-laboratory per week. Prerequisites: 243 or consent of instructor. Emphasis on the social change process through task-oriented group work. The process aspect of the course is designed to promote an understanding of small group dynamics, and to provide practice in how those dynamics may be influenced in such ways as to protect, promote, or restore the public health. (SP) D'Orioho

245. Health Education in Medical Care Settings. (3) Two 1-hour lecture-discussions per week. Prerequisites: 243. Overview of trends and issues in patient education, including development of educational programs. Consideration of educational concepts and principles, and health behavior models as these affect patient learning. Analysis of actual patient education programs in diverse medical environments. (SP) Garcia

246. Community Organization and Concepts Basic to the Change Process. (3) One 3-hour seminar per week. Prerequisites: Major in Public Health Education or consent of instructor. An examination of social-psychological theories of change, and impact of these theories on the social change process. Emphasis on how these theories may be influenced in such ways as to protect, promote, or restore the public health. (F) M. Minkler

247. Mass Communications in Public Health. (3) Three hours of lecture-discussion per week. Prerequisites: Consent of instructor. Review general theories, models, and assumptions of use of mass communications to communicate health information and assess mass media campaigns. Study unplanned health campaigns, i.e., using content analysis techniques to understand influence of prime time television programming on drinking patterns and problems, as well as related content in various media. Examine the structure of the mass communication system and its implications for public health. (F) Waitt

248. Training as an Educational Methodology; (3) Three hours of lecture-discussion per week. Prerequisites: Program Planning (209/203). Presents theories, concepts, and principles of training as a field and as a process. Examines the types of educational situations
in which training, as an intervention, is best applied. Analyzes training problems, including the justification of training as an education methodology. (SP) Saunders

251A. Assessment of Nutritional Status. (3) Two 1-hour lecture-discussions per week. Prerequisites: Graduate standing and consent of instructor: Concepts, methods, and approaches to the future determination of nutritional status; application of methodologies for determining and interpreting data; technical, social, and political implications of nutritional assessments and related continuing needs. (SP) Sabry

251B. Public Health Nutrition. (3) Two 1-hour lectures per week. Prerequisites: 251A. Evaluation of nutrition programs. (Second semester core course.) (SP) Staff

251C. Nutrition Intervention Programs. (3) Two 1-hour lecture/discussions per week. Prerequisites: Graduate standing and consent of instructor: Intervention strategies for nutritional improvement, including food, income distribution, subsidies, and price regulation; nutrition education, and food quality control; the political and organizational realities of such programs, and approaches to their evaluation. (F) Staff

251L. Laboratory in Public Health Nutrition. (3) Course may be repeated for credit. One 2-hour lecture/discussion and three hours of field work per week. Prerequisites: 251A, 209 [203], or concurrent enrollment. The course is taken concurrently with the 209 laboratory in fall semester with 251A in spring semester. Students observe and participate in the work of community agencies, carrying out the assessment and planning functions of a public nutritionist; Bay Area community settings. Students will have the laboratory. (SP) Disbrow

252. Current Developments in Public Health Nutrition. (3) Two 1-hour lecture-discussions per week. Prerequisites: Previous course work in advanced nutrition, or consent of instructor: Critical evaluation of current literature related to public health nutrition issues and problems; implications for programs and research; interpretation to health professionals. (SP) Staff

253. Public Health Aspects of Maternal and Child Nutrition. (2) One 2-hour lecture/discussion per week. An overview of nutritional requirements and problems during pregnancy, lactation, infancy, childhood, and adolescence. Introduction to nutritional assessment of individuals and communities. Discussion of programs, policies, and legal issues that influence food resources for mothers and children. Course is intended for students of maternal and child health, social welfare, and other disciplines as well as nutrition students. (SP) Abrams

254. Nutrition and Aging. (3) Two 1-hour lecture/discussions per week. Prerequisites: Consent of instructor. The effect of nutrition on the aging process and the evaluation of the food and nutritional needs of the elderly from a biological, psychological, and social perspective; relationships on important health care needs for the elderly. (SP) Sabry

255. International Nutrition. (3) Two 1-hour lecture/discussions per week. Prerequisites: Consent of instructor. A survey of the world food situation with emphasis on the interrelationships of food issues and problems during pregnancy, lactation, infancy, childhood, and adolescence. (SP) Staff

256A. Public Health Aspects of Nutritional Care: In Selected Facilities. (3) Course may be repeated for credit. One hour of lecture/discussion and eight hours of field work per week. Prerequisites: Completion of 255A or consent of instructor: Organization and delivery of nutritional care services in facilities such as health departments, ambulatory health care settings, child care and educational facilities, and out-patient clinics. Includes nutrition education and counseling, food service, nutrition assessments, consultation, and training. (F,SP) Disbrow

260A-260B. Problems and Programs in Maternal and Child Health. (1 or 3 or 1 or 3) Course may be repeated for credit. Two 1-hour seminar-discussions per week. Prerequisites: Major in MCH or consent of instructor. A two-semester course which focuses on promotion of health of children, youth, and women of childbearing age to assure maximum growth potential. Emphasis on primary prevention and planning. (F,SP) O'Grady

260C. Delivering Maternal and Child Health Services. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 260A or consent of instructor. Design, implementation and evaluation of maternal and child health programs. Examples of MCH programs and evaluations from public and voluntary sectors. Program reviews will be developed, and students will write an MCH plan. (SP) Estenazi

260D. Research Issues in Maternal and Child Health. (2) Course may be repeated for credit. One 2-hour lecture/seminar per week. Research methods and issues in maternal and child health, with emphasis on epidemiological specific adverse reproductive outcomes, risk factors and prevalence. Will include critiques of published studies and techniques of proposal writing. (SP) Estenazi

261. Human Growth and Development: The Life Span. (2) One lecture-discussion per week. (Fall) One 2-hour lecture-discussion per week. (Spring) An overview of human development from conception to death. Topics will include cognitive development, socialization, growth and development, including normal and abnormal development. (F,SP) Failer

262. International Maternal and Child Health. (2) One 3-hour lecture per week. Prerequisites: Consent of instructor. Critical evaluation of current literature related to public health nutrition issues and problems; implications for programs and research; interpretation to health professionals. (SP) Staff

263. Evaluation and Improvement of Perinatal Health. (3) Three 1-hour lectures per week. This course is designed for students planning to do perinatal program development or research. Perinatal outcome variables and their measurement, factors affecting perinatal program outcomes and strategies to improve perinatal outcome will be considered. Readings address both national and international issues. (SP) Gould

264. Application of Genetics to Maternal and Child Health. (3) Two 1-hour lecture-discussions per week. Prerequisites: Consent of instructor. The use of the scientific knowledge necessary to assess the hazards of chemical exposures to human male and female reproduction. The scope of the course includes the effects of chemical exposures in the workplace, in the home, in food, and in critical scientific articles are criticized. Non-hazardous hazards to reproduction, e.g., radiation, are not discussed. (F) Ekenazi

265. Reproductive Hazards of Industrial Chemicals. (3) Two 1-hour lecture/discussions per week. Prerequisites: BEHS 122 or BEHS 130. The course will provide the student with the scientific knowledge necessary to assess the hazards of chemical exposures to human male and female reproduction. The scope of the course includes the effects of chemical exposures in the workplace, in the home, in food, and in critical scientific articles are criticized. Non-hazardous hazards to reproduction, e.g., radiation, are not discussed. (F) Ekenazi

266. Programs and Services for Handicapped Children. (3) One 2-hour lecture-discussion per week. Prerequisites: Graduate standing or consent of instructor: Examines family needs and critical issues in health promotion for families with children from birth through the age of 3 years. Specific policy issues and one-discussions per week. (SP) Kohn

267. Family Issues, Child Care, and Public Health. (3) One 2-hour seminar/discussion per week. Prerequisites: Graduate standing or consent of instructor: Examines family needs and critical issues in health promotion for families with children from birth through the age of 3 years. Specific policy issues and one-discussions per week. (SP) O'Grady, Guendelman

268. Population Dynamics, Family Planning, and Health. (2) One 2-hour lecture-discussion per week. Introduction to family planning policies and service delivery systems. Interrelationships between nutrition, population, family planning, and social and economic development. Role of family planning in international health and development activities. (F) D. Minkler

269. Biomedical and Behavioral Aspects of Family Planning. (2) One 2-hour lecture-discussion per week. The physiology of reproduction, contraceptive methods, and recent advances in contraception, sterilization, and abortion. Current issues in family practice. (SP) D. Minkler

271. Indian Health Care: Past, Present, and Future. (2) Course may be repeated for credit. One 2-hour lecture per week. Introduction to the Indian health field to better prepare students for service in Indian health programs; to provide students with the capacity to analyze policy, legislation, and programs affecting Indian health care; to constructively criticize pertinent Indian health issues; and to develop alternative approaches to solve Indian health problems. The course is intended to draw students from all disciplines within the School of Public Health so they can share their divergent perspectives in resolving specific Indian health problems. (SP) DuHahn

272. Aging: Value and Social Policy Issues. (3) One 3-hour lecture per week. Prerequisites: Graduate standing in public health or related discipline. This seminar examines key theoretics, value systems, and understandings the complex linkages between public health education, public policy, and aging. (SP) M. Minkler

274. Occupational Health Education. (2 or 3) One 2-hour lecture per week and three hours of optional field work. Participants from various disciplines will survey current issues in occupational health related to public health and the scope of hazards faced by workers; an overview of social, legal, and political forces that impact occupational safety and health; health education programs designed to prevent occupational illness and injury; and learning how to evaluate and implement effective occupational health programs. (SP) Baker

275. Disease Prevention and Health Promotion for the Elderly. (2) One 2-hour lecture/discussion per week. Prerequisites: Graduate standing or consent of instructor. How health promotion programs recognize and respond to the needs of older populations. Topics will include drug management, fitness, nutrition, etc., as they relate to aging; how to develop health promotion programs for the elderly; and critical assessment of research, programs, and policies. Activities may include field interviews of elderly persons in a variety of settings to gain insights. (F) Pasick

276. Substance Abuse Prevention. (3) One 3-hour lecture/discussion per week. Considers patterns of use and social responses to alcohol, tobacco, and other psychoactive drugs, and factors in changes in use and social response. Attention is given to the growth of community treatment systems and to preventive strategies and their effectiveness. (F) Morgan

279. Problems and Programs in Mental Health. (3) One 3-hour lecture-discussion per week. Examines historical development of mental health issues in the community, focusing on the role of community treatment systems and to preventive strategies and their effectiveness. (SP) Morgan

280. Research Methods: Logic and Design. (3) Two 1-hour lectures-discussions per week. The study of scientific methods: the analysis of behavioral research as they apply to public health. (F) Buvelot

281. Research Methods: Program Evaluation. (3) Two 1-hour lectures-discussions per week. The study of concepts, methods, rationale, and uses of evaluation research as they apply to public health. (SP) Morgan

283. Advanced Methods: Field Applications. (3) One 2-hour lecture-discussion per week. Critical analysis of selected research topics in health, including approaches to conceptualizing research on particular issues, meth-
Social Sciences
(College of Letters and Science)

Field Major Office: Division of Special Programs, 301
Campbell Hall, 842-0108

Professor: William V. Nistrick, Ph.D. (Associate Dean)

Lecturers:
Gerald J. Cavanaugh, Ph.D.
Robert Ehrlich, Ph.D.
Earl Klee, Ph.D.
Kathleen Moran, Ph.D.
Gary P. Wren, Ph.D.

Field Major in Social Sciences:
The Major Program

The field major in social science is especially devised for students who wish to acquire a liberal arts education in the social sciences. The major combines breadth—courses drawn from a number of disciplines—with an individual area of concentration tailored to the needs of the individual student. Students are responsible for developing their own program of studies with the advice and approval of a member of the staff who will act as their official adviser. The courses chosen from the fields listed above must relate coherently to each other.

Upper Division Courses

*101. Problems in the Social Sciences. (3) Course may be repeated for credit if topic changes. Two 1½-hour lectures per week. Prerequisites: Completion of 103A-103B: at least 9 upper division units in history and other social sciences. Application of the methods of the Social Sciences to a problem in history, the other social sciences, or an immediately related area.

103A. Theories, Methods, and Applications of the Social Sciences. (3) Two 1½-hour lectures per week. Introduction to the methodological principles and key concepts of the social sciences.

103B. Theories, Methods, and Applications of the Social Sciences. (3) Course may be repeated for credit. Two 1½-hour lectures per week. The application of methodological principles and key concepts of the social sciences to specific problems in contemporary society.

*156. Education and American Society. (3) Two 1½-hour sessions per week. Prerequisites: Upper division standing or consent of instructor. Examination of educational institutions in America including the shifting educational responsibilities of family, church, workplace, schools, colleges, and youth culture; the demographic, economic, political, and cultural forces explaining the rise of public schooling; present-day challenges to school hegemony.
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190. Senior Thesis. (4) Individual conferences. Prerequisites: Senior standing; completion of Social Welfare 102, 103B; at least 9 upper division units in history and other social sciences. The preparation and presentation of a senior thesis pertaining to the student’s individual area of concentration within the social science field major. Staff

H195. Honors Thesis. (4) Individual conferences. Prerequisites: Senior standing; completion of Social Welfare 102, 103B; at least 9 upper division units in history and other social sciences. Entails writing a bachelor’s thesis pertaining to the student’s individual area of concentration within the social science field major. The completed thesis will be read by the thesis supervisor and one other faculty member. Staff

197. Social Sciences. (3) One 3-hour seminar and 10-12 hours of field laboratory per week. Prerequisites: Minimum of 60 units and be in good academic standing. Analysis of contemporary social and political organizations. Changing topics (depending on the nature of field placements) include the politics of urban planning and development, the structure of contemporary communication media, women in political life, poverty and the social welfare system, consumer advocacy and the legal system. Assignments include weekly readings and issue papers, field research papers, and a journal. Staff

198. Directed Group Study for Upper Division Students. (2) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Directed group study on special topics approved by the division. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Directed individual study on special topics approved by the division. (F,SP) Staff

Social Welfare
(School of Social Welfare)

School of Social Welfare Office: 120 Haviland Hall, 642-4341
Dean: Harry Specht, Ph.D.

Professors:
Elleeri Gambrel, Ph.D. University of Michigan. Child welfare, mental health
Steven P. Segal, Ph.D. University of Wisconsin. Mental Health
Elof J. Miller, D.S.W. Columbia University. Research, mental health
Judith Wallerstein, Ph.D. University of Lund, Sweden. Divorce and mental health

Associate Professors:
William McKInley Runyan, Ph.D. Harvard University. Adult development
Lorraine M. Robinson, Jr., Ph.D. Wayne State University. Social Support, cross-cultural issues

Assistant Professors:
Rosemary McCaslin, Ph.D. University of Chicago. Aging, women’s issues
Lorraine Midian, Ph.D. John Hopkins University. Health services, substance abuse
Yu Wen Ying, Ph.D. University of California at Berkeley. Psychotherapy

Academic Administrator/Lecturer:
Paul Terfeil, D.S.W. University of California at Berkeley. Social policy and planning

Senior Lecturer:
Judith Wallerstein, Ph.D. University of Lund, Sweden. Divorce and mental health

Lecturers:
Dorothea Cutlavage, D.S.W. University of California at Berkeley. Group work, family life education
William Smelser, Ph.D. University of California at Berkeley. Growth and development, psychopathology

Coordinator of Field Work:
Barbara Roseman, Ph.D. University of Michigan. Field education

Associate Coordinator of Field Work:
Barbara Weils, M.S.W.

Lecturer/Field Work Consultants:
Joan Dunkel, M.S.W.
Gwendolyn Foster, M.S.W.
Peter Menkes, M.S.W.
Mary Q. Day, M.S.W.
Judith G. Shepherd, D.S.W. University of California at Berkeley. Juvenile justice and cross-cultural issues

Field Work Consultants:
Dora Betts, M.S.W.
Joseph Solls, M.S.W.


Undergraduate Program, College of Letters and Science

The Department of Social Welfare administers an undergraduate group major in social welfare in the College of Letters and Science. The group major, leading to the degree of Bachelor of Arts, offers a sequence of social welfare courses and social science electives of general interest to liberal arts students. It provides students with the opportunity to test their career interest in social work prior to employment or graduate professional education. Applicants to the major will be considered throughout the year. It is recommended that prerequisites be satisfied, but students can still declare the major before they have taken all the prerequisites.

Major Requirements

Lower Division: Psychology 1, Sociology 1 or 3, and Statistics 2 or equivalent. Recommended: Anthropology 3, Economics 1, Political Science 1.

Upper Division: A minimum of 29 upper division units, including Social Welfare 100B, 102, 103, 104 (elective); a minimum of five courses chosen from the list of restricted social science electives—three of the courses taken in one department and two selected from other departments. For a list of courses, contact the Social Welfare Undergraduate Office, 117 Haviland Hall.

Honors Program. Eligible social welfare majors, upon recommendation of their advisers, may enroll in an honors course (Social Welfare H195) to prepare a senior thesis. Prerequisites: Social Welfare 100B, 101, 102, 103, 104 (elective); a minimum of five courses chosen from the list of restricted social science electives—three of the courses taken in one department and two selected from other departments. For a list of courses, contact the Social Welfare Undergraduate Office, 117 Haviland Hall.

Graduate Program

For program description, see page 80.

Lower Division Courses

20. Social Problems and Social Welfare: A View Through Literature. (2) One 2-hour seminar per week. A vision of the awful consequences of industrialization seen as through the eyes of creative writers and journalists. Among the topics are covered are: Poverty, crime, and politics, dependency, and mental illness. (F) Miller

Upper Division Courses

100B. The Social Sciences—Social Welfare Policies and Programs. (2) Three hours of lecture and one hour of discussion per week. Social welfare policies and programs. Analysis of social welfare policies and programs including public assistance, social insurance, social services, and health and mental health. (SP)

101. Seminar In Social Policy. (2) Two 1/2-hour seminar meetings per week. Prerequisites: 100B, consent of instructor. Examination of the philosophy, organization, and purpose of selected social welfare programs. (F) Leiby

102. Social Work As A Profession. (2) One 1-hour lecture and one 1-hour discussion session per week. Prerequisites: 100B, consent of instructor. Examination of social work as a profession. What social workers do (the practice of the profession); where they do it (the organizational context of professional practice); and the rules of conduct they follow (the ethics of the profession). (F)

103. Practice in Social Work. (3) One 2-hour lecture and one 2-hour laboratory discussion per week. An introduction to basic skills of interpersonal helping and problem solving and to related theory and research. (F) Gambrill

104. Field Study In Social Welfare. (4) Must be taken on a passed/not passed basis. Fifteen days in field work plus one 2-hour seminar per week. Prerequisites: 100B and 102. Supervised field work in social agencies plus university-based integrative seminars. Open only to social welfare majors. (SP)

105. Current Topics In Social Welfare. (2) Must be taken on a passed/not passed basis. A minimum of 29 upper division units, including Social Welfare 100B, 102, 103, 104 (elective); a minimum of five courses chosen from the list of restricted social science electives—three of the courses taken in one department and two selected from other departments. For a list of courses, contact the Social Welfare Undergraduate Office, 117 Haviland Hall.

109. Honors Senior Seminar. (3) One 2-hour seminar and one hour of discussion per week. Prerequisites: 100B, 101. Preparation of an honors thesis. (SP) Leiby

197. Field Studies In Social Welfare. (1-3) Must be taken on a passed/not passed basis. Fifteen days in field work per course and credit as topics vary. Field work in community agencies and individual conferences with faculty. Supervised experience relevant to specific aspects of social welfare in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

198. Group Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Lecture and discussion. Group study on selected social welfare topics. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial conference. Enrollment is restricted by regulations listed on pages 81 and 82 of this catalog. (F,SP) Staff

Graduate Courses

200. Human Development In The Social Environment. (2) One 2-hour lecture per week. The psychological, interpersonal, and social development of the person across the life cycle in the context of different social environments. (F)

205. Psychosocial Problems and Psychopathology. (2) One 2-hour lecture per week. Developmental abnormalities and deviations which result in dysfunctional behavior in the individual. Examines problems and disorders of children and adults from psychosocial and social perspectives. (SP) Smelser

210. Topics In Human Development. (2) Gibbes

210A. Stress and Coping in Adulthood: Descriptions, measurements, and major theories concerning the etiology of stress and coping in the adult (25-60) years. (SP)

210B. Infant Development. Topics and issues in infant development, including infant-mother relationship, infant behaviors, development, behavior assessment, predictors of disturbance, and intervention with high risk infants.

*On leave, spring
**On leave, fall
*Recipient of Distinguished Teaching Award
210C. Aging Processes. Sociological, psychological, and physiological variables relevant to the assessment of older persons. (SP) McCaslin

210D. Life Histories and Case Studies. Theoretical and methodological problems in the study of individual lives. Focus on the intellectual and social processes involved in the formation, life history, and reform of clinical case studies and psycho-biographies. (F) Runyan

210E. Human Development and Social Policy. Selected topics in human development and their relevance for social policy. Attention to topics such as cognitive-social development and educational policy, maternal deprivation and day care, burn-out, displaced homemakers, and issues in aging. (SP) Runyan

210F. Social Networks and Social Support. Focus on the personal community—the significant others available to render assistance in times of physical or emotional strain. How networks operate; their accomplishments and limitations; the role and skills of professionals in assessing and utilizing networks for clients. (SP) Snowden

210G. Psychoanalytic Psychodynamics. Prerequisites: 200 and 205. Basic principles of psychodynamics and psychopathology; psychoanalytic psychology will serve as the underlying theoretical orientation.

220. Introduction to Social Policy. (2) One 2-hour lecture per week. Analysis of issues in social policy and recent trends shaping the development of the American welfare state. (F) Pruger, Gilbert

222. Mental Health and Social Policy. (2) One 2-hour lecture per week. Mental health policies and programs at the national, state, and local levels; major factors influencing the provision of mental health services; reciprocal relationships between mental health policy and social work practice. (SP) Segal

223. Designing Solutions to Mental Health Problems. (2) One 2-hour lecture per week. How mental health problems are defined; optimum solutions to such problems are determined; new directions in the roles of community mental health workers.

228. Social Policy and Gerontology. (2) One 2-hour lecture per week. U.S. social policy and programs for the aging are analyzed with respect to the knowledge required to assess the needs for societal supports and major issues and trends in the delivery of social services. (SP) O'Day

227. Advanced Study in Aging Policy. (2) One 2-hour lecture per week. Advanced study in special program and policy areas.

230. Social Policy: Children and Families. (2) One 2-hour lecture per week. Social and economic influences on child and family welfare; introduction to current problems, programs, and policies. (SP)

231. Advanced Study in Children and Family Policy. (2) One 2-hour lecture per week. Advanced study in special problem and policy areas.

234A. Law and Social Welfare: Children and Families. (2) One 2-hour lecture per week. Legal information and policy discussion for social workers and other human service providers in the child and family welfare field. (SP)

234B. Law and Social Welfare: Mental Health and Disability. (2) One 2-hour lecture per week. Legal information and policy discussion for social workers and other human service providers in the mental health, health, and physical and mental disabilities field. (SP)

234C. Law and Social Welfare: Gerontology. (2) One 2-hour lecture per week. Legal information and policy discussion for social workers and other human service providers in the field of aging. (F)

238. Topics in Social Welfare Policy. (2) Brown

238A. Social Welfare in the Workplace. Formerly 298. Course reviews characteristics of and controversies in modern employee services. Examines employer-sponsored programs in the workplace, such as family counseling, and day care. Analysis of benefit plan design. (F)

238B. Substance Abuse. Prerequisites: 220. Examines how substance abuse policy is formulated by examining political, historical, epidemiological and clinical factors. Emphasis on how alcohol and drug problems become defined as social problems and how these definitions influence substance abuse intervention strategies. Focus on alcohol abuse and on individual and social control models of substance abuse. In addition, the development and evaluation of alcohol and drug abuse treatment will be discussed. Additional topics include alcohol and women, drunk driving and legal liability issues. (SP) Middanik

238C. Health Policy—A Social Welfare Perspective. Major issues and programs in the health care field. Course considers the social context of health care; the roles of the public, voluntary, and private sectors; and the implications of policies and programs for society and the individual client. (F) Segal

238D. Women's Issues. The changing roles of women in society and their impact. Topics include socio-economic status, sex role socialization, fertility control, and community resources. Social policies in employment, health, mental health, social security, day care, and public assistance will be explored using an analytic framework to investigate impact on women and their families. (SP) Middanik

240. Introduction to Social Work Methods. (2) Core principles of social work practice with individuals, groups, families, social agencies, and communities. (F) Specht; McCaslin, Grossman


250. Topics in Direct Practice. (2) One 2-hour lecture per week. Examines the psychotherapeutic interaction between practitioners and clients, with emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Specht

250A. Social Work with Groups. (1-2) Theory and practice regarding the formation, functioning, and termination of groups. Emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Specht

250B. Family Therapy. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Theoretical frameworks and intervention skills for family work. (F,SP)

250C. Brief Therapy and Crisis Intervention. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Examines the clinical application of crisis intervention and brief psychotherapy from an historic and psychodynamic perspective. Provides assessment criteria for assignment to these forms of treatment and techniques for intervention. (SP) Smeltzer

250D. Psychotherapeutic Methods with Adults. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Examines the application and use of various psychotherapeutic methods and their applications for clinicians. Examines supportive treatment, depression and suicide management and treatment, brief and long range expressive psychotherapy and other intervention models. (SP) Walerstein

250F. Social Work in Health Care. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Theoretical bases and intervention strategies for health care. Emphasis on concepts and techniques for establishing and maintaining helping relationships. Topics will include dangerous behavior, acute psychotic episodes, long-term chronic disability, enhancing social skills and social support systems, and the interaction of medical and social functioning. (SP) Watson

250G. Direct Treatment of Children. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Examines the psychotherapeutic interactions between practitioners and clients, with emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Specht

250H. Clinical Intervention with the Elderly. (2) One 2-hour lecture per week; Prerequisites: 240 and 242 or consent of instructor. Examines the psychotherapeutic interaction between practitioners and clients, with emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Specht

250I. Clinical Intervention with the Elderly. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Utilizing several theoretical frameworks, this course examines problems of the elderly and appropriate social work interventions, such as congregate systems management, and direct services. Particular attention will be given to the impact of chronic illness and the health care system on the elderly and their families. (F) Dunkel

250J. Intervention with Adult Families. (2) Formerly 296. One 2-hour seminar per week. Prerequisites: 242. Course will examine the dynamics and problems of families from the post-parental phase through the aging and death of the parents. These issues will be analyzed in relation to their implications for service delivery strategies which support the continued growth of both the family as a network and of its individual adult members. Emphasis will be on preventive interventions which will prepare the family to cope with complex issues that arise if and when the parents become dependent in later life. (SP)

250K. Social Work Practice with Sexual Problems. (1) One 2-hour lecture per week for 7½ weeks. Prerequisites: 240 and 242 or consent of instructor. Skills applicable to sexual problems in social work practice. Presents theories of the etiology of sexual problems; explores treatment modalities. (SP)

250L. Child Welfare. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Examines practice roles in child welfare settings using permanency planning as a guiding framework. (F)

250M. Curriculum and Career Counseling in Schools. (2) One 2-hour lecture per week. This course is designed to help students meet the career counseling and curriculum development competencies of the P.P.S. credential in school social work. Addresses theories and assessment techniques in career counseling and the structure and goals of curriculum. Students must be concurrently enrolled in a school-based field placement. (SP) Britt, Henry

250N. Social Work with Chronically Mentally Ill Adults. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Theoretical and technical issues of direct intervention useful in helping those with major mental disorders to cope with their illnesses and aspects of their life situations associated with the illness. Emphasis on concepts and techniques for maintaining helpful relationships. Topics will include dangerous behavior, acute psychotic episodes, long-term chronic disability, enhancing social skills and social support systems, and the interaction of medical and social functioning. (SP) Middanik

250O. School Social Work. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Examines the psychotherapeutic interaction between practitioners and clients, with emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Specht

250P. Life Histories and Case Studies. The theoretical bases and intervention strategies for social work practice with children and youth in the school context; and issues of child abuse and handicaps. (SP) Barth
250T. Treatment of Children and Youth. (2) One 2-hour lecture per week. Prerequisites: 240 and 242 or consent of instructor. Will be offered to help children and their families learn cognitive and social skills to achieve specific treatment objectives. Methods described are derived from family therapy, behavior therapy, and special education. (F) Barth

250U. Substance Abuse Treatment. (2) New course. One 2-hour lecture per week. Prerequisites: 240, 242. Course provides an introductory overview of various treatment methods and briefly reviews special education. (F) Badh and their families (earn cognitive and soci^ skills to are derived from family therapy, behaviortherapy, and special education. (F) Barth

251F. Diagnosis and Treatment of Substance Abuse Disorders. (2) Formerly 298. One 2-hour lecture per week plus one 1-hour discussion section per week. Course focuses on the assessment and treatment of Asians, blacks, Hispanics, and American Indians. While the major emphasis is on clinical treatment of families, the course also examines issues of child welfare, health care, and juvenile justice systems. Issues of access and utilization will also be explored. (F) Gibbs

251G. Seminar in the History and Philosophy of Social Welfare. (2) One 2-hour seminar per week. Primarily for doctoral students. A review of efforts to conceptualize the field of social welfare and to analyze its tendencies. (FSP) Leiby

251H. Seminar in Social Welfare Research. (2) One 1-hour lecture and one 1-hour discussion per week. Introduction to the theory and practice of research in social welfare. (SP) Kramer

252A-252B. Seminar in Social Welfare Research. (2,2) One 2-hour seminar per week. Prerequisite: 298. Problem formulation, design, and implementation. (F.SP) Snowden, Shepherd, Gambrell, Gilbert

252C. Introduction to Social Welfare Research. (2) Formerly 298. One 2-hour lecture per week. Prerequisites: 240 or consent of instructor. Course focuses on the assessment and treatment of Asians, blacks, Hispanics, and American Indians. While the major emphasis is on clinical treatment of families, the course also examines issues of child welfare, health care, and juvenile justice systems. Issues of access and utilization will also be explored. (F) Gibbs

253F. Seminar in Social Welfare Research. (2) One 1-hour lecture and one 1-hour discussion per week. Introduction to the theory and practice of research in social welfare. (SP) Kramer

254A. Topics in Agency Management: Program Development and Proposal Writing. (2) One 2-hour lecture per week. Prerequisites: 240 and 252. Principles and methods of program design and proposal writing. (SP) Prager

254D. Topics in Agency Management: The Management Cycle. (2) One 2-hour lecture per week. Prerequisites: 240 and 252. Theories of organizational behavior and the practice of administration. Socialization to work environment, conflict, and change in human service organizations. (SP) Prager

254E. Topics in Agency Management: The Good Bureaucrat. (2) One 2-hour lecture per week. Prerequisite: 240. An analysis of the problems and opportunities faced by service providers in bureaucracies. Addresses the question: How can the professional manager create the bureaucratic environment of service giving rather than be managed by it? (F) Prager

254F. Topics in Agency Management: Efficiency in Social Welfare Administration. (2) One 2-hour lecture per week. Prerequisites: 240 and 252. Theories of organizational behavior and the practice of administration. Socialization to work environment, conflict, and change in human service organizations. (SP) Prager

255A. Research Methods and Techniques in Social Welfare. (2) One 2-hour lecture per week. Prerequisites: 240 and 252. Basic skills in human services management; particularly planning, budgeting, monitoring, and assessment of results. (SP) Prager

255B. Social Welfare Planning. (2) One 2-hour lecture per week. Prerequisites: 240. Philosophies and models of the social planning process, program analysis, design and assessing alternatives, performance assessment and evaluation. Consideration of the politics of planning and policy analysis. (SP) Gilbert


270. Access to Human Services Among Low-Income and Minority Populations. (2) Formerly 298. One 2-hour seminar per week. Course examines mental health and mental health services as culture-bound conceptualizations and demonstrates culture-specific biases of Western views and Interventions. Explores mental health needs of U.S. minority groups and intervention techniques. (F) Ying

274. Immigrants and Refugees: Policy Issues and Clinical Concerns. (2) Formerly 298. One 2-hour seminar per week. Overview of immigration policy in the U.S. from an international and historical perspective and of psycho-social theories of migration. Theories of acculturation, assimilation, and adaptation will be included and applied to analysis of individual cases. Course material also reviews clinical cases with discussion of relevant treatment models and issues in cross-cultural Interventions and function. Emphasis will be placed on the unique practice role of social workers in the prevention/intervention of substance abuse problems. (F) Mancillas

282. Social Agency Management. (2) One 2-hour lecture per week. Prerequisites: 240. Basic theories, areas of knowledge, and practice skills for the administration of human services. Topics include program development and implementation, relations with community resources, development, supervision, and finance. (SP) Kramer

282A. Topics in Social Welfare Planning: Community Planning. (2) One 2-hour lecture per week. Prerequisites: 240 and 252. Theories of organizational behavior and the practice of administration. Socialization to work environment, conflict, and change in human service organizations. (SP) Prager

282B-282B. Seminar in Social Welfare Research. (2,2) One 2-hour seminar per week. Prerequisite: 282A. Problem formulation, design, and implementation. (F.SP) Snowden, Shepherd, Gambrell, Gilbert

284. Library Research in Social Welfare. (1) Must be taken on a satisfactory/unsatisfactory basis. Two 2-hour sessions per week for the first semester of the fall semester. Primarily for doctoral students. A systematic introduction to tasks and tools of library research in social welfare: reference works, finding and bibliographic aids. Attention will be given to data collection, data storage, and arrangements for collecting and retrieving information. (F) Leiby

285. Report Writing and Editing. (1) Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week and individual consultation. Primarily for doctoral students. A systematic approach to writing and editing for social work, bills, grants, articles, or student papers. Attention to formal organization, style, selection of media for publication, and preparation of manuscripts. (SP) Leiby

286A. Research Methods and Techniques in Social Welfare. (2) One 2-hour lecture per week. The logic of social research. Topics include rationale and procedure of research design, validity, reliability, and an introduction to sampling. (F) Midanic

288B. Inferential Statistics. (2) Formerly 288B. One 2-hour lecture per week. Prerequisites: 288A. This is an intermediate-level course in statistical concepts, methodology, and application of statistical inference. Topics include probability, random variables, statistical distributions, descriptive statistics, statistical hypothesis testing, Z-tests, T-tests, chi-square tests. (SP)

289C. Introduction to Regression. (2) Formerly 298. One 2-hour lecture per week. Prerequisites: 288A, 288B. Course addresses: the linear stochastic specification; the reason why ordinary least squares estimates are desirable—the Gauss-Markov theorem; sampling dis-

289D. Introduction to Regression. (2) Formerly 298. One 2-hour lecture per week. Prerequisites: 288A. This is an intermediate-level course in statistical concepts, methodology, and application of statistical inference. Topics include probability, random variables, statistical distributions, descriptive statistics, statistical hypothesis testing, Z-tests, T-tests, chi-square tests. (SP)

289E. Introduction to Regression. (2) Formerly 298. One 2-hour lecture per week. Prerequisites: 288A, 288B. Course addresses: the linear stochastic specification; the reason why ordinary least squares estimates are desirable—the Gauss-Markov theorem; sampling dis-

291. Training in Teaching. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Supervised teaching assistance. One unit will be awarded for each four hours per week of student work. (F,SP)

400. Introductory Practicum. (2) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week plus 17 days of field work. Introduction to the range of professional roles and services in social workers through diversity-based internships and field work in social agencies. Taken in the first semester of the M.S.W. program. (F) Grossman

401. Field Practicum. (1-10) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One unit of credit awarded for each four hours per week of practicum work. Prerequisites: 400. Supervised field work in social agencies and university-based group meetings. Taken in second, third, and fourth semesters of the M.S.W. program. (F) Grossman

403. Training in Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Supervised research assistance. One unit will be awarded for each four hours per week of student work. (F,SP)

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit up to a limit of 16 units. Must be taken on a satisfactory/unsatisfactory basis. One unit will be awarded for each four hours per week of student work. Individual consultation. Individual study in consultation: Consent of instructor. Designed to permit qualified graduate students to pursue research in a subject area of their choosing under the direction of a faculty member. (F,SP)

Interdepartmental Studies Courses

Undergraduate Courses

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) One 2-hour lecture per week in the evening. Prerequisites: high school biology and chemistry. This interdisciplinary course will single out specific topics in aging of great current interest (fall, Alzheimer's disease; spring, strategies for intervention) and present lectures on all aspects of each topic (biological, psychological, social, economic, legal, and ethical). Invited speakers with special expertise in these areas will participate. Credit for the course will

*Not offered 1988-89
*On leave, spring, fall
*Recipient of Distinguished Teaching Award
Kenneth E. Bock, Ph.D. (Emeritus) University of California at Berkeley. Theory, social evolution
John A. Clausen, Ph.D. University of Chicago. Socialization, mental health, life-cycle
Kingsley Davis, Ph.D. (Post Professor of Sociology and Comparative Social Studies) (Emeritus) Harvard University. Demography, family, urbanization, population
Wolfram Franz, Ph.D. (Emeritus) University of California at Berkeley. Chinese society, Asian folklore
Charles Y. Glock, Ph.D. (Emeritus) Columbia University. Survey, attitudes, race
Lee Lowenthal, Ph.D. (Emeritus) University of Florida. Culture, literature, theory
Philip Selznick, Ph.D., Dr. Jur. h.c. (Emeritus) Columbia University. Theory, organizations/institutions

Associate Professors:
Victoria E. Bonnell, Ph.D. Harvard University. Historical, labor, Soviet Union
Michael Burawoy, Ph.D. University of Chicago. Labor, comparative, political economy
Nancy J. Chodorow, Ph.D. Brandeis University. Feminist theory, family, psychoanalysis
Harry Edwards, Ph.D. University of California at Berkeley. Race, sport, family
Michael Hout, Ph.D. Indiana University. Demography, methods, culture, social class
Jerome Karabel, Ph.D. Harvard University. Education, stratification, intellectuals, political
Ann Swidler, University of California at Berkeley. Culture, religion, theory, organizations

Visiting Professor:
Wolfgang Schluchter, Ph.D. Free University of Berlin. Visiting from University of Heidelberg. History, theory of sociology

Adjunct Associate Professors:
Carol Hufnagel, Ph.D. University of California at Berkeley. Medical, adult development, aging
James Wilcox, Ph.D. Vassar College University. Methods, medical, family

Affiliated Professors:
Reinhard Bendix, Ph.D. (Emeritus) (Political Science) University of Chicago. Theory, political, German, intellectuals
Glenn Carroll, Ph.D. (Business Administration) Stanford University. Organizations, methods, ecology, urban
Manuel Castells, Ph.D. University of Paris. (City and Regional Planning) University of Paris. Urban, political, economic, technology
Gail Epple, Ph.D. (Political Science) Harvard University. Soviet Union, social integration, politics
Leonard P. Fish, Ph.D. (Psychology) University of California at San Francisco. (Sociology) University of California. Mental health, stress, life-cycle
Harold L. Wasserheit, Ph.D. (Political Science) University of Chicago. Work, politics, modern society

The Major

Students intending to major in sociology are advised to prepare themselves by taking background work in such areas as history, philosophy, cultural anthropology, psychology, economics, and political science.

Prerequisite Courses for the Major. A student must have successfully completed Sociology 1 and 5 as well as a course in either statistics or logic prior to entrance into the major. Students who have received credit for more than two upper division courses must substitute another core course for Sociology 1.

Upper Division. A student must take the following courses:

2. Three courses from the following core list: 110; 111, 112, 113, 115, 116, 125, 130, 131A-131B, 133, 134, 140, 150, 170, 172.
3. Three additional courses which must be upper division sociology courses numbered 102A-190, or graduate sociology courses (subject to instructor approval). Courses taken from the core list in excess of the three required, or additional upper division seminar courses, will count as electives, as will non-core courses.
4. One 90 or 190.

Honors Program. Majors who enter their senior year with a 3.3 grade-point average in the major may join the honors program, after confronting with a major advisor, by taking Sociology H190A-190B, Senior Honors Thesis and Seminar.

Students who plan to go on to graduate work in sociology or other related disciplines and professions are strongly urged to take both Sociology 105 and 106.

The Graduate Program

Facilities for graduate study and research leading to the M.A. and Ph.D. degrees include courses, seminars, and research training under faculty supervision in: comparative/historical and area studies, demography, political organization, and development, deviance, education, family, gender, industrial sociology, methodology, organizations and institutions, political sociology, race and ethnicity, religion, social change, social psychology, social movements, social stratification, sociological theory, and urban sociology.

Applications are considered once a year for fall semester admission only. Candidates for admission must apply by February 1, except those applying for a Master of Arts degree, who must apply by May 15. Applications are available from the graduate assistant of the Department of Sociology, 410 Barrows Hall, during the fall and until February 1. Applicants must take the Graduate Record Examination (apply Educational Testing Service either at 1947 Center Street, Berkeley, CA 94704 [after June 1987, P.O. Box 23470, Oakland, CA 94623-2347]) or 6th Street, Princeton, NJ 08540. Applicants are strongly encouraged to take the Graduate Record Examination administered in October rather than waiting for the December examination. The undergraduate major need not have been in sociology. The character and quality of the individual's prior education and experience are more important than the actual field of study.

M.A. Degree Requirements. Nine courses taken for a letter grade are required, as follows:

The student must pass Sociology 201 (Theory) and must fulfill the methods requirement. Most students fulfill the methods requirement by passing Sociology 271A and 271B with a grade of B or better, and by submitting a satisfactory methods paper. (More details are available from the department's graduate assistant.)

At least two courses in the Sociology 280 series. A maximum of three courses may be taken as 205E in counting toward the nine courses. And a maximum of two courses of work taken in Sociology 299 and in upper division and graduate courses of other departments may be counted toward the nine course minimum. No undergraduate sociology courses may count toward the nine courses. With permission of both the personal adviser and the graduate adviser, one additional course from these categories may be applied to the nine-course requirement. No units in Sociology 295, 296, 301, 401, 601, or 602 may be counted toward the nine-course requirement. No courses are available for the M.A. for a letter grade satisfactory/unsatisfactory.

Deadlines for Completion. During the first three semesters of residence, the student is expected to complete (a) the theory and method requirement, (b) writing a paper in each of these areas; (b) at least three additional papers on sociological subjects written for instructors other than those for whom the theory and methods papers were written. The papers need not be written as assignments in sociology courses, and, however, the paper may be submitted for appraisal to a member of this department's faculty.

There is no foreign language requirement for the M.A. degree.

Ph.D. Requirements. A master's degree is required. Students who have taken the M.A. at another university must meet the basic course requirements for M.A. students at Berkeley.
Before the qualifying examination, the student must have completed (beyond any work taken for the M.A.) three graduate sociology courses or seminars (except for Sociology 210A, one of which is a theory course in the 202 series and one of which is a methods course in the 272 or 273 series. All three courses must be taken for a letter grade and both the theory and methods courses must be passed with a grade of B or better.) Competence in meth- odology must also be demonstrated by preparation of an acceptable research paper. The department members of the student's qualifying examination committee will determine the acceptability of the paper.

A foreign language may be required by the student's qualifying examination committee if deemed neces- sary for the dissertation research. Before formal admission to candidacy for the Ph.D., the student must have written and received approval by the proposed committee of a dissertation prospectus.

Within a period of no more than six years from the date of admission, students are expected to complete and file their dissertation. Under special circumstances, the department may recommend to the Graduate Division an extension of candidacy if the extension has been approved by the dissertation committee chair and the graduate adviser.

### Lower Division Courses

1. **Introduction to Sociology.** (4) Not open to students who have taken 3. Two hours of lecture and two hours discussion per week. Introduces students who are con- sidering a sociology major to the basic topics, concepts, and principles of the discipline. This course is required for the major; 1 or 3 is prerequisite for other sociology classes; students not considering a sociology major are directed to 3.

2. **Principles of Sociology.** (4) Not open to students who have taken 3. One hour of lecture per week. An overview of sociology for students who will not major in the field. Sociological approaches to the study of fundamental problems of group life—social organization, culture, interaction processes and socialization—and the dynamics of modern society. Satisfies prerequisites for other sociology courses, but not for major.

3. **Evaluation of Evidence.** (4) Three hours of lecture and two hours discussion per week. A review of meth- odological issues in research data relating to social life. Topics to be covered include: posing a sociological problem, gaining access to data, measuring, establishing correlation and causation among data, and relating data to theoretical context.

13. **The Sociological Perspective.** (2) New course. Students who have taken 1 may not receive credit for this course. Three hours of lecture per week. An introduction to the sociological perspective through structured writing and public speaking. It is designed to develop writing, analytical, and speaking skills while exploring the varying uses of this perspective.

90. **Freshman/Sophomore Seminar.** (4) Course may be repeated for credit as topic changes. Two hours of seminar per week and individual conferences. Prereq- uisites: 1 or 3 or consent of instructor. Specific topics in sociology will be covered in seminar format as a way of introducing students to the process of sociological inquiry.

98. **Directed Group Study.** (1-4) New course. Course may be repeated for credit. Must be taken on a pass/ fail basis. Open to freshmen and sophomores. Prerequisites: Consent of instructor. Group studies of selected topics which vary over time.

### Upper Division Courses

101A. **Sociological Theory.** (5) Three hours of lecture and two hours discussion per week. Prerequisites: 1 or 3 or consent of instructor. History of social thought as a source of present-day problems and hypotheses.

101B. **Sociological Theory.** (5) Three hours of lecture and two hours of discussion per week. Prerequisites: *101A.* History of social thought as a source of present-day problems and hypotheses.

102. **Advanced Study In Social Theory.** (4) New course. Individual courses may not be repeated (e.g., 102A) but more than one 102 may be taken. Three hours of lecture per week. Prerequisites: A course in social theory or consent of instructor. Courses under this number involved pursuing study in subfields of so- ciological theory, such as the sociological basis of a given background in social theory. Consultant as instructor if your background is appropriate.

102A. **Contemporary Marxist Social Science.** (4) 102B. ** Feminist Theory.** (4)

105. **Introduction to Sociological Methods.** (5) Three hours of lecture and two hours discussion per week. Prerequisites: 5 or consent of instructor. Problems of research design, measurement, and data collection, processing, and analysis. Attention will be given to both qualitative and quantitative studies.

106. **Intermediate Sociological Methods.** (5) Three hours of lecture and two hours discussion per week. Prerequisites: 105. This course will cover more technical issues in quantitative research methods introduced in 105, and will include, according to discretion of instructor, a practicum in data collection and/or analysis. Rec- ommended for students interested in graduate work in sociology or related fields.

110. **Organizations and Institutions.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Administrative organizations and voluntary associations; major social institutions in industry, gov- ernment, religion, and education. Prerequisites: 1 or 3 or consent of instructor.

111. **Sociology of the Family.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Systematic and comparative analysis of family structure and change: marriage, reproduction, child-rearing, marital dissolution.

112. **Sociology of Religion.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The role of religious belief and practice in society. Will include a general theory of the nature of religious experience, religious symbolism, and the basis of religious community.

113. **Sociology of Education.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The role of formal education in modern societies. Emphasis on instruction, professional associations vs. labor unions, codes of education, and historically the role that religion has played in human society. Prerequisites: 1 or 3 or consent of instructor.

115. **Deviance and Social Control.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An examination of deviant behavior. The role of social dares, occupational groups, and social psychological processes. The nature, causes, and consequences of world urbanizatirp; potential.

131A. **Race and Ethnic Relations: The U.S. Experience.** (4) Half credit to students who have taken former 131. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. A broad survey of race and ethnic relations in a wide variety of nations and periods, with special attention to similarities with the present and past patterns in the United States. Emphasis on social, economic, political, institutional, social psychological, and demographic processes.

132. **Selected Topics in Ethnic and Race Relations.** (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. There will be variation in topics, depending on instructor in charge. Possibilities include concentration on one ethnic group, consideration in depth of specific theoretical issues, or an examination of race relations from an international comparative approach.

133. **Gender and Society: The Sociology of Women.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. A broad survey of race and ethnic relations in a wide variety of nations and periods, with special attention to similarities with the present and past patterns in the United States. Emphasis on social, economic, political, institutional, social psychological, and demographic processes.

134. **Gender and Society: The Sociology of Men.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The role of men in American society examined from standpoints of socialization and role analysis; group structure, politics, and social change, and personal experience.

135. **Gender and Society: Sexual Diversity and Social Change.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An examination and analysis of the significance of homosexuality in contemporary U.S. society. Included: traditions of Western thought and the role of institutions, patterns of social change, contemporary social/political movements, social- ization and the development of individual identity, and the implications of evolving public attitudes.

136. **Political Sociology.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Political processes in organizations and institutions of power. The role of social classes, occupational groups, and religious groups, and the influence of cultural values.

141. **Social Movements and Political Action.** (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. A consideration of forms, causes, and controls of deviant behavior. The role of social dares, occupational groups, and social psychological processes. The nature, causes, and consequences of world urbanizatirp; potential.**
of instructor. Social movements, the formation and play of public opinion, and the behavior of interest groups.

142. Sociology of War and Conflict. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Violent and peaceful procedures in the pursuit of national objectives; analysis of attempts to specify the causes of war.

143. Policy, Economy, and Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Major themes of the contemporary United States: government, resources, and cities. Stress on the importance of transition from the 1960's. Examination of how each sector is influenced by policy currently. Current trends and social conflicts.

144. Ethnic Politics. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Examination of the role that ethnicity plays in influencing the political behavior of individuals as well as analysis of how the state in multi-ethnic countries interacts with ethnic groups.

150. Social Psychology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An examination of major theoretical approaches in social psychology. The approaches may include: symbolic interactionism, neo-behaviorism, psychodynamic analyses, cognitive theories, interpersonal processes and theories of exchange.

151. Personality and Social Structure. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An analysis of development and growth of personality, and of varieties of personality, as a consequence of social experience and an evaluation of social-psycho logical and sociological explanations of these developments.

153. Interpersonal Behavior in Small Groups. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An examination of sociological theories and research on behavior in small groups. Topics such as stress, communication, cooperation, and interpersonal conflict are examined in light of field and laboratory research.

155. Sociology of Illness and Medicine. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Social and cultural factors associated with the definition, occurrence, and experience of illness. Analysis of the socially-defined sick role and the systems of which it is a part.

156. Thought Reform, Influence, and Social Control. (4) Three hours of lecture per week. Prerequisites: 1, 3 or consent of instructor. Thought reform (i.e., coercive persuasion, brainwashing) and extreme methods of social control in the Soviet Union, China and in American cult organizations are analyzed. American examples include religious, political and therapeutic cults. Issues of recruitment, management and the evolution of violence and terrorism are addressed.

158. Sociology of Culture. (4) Three hours of lecture per week. Prerequisites: 1, 3 or consent of instructor. Study of human meaning systems, particularly as manifested in art, literature, music, and other media. Includes study of the production, reception, and aesthetic experience of cultural forms.

159. Sociology of Language. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The relation of literature to the social order and to systems of social control. Analysis of the social role of the writer.

163. Sociology and Mass Philosophy. (4) Students who have taken 159 (quarter system) will receive no credit for 163. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. This course considers the relations between sociology and moral philosophy through an examination of classical and contemporary studies in both fields.

179. Social Change. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Study of major changes in modern societies: the sources of these changes; the processes through which they spread; their meaning for individuals and institutions.

171. Social Origins of Modern Western Societies. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Brief historical background of modern western societies, including industrialization, the rise of liberalism, the advent of social revolution, changes in political authority and institutions, mass culture, transformation of social structure and social life.

172. Development and Modernization. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Major theoretical perspectives on structural changes in new nations. Factors and conditions influencing transformation of societies. Contributions of sociology to the analysis of major problems confronting the peoples of Africa, Asia, and Latin America.

180. American Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Various aspects of American values and behavior patterns over time; sources of differences from other developed nations.

181. Soviet Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Soviet Russia from 1917 to the present. Social structure, political and economic development, and contemporary Soviet society.

183. Contemporary Chinese Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An introduction to institutions, social groups, and values in contemporary Chinese society. Dynamics of social change in a revolutionary and post-revolutionary setting. Trends in the future development of Chinese society.

184. Social Structure of Communist Societies. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Major theoretical perspectives on structural changes in new nations. Factors and conditions influencing transformation of societies. Contributions of sociology to the analysis of major problems confronting the peoples of Africa, Asia, and Latin America.

190. Seminar on Advanced Topics. (4) Course may be repeated for credit when topic changes. Two hours of seminar per week and individual conferences. Prerequisites: 1 or 3 or consent of instructor. Various aspects of the class system, economic life, nationality groups, the family, education, demographic factors; comparison of communist social structure with the West.

197. Field Study in Sociology, (1-4) Course may be repeated for credit. Two hours of seminar per week, as well as individual meetings with the faculty sponsor and written reports required.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Direct individual study on special topics approved by the division.

Graduate Courses

201. Sociological Theory. (3) Two lecture hours per week. Prerequisites: Consent of instructor. Represen-
Professional Courses

301. Professional Training: Teachers. (3-6) Units may not be used to meet unit or residence requirements for either the master's or doctoral degree. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

401. Professional Training: Research. (3-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Units may not be used to meet unit or residence requirements for either the master's or doctoral degree.

Soil Science
(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 108 Hilgard Hall, 642-0341

Professors:
Harvey E. Doner, Ph.D. (Plant and Soil Biology)
William R. Gaudin, Ph.D. (Plant and Soil Biology, Forestry and Resource Management)
John Harte, Ph.D. (Energy and Resource Studies, Plant and Soil Biology)
John G. McColl, Ph.D. (Plant and Soil Biology)
James K. Mitchell, Ph.D. (Plant and Soil Biology)
T.N. Narasimhan, Ph.D. (Material Science and Mineral Engineering, Labor)
Arnold M. Schultz, Ph.D. (Forestry and Resource Management, Conservation and Resource Studies)
Norman Terry, Ph.D. (Plant and Soil Biology)
Geoffrey B. Bodman, Ph.D. (Emuritus) (Plant and Soil Biology)
Theodore C. Broyer, B.S. (Emeritus) (Plant and Soil Biology)
Robert Cowell, Ph.D. (Emeritus) (Forestry and Resource Management)
Paul R. Day, Ph.D. (Emeritus) (Plant and Soil Biology)
Harold Heady, Ph.D. (Emeritus) (Forestry and Resource Management)
Loua Jacobson, Ph.D. (Emeritus) (Plant and Soil Biology)
C.A. Wahrhaftig, Ph.D. (Emeritus) (Geology and Geophysics)

Associate Professors:
James Bartlome, Ph.D. (Forestry and Resource Management)
William Dietrich, Ph.D. (Geology and Geophysics)
Mary K. Freistone, Ph.D. (Plant and Soil Biology)
Paul L. Gempf, Ph.D. (Plant and Soil Biology)
Orenes C. Hulman, Ph.D. (Plant Pathology)
Lawrence J. Weir, Ph.D. (Plant and Soil Biology)
Paul J. Zinke, Ph.D. (Forestry and Resource Management)

Assistant Professor:
Ronald G. Amundson, Ph.D. (Plant and Soil Biology)

Lecturers:
Rodney J. Arkley, Ph.D. (Emeritus) (Plant and Soil Biology)
Isaac Barshad, Ph.D. (Emeritus) (Plant and Soil Biology)
Albert Ulrich, Ph.D. (Emeritus) (Plant and Soil Biology)
D.E. Williams, Ph.D. (Emeritus) (Plant and Soil Biology)

Graduate Adviser: Harvey E. Doner.

Graduate study in soil science is supervised by an interdepartmental group drawn from the staff of the Department of Plant and Soil Biology and other departments in the University who have special qualifications and interest in supervising research in soil science. Both M.S. and Ph.D. programs are available. For admission the student must have a bachelor's degree in soil science or its equivalent in the biological and physical sciences. Previous completion of courses in mathematics, statistics, physics, chemistry, biochemistry, and several fields of biology will enhance admission opportunities and reduce the time required to complete graduate programs in this field.

Graduate study in soil science offers opportunities to study problems of increasing food and fiber production and maintaining these at high levels without adverse effects on the soil and plant ecosystem. The principal lines of study are soil chemistry, soil microbiology and biochemistry, soil morphology, soil physics, and soil-plant relationships.

Research facilities include greenhouses with filtered air, pot culture areas, environmental growth chambers, and modern laboratories for diversified plant and soil studies. In addition to general laboratory equipment, there are instruments for atomic absorption spectrophotometry, emission spectrophotometry, gas chromatography, radiochemistry, electron microscopy, and high performance liquid chromatography.

South and Southeast Asian Studies
(College of Letters and Science)

Department Office: 1203 Dwinelle Hall, 642-4564
Chair: Amin Sweeney, Ph.D.

Professors:
George F. Davis, Ph.D. University of Pennsylvania. South Asian archaeology.
Robert P. Goldman, Ph.D. University of Pennsylvania. Sanskrit literature, Indian epics
George L. Hart, Ill, Ph.D. Harvard University. Tamil and Sinhalese literature.
J.F. Staill, Ph.D. University of Madras. Comparative philosophy, Sanskrit.
Amin Sweeney, Ph.D. University of California. Malay/Indonesian language and literature, oral tradition

Assistant Professors:
Bruce R. Pray, Ph.D. University of Michigan. Hindi-Urdu language and literature.
Barbara A. van Nostrand, Ph.D. University of California. Sanskrit, grammar, linguistics, palaeography.

Assistant Professor:
Linda Hess, Ph.D. University of California. Hindi literature, popular religion in India.

Lecturers:
Norma Charles, B.A. Airlangga University. Indonesian language.
Kausalya Hart, M.A. Amannal University. Tamil language and literature.
Uska R. Jain, M.A. University of California. Hindi language.
Sally Sutherland, Ph.D. University of California. Sanskrit language, Indian mythology.

Major Advisors: Hindi-Urdu, South Asian Civilization, Mr. Pray; Sanskrit, Mr. Goldman; South Asian Archaeology, Mr. Davis; Tamil, Mr. Hart; Malay-Indonesian, Mr. Sweeney.

Graduate Advisors: R.F. Goldman; A. Sweeney.

The department offers programs of both undergraduate and graduate instruction and research in the languages and civilizations of South and Southeast Asia from the most ancient period to the present.

In addition to a number of courses which substitute for the requirements of majors and minors in South and Southeast Asian Studies, a number of courses are offered which provide specialized training in literature, philosophy and religion, and archaeology; and which are designed to meet the needs of students with a wide range of interests. Opportunities exist for a limited number of students to participate in both archaeological projects and language training programs in the field. The departmental programs are enriched by the resources of the Center for South and Southeast Asian Studies and the South and Southeast Asia Library Service.
A. Hindi-Urdu: (1) Hindi-Urdu 1A-1B; (2) Hindi-Urdu 10A-10B; (3) South Asian 124; one other South Asian language, in translation or one advanced Hindi-Urdu literature course; (4) South Asian 127; South Asian 131; (5) six upper division units to be chosen from Lists L through V below; (6) Linguistics 5 is recommended.

B. Sanskrit: (1) Sanskrit 100A-100B; (2) Sanskrit 101A-101B; (3) nine upper division units to be chosen from Lists L through V below; (4) Linguistics 5 is recommended; (5) South Asian 127 and South Asian 131 optional.

C. Tamil: (1) Tamil 1A-1B; (2) Tamil 110A-110B; (3) South Asian 127; South Asian 131; (4) 12 upper division units to be chosen from Lists L through V below; (5) Linguistics 5 is recommended.

II. South Asian Archaeology
(1) 10 lower division units of a South Asian language or Sanskrit 100A-100B; (2) South Asian 110A-110B; Anthropology 2; Near Eastern Studies 123A-123B; Anthropology 130 or Anthropology 194; prerequisite, consent of instructor; (3) nine upper division electives to be chosen from lists L through V below.

III. South Asian Civilization
(1) Sanskrit 100A-100B plus 15 upper division units or one year of a modern South Asian language (10 lower division units) plus 18 upper division units to be distributed as follows: a) one literature course from List L except for the required course in religion or philosophy from List II below; b) one course in history or social science from List III below; d) one course in the fine arts from List IV below; (2) remainder of required upper division units (either 15 or 16 as indicated above) to be selected from Lists L through V; (3) South Asian 127; South Asian 131.

Courses recommended for fulfillment of the upper division unit requirement for the South Asian emphasis:
List I. Literature: South Asian 122, 124.
List II. Religion and Philosophy: South Asian 127, 129, 131, 140, 141, 155.
List III. History and Social Science: South Asian 108, 130; History 114A-114B, Anthropology 184; Political Science 146A, 146B.
List IV. Fine Arts: History of Art 136A, 136B; Music 133A, 133B.
List V. Archaeology: Relevant courses in anthropology, geography, geology, statistics, or other departments as the student's specific field of archaeology requires.

Minor Program
Minor in South Asian Civilization: This will provide students with a general introduction to the rich, diverse, and ancient cultures and civilizations of India. Required courses: Five upper-division courses from lists I-V.

I. South Asian 122, 124.
II. South Asian 127, 129, 131, 140, 141, 155.
III. South Asian 108, 130; History 114A, 114B; Anthropology 184; Political Science 145A, 145B.
IV. Art History 136A, 136B; Music 133A, 133B.
V. Relevant courses in anthropology, geography, geology, statistics, or others.

Minor in South Asian Archaeology: Students will be given a systematic introduction to the geographical, technological, and cultural bases for the origins and development of urban civilization in India and Pakistan. Required courses: six upper-division courses as follows:
1) South Asian 110A, 110B.
2) Four courses from lists I-V (see Minor in South Asian Civilization, above).

Graduate Program
Programs of graduate study and research leading to the M.A. degree are offered with emphases in Hindi and Urdu, Malay/Indonesian, Sanskrit, South Asian archaeology, South Asian civilization, and Tamil. Programs leading to the Ph.D. degree are offered with emphases in Malay/Indonesian, Modern Indo-Aryan; Hindi and Urdu, Sanskrit, South Asian archaeology, and Tamil.

Degrees. All students admitted to programs leading to a graduate degree will be expected to have, in addition to a B.A. or its equivalent, some formal academic background in South or Southeast Asian languages and cultures. Students should in general be prepared to have undergone training equivalent to that required of the departmental major in one of the various areas. M.A. candidates with insufficient preparation may be required to make up deficiencies during the first year. Students are required to take the departmental seminar, SSEAS 294.

As part of the M.A. requirement, the student must pass a reading examination in a non-South or Southeast Asian language which the student and graduate adviser decide is relevant to the student's program, i.e., Dutch, French, German, Japanese, Russian. For the Malay/Indonesian emphasis, the student must pass a reading exam in Dutch. The language(s) required for the Malay/Indonesian emphasis cannot be offered for this reading requirement. In addition, first-year proficiency in a second area-related language is required for the M.A. emphasis in Hindi-Urdu, Malay-Indonesian, South Asian archaeology, and Tamil, to be satisfied by passing a reading examination or by earning a satisfactory grade (B- or better) in relevant course work. For the Malay/Indonesian emphasis, the student must pass a reading exam in Malay or Indonesian. The foreign language requirement is not to be satisfied in the departmental office, 1203 Dwinelle.

Except in unusual circumstances, a student must complete the M.A. program in at most four semesters. Further information about University degree regulations can be found in this catalog.

The general prerequisites for admission to the Ph.D. program are the requirements for the M.A. degree, plus a satisfactory grade in a second area-related language, as well as sufficient preparation in the appropriate field. Students without such a degree will normally be advised to apply for admission to the M.A. program, even though their eventual goal is the Ph.D. degree. At the conclusion of the M.A. program, they will be informed as to whether they are eligible for admission to the Ph.D. program. Students with an M.A. degree from another university will be expected to make up deficiencies in preparation and to fulfill the requirements for the M.A. degree in this department, except for the comprehensive examination.

The Ph.D. degree is offered according to Plan A (as of fall 1984). Beyond the course requirements for the M.A. students in the South Asian emphasis will complete a course in Indo-Aryan or Indo-European linguistics. In addition, they must demonstrate second year proficiency in a second area-related language. For the Malay/Indonesian emphasis, the language is to be chosen from: Sanskrit; Arabic; Javanese, Balinese, or other major Indonesian language; Thai. This requirement may be satisfied by passing a reading examination or by earning a satisfactory grade (B- or better) in relevant course work. Students are expected to plan a program that will best prepare them for the qualifying examinations and the writing of the dissertation. Before admission to candidacy, the student must have completed three graduate units of the departmental seminar, SSEAS 294. The General Catalog should be consulted for further information and regulations.

Students must demonstrate a reading knowledge of two languages relevant to the major field of interest. These languages will normally be selected from the following list: Dutch, French, German, Japanese, Russian. Alternatively, students may offer another language with the approval of the adviser. The foreign language requirement is normally met by passing a reading examination in each language. This requirement must be met before a student can take the qualifying examinations.

Before being admitted to candidacy for the Ph.D., a student must demonstrate competence in the languages in his her program, and must pass a written and oral qualifying examination in three fields or areas of specialization. One of these fields may be in an area of study outside the department, to be decided in consultation with the graduate adviser. Examples of fields within the department are Hindi literature, Dravidian linguistics, Vedico, Prakriti, the Sanskrit grammar, and outside the department, one in Indian history and Indian art. Fields such as Indian philosophy and Buddhism can be studied both within and outside the department. For the Malay-Indo-
nesian emphasis, examples of fields within the department are classical Malay literature, traditional drama, oral literature, Indonesian literature, Malay-sian literature, dialect studies; outside the department, rhetoric, anthropology, sociology, near eastern studies and linguistics. Early in the Ph.D. program, students should consult with the graduate adviser and submit a statement of field, indicating how they will prepare themselves through reading and course work for the qualifying examinations. The examinations will be administered by a committee appointed by the Graduate Council.

After admission to candidacy, the student will complete the Ph.D. dissertation according to Plan A. The dissertation will conform to procedures and regulations set by the Graduate Division and the Graduate Council.

### South and Southeast Asian

#### Upper Division Courses

- **H195. Senior Honors.** (3) Prerequisite: Consent of instructor. To be eligible for admission to the honors program, students must have and maintain a minimum GPA 3.5 in all courses completed for the major. In addition, the student must enroll in the final semester of the senior year in H195, a course of supervised research to be guided by an instructor chosen in consultation with the major adviser. On the basis of this research the student will prepare and submit an honors thesis for evaluation. (F,SP)

- **H195A. South Asian Studies.** (3)

- **H195B. Tamil.** (3)

- **H195C. Hindi-Urdu.** (3)

- **H195D. Malay/Indonesian.** (3)

- **H195E. Southeast Asian Studies.** (3)

- **H195F. Sanskrit.** (3)

- **198. Directed Group Study for Upper Division Students.** (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial instruction in areas not covered by regularly scheduled courses. Four units limit per term. (F,SP)

- **198A. South Asian Studies.** (1-4)

- **198B. Tamil.** (1-4)

- **198C. Hindi-Urdu.** (1-4)

- **198D. Malay/Indonesian.** (1-4)

- **198E. Southeast Asian Studies.** (1-4)

- **198F. Sanskrit.** (1-4)

- **199. Supervised Independent Study and Research.** (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Four units limit per term. (F,SP)

- **199A. South Asian Studies.** (1-4)

- **199B. Tamil.** (1-4)

- **199C. Hindi-Urdu.** (1-4)

- **199D. Malay/Indonesian.** (1-4)

- **199E. Southeast Asian Studies.** (1-4)

- **199F. Sanskrit.** (1-4)

#### Graduate Courses

- **230. General Computing for South and Southeast Asian Studies.** (3) One 3-hour lecture and one 1-hour discussion/laboratory per week. Prerequisites: Graduate student in South and Southeast Asian Studies or consent of instructor. An introduction to the use of computers for students in SSEAS. The course will cover the practical needs of students in our department and will involve use of our departmental multi-user microcomputer. (SP)

- **290. Special Studies.** (1-5) Course may be repeated for credit. Individual conferences. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one semester may not exceed 12. (F,SP)

### South Asian

#### Lower Division Courses

- **1A. Introduction to the Civilization of India.** (3) Three 1-hour classes per week. Readings, lectures, and discussions in the culture and civilization of India from the Hindu and Brahminic civilization to the advent of Islam. Special emphasis on the development of religious, philosophical, and aesthetic systems of traditional India. (F) van Noorten

- **1B. Introduction to the Civilization of India.** (3) Three 1-hour classes per week. Readings, lectures, and discussions in the development of Indian culture from the advent of Islam to the present. Special emphasis on the use of the medieval religious movements of Shi'ite and Indian Islam and the conflict of traditional and modern values in contemporary India. (SP)

- **5A. Great Books of India.** (4) Three 1-hour classes and one hour discussion section per week. Reading and composition based on 10 classic works of Indian literature ranging from the ancient Sanskrit epics to modern novels by Indian and western authors. Weekly composition on texts and topics read and discussed in class. (F) G. Hart

- **5B. India in the Writer's Eye.** (4) Three 1-hour classes and one hour discussion section per week. Reading and composition in connection with eastern and western representation of India, and other Asian cultures in great works of modern literature. (SP) Staff

### Upper Division Courses

- **108. Psychology and Traditional India.** (3) Three 1-hour classes per week. Prerequisites: South Asian 1A. Psychology 1, or permission of instructor. Lectures and discussion of psychological and psychoanalytic approaches to some of the characteristic cultural and social aspects of ancient and modern India. Readings in translated and important secondary works on the psychology of Indian culture, and selected works from the psychoanalytic literature. (F) Goldman

- **110A. Origins of South Asian Civilization.** (3) Students who have taken South Asian 198A-198B will receive no credit for 110A-110B. Three 1-hour lectures per week.

- A. Archaeology of the Neolithic through the Harappan civilization. Survey of archaeological evidence in Pakistan, India, and, and from Afghanistan from Neolithic period through rise and decline of South Asia's first urban civilization. (F)

- B. Post-Harappan to the emergence of Buddhism. Survey of archaeological evidence in Pakistan and India from demise of the Indus civilization to the rise of urbanization in the Gangetic Valley, including period of Persian, Greek, and Roman contacts. (SP) Dales

- **122. Poetry and Religion in India.** (3) Three 1-hour classes per week. A study of medieval poetry of devotional Hinduism and Indian Sufism, through readings in English translation. Emphasis on works in the regional spoken languages, and on the role of devotional and mystical movements in the development of regional literature. Staff

- **124. Modern Indian Literature.** (3) Three 1-hour classes per week. Lectures and discussion of 19th and 20th century Indian literature through English translations and original works in English. In addition to studying its intrinsic importance as literature, this course will also examine the interpretation of Indian society and culture through literature. Staff

- **127. Brahmanism and Hinduism.** (3) Three 1-hour classes per week. Readings in selected translations from the Hindu scriptures: the Vedas, the Upanishads, and the Gitas including the Gita. These will be supplemented by critical writings of modern scholars on Hindu caste system and the formation of various cults within the tradition. (F) Staff

- **129. Indian Mystical Traditions and Practices.** (3) Three 1-hour classes per week. Readings and discussions of the main traditions of mystical thought and practice, both Hindu and Muslim. Staff

### History and Structure of South Asian Languages

- **130. History and Structure of South Asian Languages.** (3) Three 1-hour classes per week. Relationship of Indo-Aryan to Indo-European and Linguistic development of old Indo-Aryan (Vedic and Sanskrit), Middle Indo-Aryan (Pali, Prakrit, Abhagrams) and Modern Indo-Aryan languages. The rise of literary languages. South Asia as a linguistic paradigm. (F) Staff

- **131. Indian Buddhism.** (3) Three 1-hour classes per week. General introduction to the systems of Buddhist thought in India. Selected readings from the Hinayana and Mahayana scriptures in translation. Brief survey of the historical development of the Buddhist samskara and

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*On leave, spring*  
*Active service*  
*Recipient of Distinguished Teaching Award*
137. Cinema and Society: India. (3) Two 1½-hour, lecture per week. The course will study 1) the role of cinema among the principal arts in contemporary India: fiction, theater, painting, and architecture; 2) the ways in which cinema names some aspects of living and stages crises, and the profound effects of naming and exclusion on the lives of Indians. Readings in contemporary fiction and drama; films by Raj Kapoor, Shyam Benegal, and Satyajit Ray; slides of traditional and contemporary architecture, classical and modern painting.

140. Hindu Mythology. (3) Two 1½-hour classes per week. Literary and religious aspects of Hindu myths. Reading of selected mythological texts in translation. (SP)

141. Religion in South India. (3) Two 1½-hour classes per week. The development and practice of religion in South India. Emphasis will be on sources translated directly from Indian languages. Subjects covered include: the indigenous religion, the effect of Brahmanical religion, bhakti movements, and the practice of Hinduism in modern South India.

148. Studies in South Asian Languages. (2-4) Course may be repeated for credit. Two to four hours of lecture per week. Directed study in South Asian languages other than those regularly taught in the department.

155. Philosophies of India. (3) Two 1½-hour classes per week. Philosophy of India, Hindu, and Buddhist, beginning with the Vedanta period and concentrating on the classical systems. (F) Staal

165. India's Most Popular Epic: The Rāmāyana as Literature, Performance, Scripture and Ideology. (3) New course. Three 1-hour lectures or two 1½-hour lectures per week. In its Sanskrit and vernacular versions, the Rāmāyana is probably the most influential literary work in India. Besides providing hundreds of millions with religious guidance and a compelling mythical world, it sets up models for men, women, family, society, and state. Studying texts and varieties of performance, we will learn what the Rāmāyana is and how it lives in the culture.

Graduate Courses

201. Readings in Jaina Sanskrit Texts. (3) Course may be repeated for credit. Three 1-hour classes per week. The aim of the seminar is to give the student a firsthand acquaintance with Jaina doctrine and practice through selected sources from both canonical and canonical sources, notably the Acaranga, Uttarādhyayana, Samayasara and Tatvarthasūtra, and relevant commentaries in Sanskrit. (F) Jaini

205. Indian Paleography. (3) Course may be repeated for credit. Three 1-hour classes plus 1-hour of lecture per week. Survey of the paleographical materials in South and Southeast Asia and readings from early inscriptions in various Indian alphabets. (F,SP) van Nooten

210. Panini and the Indian Linguistic Tradition. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisites: Some familiarity with linguistics and/or the elements of an Indian language or consent of Instructor. The linguistic description and analysis of Sanskrit as created and developed by the Sanskrit grammarians.

212. Indian Philosophical Texts. (3) Course may be repeated for credit. Two 1½-hour classes per week. Prerequisites: Some knowledge of Sanskrit. Reading of Sanskrit texts on Indian philosophy (e.g., Vedanta, Mimamsa, Yoga, etc.).

215A-215B. Readings in Indian Buddhist Texts. (3) Course may be repeated for credit. One 1-hour class and one 2-hour class per week. Prerequisites: 215A is prerequisite to 215B. One year of Sanskrit and/or consent of Instructor. A survey of the origins and development of the Abhidharma texts and commentaries in Pāli and Sanskrit. (SP)

250. Seminar in South Asian Studies. (3) Course may be repeated for credit. Students may receive credit for more than one seminar in the same semester. Three hours of seminar per week. Prerequisites: Graduate standing or consent of Instructor. Topics will vary from semester to semester. (SP) Jaini

293. Seminar in South Asian Archaeology. (3) Course may be repeated for credit. Two 1½-hour classes per semester. Prerequisites: Consent of Instructor, Discussion of and research into a major aspect or problem of South Asian archaeology. Subject to be selected through consultation between students and instructor. (F) Dates

297. Archaeological Project in South Asia. (12) A year course may be repeated for credit. Two 2-hour classes per week. Prerequisites: Consent of Instructor. An intensive three-month, 40-hour per week field school at a major archaeological site. Excavation, surveying, quantitative and analytical techniques will be stressed. Weekly written reports plus a research paper based on finds from the excavations are required. Qualifications of participants to be determined by director. (SP) Hart

Southeast Asian

Lower Division Courses

10A-10B. Introduction to the Civilization of Southeast Asia. (3) Three hours of lecture per week. Readings, lectures and discussion of the culture and civilization of Southeast Asia. Subjects discussed will include art, architecture, social structure, systems of government, and religion. A. Mainland: special emphasis on the impact of Hinduism and Buddhism. (F) Staff

B. Insular Southeast Asia (Indonesia and Malaysia): special emphasis on the impact of Hinduism, Buddhism and Islam. (SP) Staff

15. Exploring the Malay World. (2) Two 1½-hour meetings per week. Prerequisites: To be taken in conjunction with 10A-10B. The intent of this lower division seminar is to improve the abilities of students to discuss and present papers on a number of selected topics concerning the languages, literatures and cultures of the Malay world. (SP) Staff

Upper Division Courses

122. Authors and Audiences in the Malay World. (3) Three hours of lecture per week. Lectures, readings and discussion of the classical systems with emphasis on the interface between crafty and literary, schematic composition, aural consumption and the rhetorical framework. Sweeney


124. The Shadow-Play in Southeast Asia. (3) Two 1½-hour classes per week. Introduction to study of Southeast Asian shadow-plays (Indonesia, Malaysia, Thailand, Cambodia) with special reference to Malay genre. Course will deal with origins, history and development, cultural context, transmission, language and style of performance, repertoire, and ritual. Students will also learn rudiments of performing. Sweeney

128. Introduction to Modern Indonesian and Malaysian Literature. (3) Three 1-hour classes per week. This course will examine the contemporary literature in Indonesian/Malaysian society. Emphasis on the socio-political aspects of this literature in historical context. Course discussed will include poetry, the novel, the short story, and drama. Staff

Hindi-Urdu

Lower Division Courses

1A-1B. Introductory Hindi and Urdu. (5) Five 1-hour classes plus one hour of laboratory per week. Hindi and Urdu writing systems. Survey of grammar, graded exercises and readings drawn from Hindi and Urdu literature, leading to mastery of grammatical structures and essential vocabulary and achievement of basic reading and writing competence. (F,SP) Jaini

2. Conversational Hindi-Urdu. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in Introductory Hindi-Urdu. Practice of spoken Hindi-Urdu as a supplement to Introductory Hindi-Urdu. Staff

Upper Division Courses

100A-100B. Intermediate Hindi and Urdu. (5) Five 1-hour classes plus one hour of laboratory per week. Prerequisite: 1A-1B. Representative readings in Hindi and Urdu literature and expository prose, exploring a variety of literary forms and styles. Systematic study of grammatical and lexical problems arising from these readings. Advanced exercises in composition. (F,SP) Staff

102. Conversational Hindi-Urdu—Second Year. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 100A-100B. Practice of spoken Hindi-Urdu as a supplement to Intermediate Hindi-Urdu. Staff

Graduate Courses

210. Modern Urdu Literature. (3) Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: Two years of Hindi or equivalent and a knowledge of Urdu script. Readings in nineteenth and twentieth century Urdu prose literature in a variety of genres. Selected articles in literary criticism will be read. Pray

215. Urdu Poetry. (3) Course may be repeated for credit. Two 1½-hour classes per week. Prerequisites: Two years of equivalent of Hindi-Urdu and a good knowledge of Urdu script. Readings and analysis of Urdu poetry from both the classic and the modern periods, with emphasis on the classical Urdu ghazal. (SP) Staff

220. The Hindi Short Story. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisites: Two years of Hindi or equivalent. Reading and analysis of representative modern Hindi short stories. Emphasis on the evolution of the Hindi short story genre. (F) Staff

221. Hindi Bhakti Poetry. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisites: Two years of Hindi or equivalent. Study of the tradition of the novel in Hindi. The course will center on the critical reading of one complete major Hindi novel. Other readings will include criticism, literary history and translations of other novels. (SP) Staff

Malay/Indonesian

Lower Division Courses

1A-1B. Introductory Indonesian. (5) Five 1-hour classes plus 1-hour of laboratory per week. Survey of grammar, graded exercises and readings drawn from Indonesian literature, leading to mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence. (F,SP) Charles

2. First-Year Indonesian/Malay Conversation and Composition. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 1A or 1B. Practice
102. Second-Year Indonesian/Malay Conversation and Composition. (Two) Two 1-hour meetings per week. Practice in spoken and written Indonesian/Malay as a supplement to Intermediate Indonesian and Malay.

132. Readings in Modern Indonesian and Malay Literature. (Three) Three 1-hour classes per week. Prerequisites: Two years of Malay/Indonesian or consent of instructor. This course covers Indonesian and Malay literature of the 20th century. Selected texts will be studied, including such genres as the novel, the short story, and poetry. (F)

133. Third-Year Indonesian/Malay Conversation and Composition. (Two) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 103A or 103B. Practice in spoken and written Indonesian/Malay as a supplement to Readings in Modern Indonesian and Malay Literature.

150. Advanced Indonesian. (3) New course. Three 1-hour lectures per week. Prerequisite: 100A-100B. This course will develop writing and speaking skills in a variety of styles. Emphasis will be placed upon the discourse of literary studies. Students will be required to write essays and make oral presentations in Indonesian. (SP)

Graduate Courses

210A-210B. Seminar in Malay Letters and Oral Traditions. (3:3) Course may be repeated for credit with consent of instructor. Three 1-hour classes per week. Various aspects of Malay language and literature, history and development of the language, classical literature, drama, oral literature, modern literature of Indonesia and Malaysia, and dialect studies. Applications various theoretical approaches to the study of the language and literature. (F,SP) Sweeney

150. Advanced Indonesian. (3) New course. Three 1-hour lectures per week. Prerequisite: 100A-100B. This course will develop writing and speaking skills in a variety of styles. Emphasis will be placed upon the discourse of literary studies. Students will be required to write essays and make oral presentations in Indonesian. (F,SP)

Tamil

Graduate Courses

202A-202B. Sanskrit Literature. (3:3) Course may be repeated for credit. Two 1/2-hour classes per week. Prerequisite: 101B or equivalent. Advanced readings in Sanskrit literature, including Sankirtan omate poetry with emphasis on the concepts of poetic analysis of the Indian aesthetic tradition. (F,SP) Goldman

203. Vedic Sanskrit. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisites: 101B or equivalent. Readings from the Rigveda and other Vedic texts, including Brahmaas and Upanishads. Knowledge of German and/or French is recommended. (F,SP) van Nooten

204. Introduction to Vedic Ritual. (3) Course may be repeated for credit. One 3-hour lecture per week. Prerequisites: Two years of Sanskrit or consent of instructor. The main types of domestic (dhoiya) and Srauta ritual. Sources for the study of ritual. The Vedic schools and their principal texts. The Soma sacrifices. The principal recitations, chants and offerings. Discussion of representative textual passages and recordings. (F,SP) van Nooten

205. Middle Indic. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisite: 101B or equivalent. Introduction to Middle Indic. An intensive study of texts in one or more of the Prakrit dialects, Pali, or Apabhramsa. (F,SP) van Nooten

206. Buddhist Sanskrit. (3) New course. Course may be repeated for credit. Two 1/2-hour lectures per week. Prerequisites: 2 years of Sanskrit or equivalent. Readings in the literature of North-Indian Buddhism with emphasis on the grammatical features that distinguish it from Classical Sanskrit and Pali. (SP) van Nooten

2. Conversational Tamil—Second Year. (Two) Two 1-hour meetings per week. Practice of spoken Tamil as a supplement to Intermediate Tamil. Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 255A-255B. Eastern Frontiers of the Classical World. (4:4) Course may be repeated for credit. Three 1-hour classes per week. The course is intended to provide an archaeological perspective on the eastern frontiers of the classical world: frontiers which came to extend to Afghanistan and beyond. 255A will deal with prehistoric development in this easterly area which eventually became a part of the classical world. 255B will explore the interactions of the classical world with the indigenous cultures of Central Asia. Sponsoring departments: Near Eastern Studies and South and Southeast Asian Studies. (Deles, Stronach)

Spanish and Portuguese

(College of Letters and Science)

Department Office: 4319 Dwinelle Hall, 842-0471
Chair: Jerry R. Craddock, Ph.D.
Professors: Arthur L. Askin, Ph.D. University of California, Berkeley. Spanish, Portuguese Renaissance poetry
Jerry R. Craddock, Ph.D. University of California, Berkeley. Spanish, medieval literature
Charles B. Faubert, Ph.D. Yales University. Medieval Latin literature
José Durand, Doctor en Filosofia. University of San Marcos. Spanish American Colonial literature
Charles Faubert, Ph.D. Yale University. Medieval Latin literature
John H. R. Poll, Ph.D. University of California, Berkeley. Modern Spanish literature
James W. Pyle, Ph.D. University of Virginia. Medieval Spanish
Cesareo Martinez-Celaya, Ph.D. Emeritus
Louis Monfort, Licenciado en Derecho, L.L.D. Emeritus
Lucia Mirollo, Ph.D. Emeritus
Dorothy C. Shade, Ph.D. Emeritus
Robert K. Specking, Ph.D. Emeritus
Benjamin M. Montgomery, Jr., Ph.D. Emeritus
Associate Professors:
Milton M. Azvedo, Ph.D. Cornell University, Linguistics
Emilia L. Bergman, Ph.D. Johns Hopkins University, Spanish Golden Age literature
Anthony J. Gosford, Ph.D. Harvard University, Spanish Golden Age literature
Francisco R. Mestizo, Ph.D. University of Michigan. Spanish and Portuguese Renaissance
Candace Slater, Ph.D. Stanford University, Contemporary Spanish literature
Asst. Professor:
M. Gwen Kirkpatrick, Ph.D. Princeton University. Modern Spanish and Portuguese
Ignacio E. Navarrete, Ph.D. Indiana University. 16th-century poetry and literary theory
Major Advisors: Option A: Ms. Masiello, Mr. Walsh. Option B: Ms. Slater.

The sequence of undergraduate and graduate programs of the Department of Spanish and Portuguese is designed to lead from the acquisition of competencies in written and oral skills in Spanish or Portuguese, through an acquaintance with the structure and history of one or both of these languages and a critical understanding of the development and achievements of their literatures in the Old World and in the New, to training in advanced study and independent research. The department's policy is to maintain a balanced strength between language

On leave, spring
Recipient of Distinguished Teaching Award
Students in the honors program must complete the special honors course or two graduate courses, preferably in sequence, that require the writing of a major research paper. The special honors course (Spanish H195A or H195B; H195A-H195B for Option B) is offered each semester. This course consists of independent study and the writing of a thesis under the direction of an appropriate member of the department.

The Minor in Spanish Languages and Literatures; Minor in Luso-Brazilian Languages and Literatures

Minor Adviser: Mr. Navarrete.

General Requirements: 1) Courses must be completed on a letter-grade basis; 2) A minimum GPA of 2.0 in the courses of the minor; 3) A minimum of three of the courses to be completed at Berkeley; 4) No more than two of the courses may also be used for a major program of another department of group; 5) Courses in English translation may not be offered in satisfaction of the elective portions of the minor programs.

The Minor in Spanish Languages and Literatures

Prerequisite: Spanish 25 or equivalent. Required courses: five upper-division courses: 1) Spanish 104A-104B or 107A-107B; 2) Three additional upper division courses in Portuguese language and/or literature, selected in consultation with the minor program adviser.

Minor in Luso-Brazilian Languages and Literatures

Prerequisite: Portuguese 4 or equivalent. Required courses: five upper-division courses: 1) Portuguese 104 or Portuguese 107; 2) Four additional upper division courses in Portuguese language and/or literature (excluding Portuguese 101A-101B, 102, and 144), selected in consultation with the minor program adviser.

Procedures: No formal declaration of enrollment in the minor program is required. Upon completion of the program, however, students must file with the undergraduate assistant of the department the Petition for Confirmation of Minor Program Completed, validated by the departmental adviser for the minor program. Students interested in either the undergraduate major at Berkeley (Option A) or the graduate major at Berkeley (Option A) may wish to pursue work toward advanced degrees with a graduate adviser, will lay out a program designed to prepare them for the qualifying examination preceding advancement to candidacy. As early as possible, they must demonstrate a reading knowledge of Latin, Italian, and French by a written examination in one of these languages, and by either written examination or appropriate course work in the others. A reading knowledge of German is recommended. The precise qualifying examination will depend on the student's choice of two alternative plans of preparation, both of which require a detailed knowledge of Spanish and Spanish American literature and familiarity with Romance philology, with emphasis on Spanish. Plan I further requires a knowledge of a second Romance literature as a collateral, and of prescribed masterpieces in the third. Plan II requires a command of one broad, integrated field (period, movement, or genre) in both Italian and French literatures. Students whose principal interest is philology should see the statement under Romance Philology.

The Ph.D. Programs. The Department of Spanish and Portuguese administers two doctoral programs.

I. The Program in Romance Languages and Literatures (with emphasis on Spanish). Three programs are offered for admission: an A.B. degree with a major in Spanish equivalently to the undergraduate major at Berkeley (Option A). No specific courses are required, but coursework directed by a graduate adviser, will lay out a program designed to prepare them for the qualifying examination preceding advancement to candidacy. As early as possible, they must demonstrate a reading knowledge of Latin, Italian, and French by a written examination in one of these languages, and by either written examination or appropriate course work in the others. A reading knowledge of German is recommended. The precise qualifying examination will depend on the student's choice of two alternative plans of preparation, both of which require a detailed knowledge of Spanish and Spanish American literature and familiarity with Romance philology, with emphasis on Spanish. Plan I further requires a knowledge of a second Romance literature as a collateral, and of prescribed masterpieces in the third. Plan II requires a command of one broad, integrated field (period, movement, or genre) in both Italian and French literatures. Students whose principal interest is philology should see the statement under Romance Philology.

II. The Program in Hispanic Languages and Literatures. Prerequisites for admission are the following: (a) An A.B. degree with a major in Spanish equivalent to the undergraduate major at Berkeley (Option A or Option B), or with a corresponding major in Portuguese; (b) the completion of 33 post-baccalaureate units (or the equivalent) in Hispanic literatures, linguistics, and philology, with emphasis on Spanish; (c) at least one college semester of Latin (or the equivalent) must be included in the minor program. Students interested in pursuing advanced degrees with a graduate adviser, will lay out a program designed to prepare them for the qualifying examination preceding advancement to candidacy. As early as possible, they must demonstrate a reading knowledge of Latin and French, and by either written examination in one of these languages, and by either written examination or appropriate course work in the others. A reading knowledge of German is recommended. The precise qualifying examination will depend on the student's choice of two alternative plans of preparation, both of which require a detailed knowledge of Spanish and Spanish American literature and familiarity with Romance philology, with emphasis on Spanish. Plan I further requires a knowledge of a second Romance literature as a collateral, and of prescribed masterpieces in the third. Plan II requires a command of one broad, integrated field (period, movement, or genre) in both Italian and French literatures. Students whose principal interest is philology should see the statement under Romance Philology.
selected collateral subjects pertinent to the main field.

**Spanish**

The college is planning to implement the following policy beginning fall semester 1990:

*Duplication of credit:* Students first admitted to the College of Letters and Science in fall semester 1990 and thereafter will not be allowed baccalaureate credit (unit credit) for Letters and Science courses in lower division foreign language that duplicate courses completed previously in high school or at another collegiate institution. (Students will, however, be allowed study list credit in the semester in which they take a course that duplicates such work.) High school equivalencies are evaluated as follows: the first two years of high school foreign language are considered equivalent to one semester in college; each successive year in high school is equivalent to an additional semester in college. College-level equivalencies are determined on a course-by-course basis.

### Lower Division Courses

1. **Elementary Spanish.** (5) Students who have taken Spanish 1A4 may not receive credit for Spanish 1. Not open to students who have completed two years or more of high school Spanish, or to native speakers. Five 1-hour classes and 1½ hours of laboratory per week. Beginners' course. (F,SP) Staff

2. **Elementary Spanish.** (5) Students who have taken Spanish 14B may not receive credit for Spanish 2. Five 1-hour classes and 1½ hours of laboratory per week. Prerequisite: 1 or equivalent. Continuation of 1. (F,SP) Staff

3. **Intermediate Spanish.** (5) Five 1-hour classes and 1½ hours of laboratory per week. Prerequisite: 2 or equivalent. Continuation of 2. Course includes review and further practice of grammar concepts taught in Spanish 1-2, as well as further practice in composition. (F,SP) Staff

4. **Intermediate Spanish.** (5) Five 1-hour classes and 1½ hours of laboratory per week. Prerequisite: 3 or equivalent. Continuation of 3. Development of grammatical concepts taught in Spanish 1-3 and further practice in composition. (F,SP) Staff

5. **Spoken Spanish.** (4) Students who have taken 8A and 8B (prior to spring 1984) may not receive credit for 8A. Five 1-hour classes and 1½ hours of laboratory per week. Prerequisites: 3 or equivalent. Course designed to increase vocabulary and to improve listening comprehension, pronunciation accuracy, grammar control, and speaking fluency by means of oral expression practice. Some reading/laboratory work required. Not for students whose native language is not Spanish. Enrollment limit: 16 students per section. (F,SP) Staff

14A-14B. **Individualized Instruction in Elementary Spanish.** (1-5,1-5) Students who have taken Spanish 1 or 2 may not receive credit for 14A-14B. Hours to be determined on a flexible basis. Prerequisites: Open to any student whose program, including this course, meets the minimum study list requirement. This series of two courses consists of the material of Spanish 1-2, each course offering 5 units of credit. Students may enter at the beginning of any level for which they are qualified. They are strongly urged to enroll for no more than the 3-unit minimum; 1- and 2-unit enrollments are allowed only in order to complete either of the two levels. 14A: Not open to students who have completed two years or more of high school Spanish. 14B: Not open to students who have completed three years or more of high school Spanish. (F,SP) Staff

25. **Reading and Analysis of Literary Texts.** (3) Three 1-hour classes per week. Prerequisites: 4 or equivalent. Introduction to literary concepts, terminology, and theory with application to poetic, dramatic, and prose works. Required of majors. (F,SP) Staff

26. **Advanced Spoken Spanish.** (3) Three 1-hour lecture/discussion meetings per week. Prerequisites: 4 or equivalent. Course designed to develop control of oral communication skills at an advanced level, by means of practice of conversation and presentation in class. Some reading and writing, laboratory attendance, required. Not open to native speakers. (F,SP) Staff

40. **Hispanic Culture.** (2) One 2-hour meeting per week. Prerequisites: Freshman or sophomore standing. A study of Hispanic culture from its origins until modern times. This course will examine the structures of value of the Hispanic peoples through significant areas of cultural expression, including literature and the visual arts. Within this context, emphasis will be placed on the historical continuity of Hispanic culture and on the transformations of Hispanic societies. Enrollment limit: 15. (F) Cescardi

70. **Spanish for Bilingual Students, First Course.** (3) Three 1-hour classes and one hour of laboratory per week. Prerequisites: Consent of instructor. An elementary course for students whose native language is Spanish. (F,SP) Staff

71. **Spanish for Bilingual Students, Second Course.** (3) Three 1-hour classes and one 1-hour laboratory per week. Prerequisites: 70 or consent of instructor. An intermediate course for students whose native language is Spanish. (F,SP) Staff

### Upper Division Courses

(Unless otherwise indicated, Spanish 25 or its equivalent is prerequisite to all upper division courses.)

100. **Introduction to Spanish Linguistics.** (2) Two hours of lecture per week. (F,SP) Arevezco, Fauthaber

102A. **Advanced Grammar and Composition.** (3) Three 1-hour classes per week. (F,SP) Polt

102B. **Advanced Grammar and Composition.** (3) Three 1-hour classes per week. (F,SP) Doughtery

104A. **Survey of Spanish American Literature.** (3) Three hours of lecture per week. Beginnings to 1600. (SP) Durand

104B. **Survey of Spanish American Literature.** (3) Three hours of lecture per week. 1600 to the present. (F,SP) Masiello

107A. **Survey of Spanish Literature.** (3) Three hours of lecture per week. Beginnings to 1700. (F,SP) Navarrete, Walsh

107B. **Survey of Spanish Literature.** (3) Three hours of lecture per week. 1700 to the present. (F,SP) Doughtery, Polt

108. **Spanish Ballads.** (3) Three hours of lecture per week. Introduction to Spanish balladry, with emphasis on origins and development through the sixteenth century. (SP) Askins

109. **Spanish Drama of the 16th and 17th Centuries.** (3) Three hours of lecture per week. (F) Bergmann

110. **The Generation of '98.** (3) Three hours of lecture per week. Analysis and discussion of selected works by Unamuno, Azorin, Valles-Inclan, etc. (SP) Doughtery

111A-111B. **Cervantes.** (3-3) Three hours of lecture/seminar per week. Analysis and discussion of selected works by Cervantes, including his dramatic writings. (SP) Cescardi

112. **Studies in Spanish Culture.** (3) Three hours of lecture per week. An overview of the culture of Latin American. (F,SP) Welsh

113. **Studies in Latin American Culture.** (3) Three hours of lecture per week. An overview of the culture of Latin America, through emphasis on selected topics. (SP) Durand

114. **The Contemporary Spanish American Novel.** (3) Three hours of lecture per week. (F,SP) Dougherty

123A-123B. **Modern Spanish Prose Fiction.** (3/3) Three hours of lecture per week. Dougherty, Polt

125. **Spanish Phonetics.** (2) Two 1-hour classes and one 1-hour laboratory per week. Training in phonetic transcription; exercises in laboratory; contrastive (English-Spanish) phonetics. (F,SP) Polt

126. **Medieval Spanish Literature.** (3) Three hours of lecture per week. (SP) Fauthaber

127. **Eighteenth-Century Spanish Literature.** (3) Three hours of lecture per week. (SP) Polt

128. **Contemporary Spanish Literature.** (3) Three hours of lecture per week. Developments in Spain's literature since 1939. (F) Dougherty

130. **Twentieth-Century Spanish American Poetry.** (3) Three hours of lecture per week. (SP) Fauthaber

131. **The Spanish American Short Story.** (Twentieth Century) (2) Two hours of lecture per week. An overview of the short story as a genre, with emphasis on selected topics. (SP) Walsh

132. **Hispanic Avant-Garde Literature.** (3) Three hours of lecture per week. Discussions in poetry, novel, and theater during the 1920s, in Spain, Spain America, and both. (F) Masiello

135. **Studies in Hispanic Literature.** (2-3) Course may be repeated for credit when topic changes. Two or three hours of lecture per week. (Two hours—2 units; three hours—3 units). Topic for fall 1988: Camilo Jose Cela. Topic for spring 1989: Literature of the Mexican Revolution. (F,SP) Polt, Kirkpatrick

142. **The Spanish American Novel in English Translation.** (2) Two hours of lecture per week. Prerequisites: none. Translation of the Spanish American novel from its beginnings; reading and discussion of selected twentieth-century novels as translated. (SP) Staff

147. **Spanish Authors in Translation.** (2) Two hours of lecture per week. Prerequisites: none. Reading and discussion of selected Spanish authors, in English translation. (SP) Staff

149. **Supplementary Work in Upper Division Hispanic Literatures.** (1-2) Course may be repeated for credit. To be arranged. Prerequisites: 25 and consent of major advisor. Students with partial credit in required upper division Hispanic literatures may satisfy the remaining portion under this heading. (SP) Staff

197. **Field Studies.** (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. One to four hours of field work per week, per unit. Prerequisites: Consent of instructor. Students will assist in the teaching of Spanish in local elementary and secondary schools. They will meet regularly with the instructor in charge and submit written reports. (F,SP) Polt

199. **Supervised Independent Study and Research.** (1-4) Course may be repeated for credit. Must be taken in consultation with an instructor. (SP) Staff

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*Not offered 1988-89*

*On leave, spring*

*Recipient of Distinguished Teaching Award*
on a passed/not passed basis. Individual conferences.
Prerequisites: Senior honor status plus preparation and 22.
Enrollment restricted to regulations on pages 58 and 62 of this catalog. (F,SP)

Staff

Graduate Courses

201. Contrastive Linguistic Analysis. (3) Students
may not receive credit for both Portuguese 201 and
Spanish 201. Two hours of lecture per week. An
overview of grammatical structure, with emphasis on
the contrastive analysis of selected aspects of English, Spanish,
and Portuguese. Required for preparation for the
linguistics part of M.A. examination. (F,SP)

202A. History of Iberio-Romance. (3) Two or three
hours of lecture per week. (F) Craddock

202B. History of Iberio-Romance. (3) Two or three
hours of lecture per week. (SP) Craddock

209. Seminar in Hispanic Linguistics. (3) Course
may be repeated for credit. One 2-hour seminar per
week. Craddock

220. Introduction to Medieval Hispanic Literature.
(3) Two or three hours of lecture per week. Walsh

221. Major Prose Authors of the Golden Age. (3)
Two or three hours of lecture per week. (F) Craddock

223. Major Poets of the Golden Age. (3) Two or three
hours of lecture per week. (SP) Navares

224. Major Dramatists of the Golden Age. (3) Two
or three hours of lecture per week. Cascardi

225. The Spanish Enlightenment. (3) Two or three
hours of lecture per week. (F) Port

226. Spanish Romanticism. (3) Two or three hours of
lecture per week. Port

227A. The Spanish Novel Since 1850. (3) Two or
three hours of lecture per week. (SP) Van Loan

227B. The Spanish Novel Since 1850. (3) Two or
three hours of lecture per week. (F) Port

228. Modern Spanish Drama. (3) Two or three hours of
lecture per week. (SP) Dougherty

(3) Two or three hours of lecture per week. (F) Dougherty

232. Colonial Spanish American Literature. (3) Two
or three hours of lecture per week. Durand

234A. Modern Spanish American Poetry. (3) Two
or three hours of lecture per week. A comprehensive survey
of poetry in Latin America from 1880-1950, on the poetics
of modernismo. Special attention given to the work of
Rubén Darío and the heritage of symbolism in Latin
America. Kirkpatrick

234B. Modern Spanish American Poetry. (3) Two
or three hours of lecture per week. Kirkpatrick

236A. Modern Spanish American Prose. (3) Two
or three hours of lecture per week. (SP) Kirkpatrick

236B. Modern Spanish American Prose. (3) Two
or three hours of lecture per week. (F) Kirkpatrick

240. Techniques of Literary Scholarship. (3) One 2-
or 3-hour lecture/seminar per week. Staff

242. Literary Theory and Criticism. (3) Course
may be repeated for credit when topic changes. One 2-
or 3-hour lecture/seminar per week. Masella

248. Hispano Paleography. (3) One 2- or 3-hour lecture
seminar per week. Vila-

250. Cervantes. (3) Course may be repeated when
topics change and with permission of instructor. One
2- or 3-hour lecture/seminar per week. Prerequisites:
Graduate standing or consent of instructor. The reading
and interpretation of the works of Cervantes, such as
Don Quixote, the Novelas ejemplares, the Persiles, the
Galatea, and the dramatic works. Focus will change
according to the needs and interests of members of
class. Major addresses such issues as the place of
Cervantes's works in literary history, the background
contexts of Cervantes's works, and contemporary
approaches and movements in Cervantes criticism.

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Portuguese

The college is planning to implement the following policy
beginning fall semester 1990:

Duplication of credit: Students first admitted to the
College of Letters and Science in fall semester 1980
and thereafter will not be allowed baccalaureate

credit (unit credit) for Letters and Science courses
in lower division foreign language that duplicate
courses completed in high school. Students interested in
another college institution. (Students will, however,
be allowed study list credit in the semester in which
they take a course that duplicates such work.) High
school equivalencies are evaluated as follows: the
first two years of high school foreign language are
considered equivalent to one semester in college;
each successive year in high school is equivalent to
an additional semester in college. College-level
 equivalencies are determined on a course-by-course
basis.

Lower Division Courses

1. Elementary Portuguese. (5) Five 1-hour classes
and 3 hours of laboratory per week. Beginners' course.

2. Intermediate Portuguese. (5) Five 1-hour classes
and 1 1/2 hours of laboratory per week. Prerequisites:
completion of 2 or equivalent. (SP)

3. Intermediate Portuguese. (5) Five 1-hour classes
and 1 1/2 hours of laboratory per week. Prerequisites:
2 or equivalent completion of 2. (SP)

4. Advanced Portuguese. (5) Five 1-hour classes
and 1 1/2 hours of laboratory per week. Prerequisites:
3 or equivalent completion of 3. (SP)

5. Spoken Portuguese. (4) Five 1-hour discussion-
classes Meetings per week. Prerequisites: 2 or
equivalent. Course designed to increase vocabulary and
improve listening, conversational accuracy, grammar,
culture, and speaking fluency by means of oral
expression practice. Some reading/laboratory work
required. Not open to native speakers. (F)

6. Intensive Intermediate Portuguese. (5) Five 1-
hour classes and two hours of lab per week. Prerequisites:
2 or 11, or equivalent completion of Portuguese
2 or 11. Not open to native speakers. (F)

Upper Division Courses

Unless otherwise indicated, 20 units or equivalent of
Portuguese or another Romance language are
required to all upper division courses.

101A. Portuguese for Advanced Students. (3) Three
hours of lecture per week. Prerequisites: Credit of 15-
20 units or equivalent of another Romance language,
or consent of instructor. An introductory course for
students with no previous study of Portuguese. This
offering may be taken independently for reading/translation
in conjunction with 101B, it constitutes an Intensive
Introduction to Portuguese, and prepares the student
for further upper division course work. (F)

101B. Portuguese for Advanced Students: Work-
shop. (3) Two 1-hour workshops per week. Prerequisites:
Credit of 15-20 units or equivalent of another Romance
language, or consent of instructor. Must be taken con-
currently with 101A. No independent registration. Em-
phasis on understanding, speaking, reading, writing, and
listening, with special emphasis on 20th-century Brazil. Discussion
in Portuguese; reinforcement of language skills. (SP)

102. Readings in Portuguese. (3) New course. Three
hours of lecture/discussion per week. Prerequisites:
101A-101B or equivalent. The continuation of Portuguese
101A-101B, this course focuses on a variety of texts
with special emphasis on 20th-century Brazil. Discussion
in Portuguese; reinforcement of language skills. (SP)

103. Advanced Grammar and Composition. (5)
Formerly 102. Three hours of lecture/discussion per week.
Prerequisites: Placement test: 101A-101B. Three
hours of laboratory in Portuguese grammatical structures.
Practice in writing.

104. Introduction to Brazilian Literature. (3) Formerly
125A-125B. Two 1/2-hour lectures per week. Prerequisites:
Portuguese 4 or the equivalent. A survey of Brazilian
literature from the beginnings through the 20th century, with attention to the relationships between literature and society. (F) Slater

107. Survey of Portuguese Literature. (3) Formerly 1229A-1229B. Three hours of lecture per week. Prerequisites: Portuguese 4 or the equivalent. A survey of Portuguese literature from the beginning through the 20th century. (SP) Askins

113. Brazilian Civilization. (3) Three hours of lecture per week. Prerequisites: Portuguese 104 is recommended but not required. An examination of the most important 20th-century writers from the 1920s through the present. Emphasis on the shifting definition of "Brazilianess" or brasileireidade and on new directions in contemporary poetry and fiction. Slater

114. Contemporary Brazilian Novel. (3) Hours of lecture per week. (F) Slater

129. Twentieth-Century Brazilian Literature. (3) Three hours of lecture per week. Prerequisites: Portuguese 104 is recommended but not required. An examination of the most important 20th-century writers from the 1920s through the present. Emphasis on the shifting definition of "Brazilianess" or brasileireidade and on new directions in contemporary poetry and fiction. Slater

135. Studies in Luso-Brazilian Literature. (2-3) Course may be repeated when topic changes. Two or three hours of lecture per week. Askins

144. Modern Brazil Through the Novel. (3) Two 1-hour lectures per week. Open to students in all departments of the University. Lectures and discussion in English. Texts available in both English and Portuguese. Students may not receive credit for both Portuguese 144 and 114. (SP) Slater

150. Introduction to Portuguese Linguistics. (2) Two hours of lecture per week. Azevedo

180. Special Study for Undergraduates. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Twentieth units or equivalent of Portuguese or another Romance language. Consent of instructor: Special tutorial or seminar on selected topics. (F,SP) Azevedo, Bergmann

229. Special Study for Graduate Students. (3-5) Course may be repeated for credit as topic varies. May be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: Graduate standing. Individual conferences on special programs of study or research in a restricted field not covered by available courses or seminars. (F,SP) Azevedo, Faubel

Special Programs (College of Letters and Science)

Division Office: 301 Campbell Hall, 442-0108
Associate Dean: William V. Newbruck, Ph.D.

The mission of the Division of Special Programs is to develop and administer innovative and interdisciplinary courses in the College of Letters and Science that do not belong to a single department. At present the Division of Special Programs administers the following majors (for complete descriptions see the entries listed separately in this catalog):

Field Majors

Humanities. This major provides students with an opportunity to acquire a broad background in the study of human beings as artists and as creators of values through the ages.

Social Science. This is a liberal arts major designed for students who want to develop individual areas of concentration drawn from a range of disciplines in the social sciences including history, economics, psychology, political science, and many others.

Group Majors

Environmental Science. This major is for students who want an understanding of the impact of science and technology on society and who wish to contribute to the solution of environmental problems. Film. This major has been designed to place the history and theory of film in the larger context of humanistic studies.

Genetics. This major is designed to provide a broad foundation in biology, centered around a core of emphasis on genetics. The field of genetics encompasses most areas of biological research.

Mass Communications. The major applies a range of disciplines in the social sciences and humanities to the study of the mass media and their structure, history, content, consequences, and policy implications.

Middle Eastern Studies. This program is designed to allow students to pursue a broad and balanced course of study which will familiarize them with the languages, culture, and history of the region, its basic geographic, demographic, and ethnographic character, and the course of recent political, economic, social, and cultural change.

Neurobiology. The major is intended for students seriously committed to the study of the nervous system. The major may lead to graduate study in neurobiology and might be appropriate for students entering the medical or health sciences.

Religious Studies. This major provides opportunities for securing a broad background in the liberal arts while at the same time allowing for a focus on a thematic concern or a particular religious tradition. The major views religion from a global perspective and combines aspects of the humanities and social science.

Women's Studies. This major offers students the opportunity systematically to focus their course of study on women and gender, drawing together insights, methods, and theories from a variety of disciplines in the humanities and social sciences.

In addition to the majors listed above, the Division of Special Programs offers special introductory courses under Western Civilization, listed below.

Lower Division Courses

Note: SP44A, SP44B and 5-unit sections of SP44C and 44D satisfy one-half of the L&S reading and composition requirement.

44A. Topics in Western Civilization. (6) Four hours of lecture and two hours of discussion per week. Prerequisites: Completion of Subject A requirement or consent of instructor. Open to freshmen only. Homeric and Classical Greece; Rome in its transition from republic to empire, and the world of the Old Testament. The course will meet in small groups for discussion. Lectures, discussions, and reading assignments will involve interdisciplinary approaches with an emphasis on the development of skill in writing. (F) Staff

44B. Topics in Western Civilization. (5) Four hours of lecture and two hours of discussion per week. Prerequisites: Completion of Subject A requirement or consent of instructor. Open to freshmen only. Will include the New Testament, readings in Medieval Literature (St. Augustine and Dante) and the history and literature of the Renaissance. The course will meet in small groups for discussion. (SP) Staff

44C. Topics in Western Civilization: The Enlightenment. (4-5) Variable. 4 units: Two 2-hour lectures and one 1-hour discussion section per week. Prerequisites: Subject A required. SP 44A recommended. Beginning with the Enlightenment, rough to the last years of the eighteenth century through the eighteenth, or from the constitutional revolution in England (1688) through the French and American revolutions. Will meet in small groups for discussion and writing. (F) Staff

44D. Topics in Western Civilization: Industrial Revolution and the Modern World. (4-5) Variable. 4 units: Two 2-hour lectures and one 1-hour discussion section per week. Prerequisites: Subject A required. SP 44A recommended. From the industrial revolution to the present; the world of Jane Austen, Beethoven and David to that of Kafka, Shoenberg and Picasso; from ranks and orders to mass society, readings include novels, poets, and theorists like Marx and Freud. (SP) Staff

*Not offered 1988-89

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
Statistics
(College of Letters and Science)

Department Office: 367 Evans Hall, 542-2781
Chair: Rudolph J. Beran, Ph.D.

Professors:
David J. Aldous, Ph.D. Cambridge University. Theoretical and applied probability. Rudolph J. Beran, Ph.D. Johns Hopkins University. Bayesian inference, game theory.
Peter J. Bickel, Ph.D. University of California at Berkeley. Nonparametric statistical inference, data analysis.
David Blackwell, Ph.D., D.S.C. (Hon.) University of Illinois. Bayesian inference, game theory.
Erich L. Lehmann, Ph.D., D.Sc. (Hon.) University of California at Berkeley. Nonparametrics, survival analysis.
Lester E. Dubins, Ph.D. University of Chicago. Probability theory, intuitive geometry.
Jacob Bien, Ph.D.
Lee A. Goodman, Ph.D. Princeton University. Multivariate analysis.
Nicholas P. Jewell, Ph.D. University of Edinburgh. Biostatistics, surveys, geometric probability.
Michael A. Klass, Ph.D.
Lucy LeCam, Ph.D. University of California at Berkeley. Multivariate analysis, survival analysis.
Christopher B. Murray, M.D., Ph.D. University of California at San Francisco. Biostatistics, surveys, geometric probability.
Michael J. Klass, Ph.D.
Statistics 21.
A. Introduction to Statistics.

Purves, Blackwell, Staff


5. Introduction to Probability and Statistics. (3) Students who have taken 2, 2X, 20, 21, or 25 will receive no credit for 2X. Three hours of lecture and two 1-hour laboratories per week. Prerequisites: One semester of calculus. For students with mathematical background who wish to acquire basic concepts. Relative frequencies, discrete probability, random variables, expectation. Testing hypotheses. Estimation. Illustrations from various fields. (FSP) Selker, Staff

21. Introductory Probability and Statistics for Business. (4) Students who have taken 2, 5, 20, 25, or 21 will receive no credit for 21. Three hours of lecture and two 1-hour laboratories per week. Prerequisites: One semester of calculus. Descriptive statistics, probability models and related concepts, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments vs. observational studies, correlation and regression. (FSP) Selker, Staff

21X. Introductory Probability and Statistics for Business—Self Paced. (4) New course. Students who have taken 2, 5, 20, 25, or 21 may not receive credit for 21X. Because there is no major emphasis on methodology, this course may be used as a general introduction to probability and statistics with an emphasis on applications. (FSP) Selker, Staff

There are two biostatistics graduate programs: M.A. and Ph.D. These programs are appropriate for students who have either a strong mathematical and statistical background or an interest in biological sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information see Biostatistics. For course listing in Biostatistics, see Biomedical and Environmental Health Sciences.
25. Introduction to Probability and Statistics for Engineers. (3) Students who have taken 2, 5, 20, or 21 will receive no credit for 25. Three hours of lecture and one hour of laboratory per week. Prerequisites: One year of calculus. Emphasis on concepts and applications. Conditional probability, Independence. Expectation, variance, law of large numbers, characteristic functions, central limit theorem. (F,SP) Speed, Staff

Upper Division Courses


102. Introduction to the Theory of Statistics. (4) Course may be repeated for credit. Three 1-hour lectures and one 2-hour lab per week. Prerequisites: 101. Properties and realism of probability models used in statistics, including the normal, t, chi-square, and F distributions. Statistical inference, including point and interval estimation and hypothesis testing. (SP) Hodges

103A. Intermediate Introduction to Probability and Statistics. (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisites: Math 50B, or equivalent. Random variables, expectation, univariate models, central limit theorem, random vectors, multivariate normal distribution, conditional distribution, simulation, and other computer applications. (F,SP) Stone

103B. Intermediate Introduction to Probability and Statistics. (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 103A. Least squares method, confidence intervals and tests of hypotheses for normal linear regression models, maximum likelihood estimation, and stochastic convergence of variables. Also discrete and other discrete linear models, chi square tests for multinomial models, interactive use of computers for statistical analyses. (SP) Stone

131A-131B. Statistical Inference for Social and Life Scientists. (4,4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 2, 5, 20 or 21. Accelerated version of Statistics 131A-131B. This course is available only to students who had some statistics and want a critical, fast-paced discussion of statistical methods in the social sciences. (SP) Staff


135. Concepts of Statistics. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 134 or equivalent. Standards and documents and continuous data. Statistical theory and methodology basic to applications in science and engineering, for students having a good background in the concepts of probability theory. (F,SP) Breiman, Freedman

150. Stochastic Processes. (3) Three hours of lecture per week. Prerequisites: 101 or 134. Random walks, discrete time Markov chains, Poisson processes. Further topics such as: continuous time Markov chains, queueing theory, point processes, branching processes, renewal theory, stationary processes, Gaussian processes. (SP) Pitman

151A. Applied Statistical Models. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Mathematics 112 and Statistics 102 or 135. Emphasis on the mathematical structure of applied models and on techniques useful for the analysis and interpretation of real data. An introduction to statistical computer packages. Regression and analysis of variance and covariance in the context of the linear model and projections. Multivariate normal distributions, hypothesis tests, power, simultaneous confidence intervals. (F) Thomason

151B. Applied Statistical Models. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 151A or consent of instructor. Emphasis is on the mathematical structure of applied models and on techniques useful for the analysis and interpretation of real data sets. An introduction to statistical computer packages. Topics in multivariate statistical analysis such as: inference concerning multivariate means; multivariate regression and correlation; factor analysis; discrimination; classification; log linear models. (SP) Hodges

152. Sampling Surveys. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 101 or 131A or 134. Theory and practice of sampling from finite populations. Simple random, stratified, cluster, and double sampling. Sampling with unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex sampling schemes. (F) Shaffer

153. Introduction to Time Series. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 101 or 134 or consent of instructor. An introduction to time series analysis in the time domain and spectral domain. Topics include: trends and seasonal effects, autoregressive moving average models, forecasting, indicators, harmonic analysis, spectra. (SP) Donoho

154. Elements of Nonparametric Inference. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 102, or equivalent. Common nonparametric tests such as the sign, Wilcoxon, Kruskal-Wallis and rank correlation tests; and point estimates and confidence intervals derived from these tests. Exact and asymptotic distribution theory, both in randomization and population models. (SP) Shaffer

155. Game Theory. (3) Three hours of lecture per week. Prerequisites: Two years of calculus. General theory of zero-sum, two-person games, including games in extensive form and continuous games, and illustrations in extensive form. (SP) Blackwell

H185. Special Study for Honors Candidates. (1-4) Course may be repeated for credit. (F,SP) Staff

195. Directed Study for Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Special tutorial or seminar on selected topics. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. (F,SP) Staff

Grades

200A-200B. Introduction to Probability and Statistics at an Advanced Level. (4,4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Two years of calculus and one semester of linear algebra. Probability spaces, random variables, distributions in probability and statistics, central limit theorem, Poisson processes, transformations involving random variables, estimation, confidence intervals; hypothesis testing, linear models, large sample theory, categorical models, decision theory. (SP) Stone

200A-200B. Probability Theory. (3,3) Three hours of lecture per week. Prerequisites: Some knowledge of real analysis and metric spaces, including compactness, Riemann integral. Knowledge of Lebesgue integral and or elementary probability is helpful, but not essential, given otherwise strong mathematical background. Measure theory concepts needed for preparing for convergence, distributions. Laws of large numbers and central limit theorems with independent random variables. Characteristic function methods. Conditional expectation, transformations of random variables, random walk, Brownian motion, diffusions, Levy processes, Markov processes, martingales, Gaussian processes and further topics. (F,SP) Dubins

210A-210B. Advanced Theory of Statistics. (3,3) Three hours of lecture per week. Prerequisites: Three years of upper division probability and statistics. A course in linear algebra. A survey of mathematical statistics: in particular both small and large sample theorems of hypothesis testing, point estimation, and confidence intervals with applications to topics such as exponential families, univariate and multivariate linear models and nonparametric inference. (SP) Bickel


216A-217B. Theory of Nonparametric Inference and Robust Methods in Statistics. (3,3) Three hours of lecture per week. Prerequisites: 205, and 210A or 210B or 208. Theory and methods for handling a large number of observations. Topics include semiparametric versions of normal families, sufficiency, minimax and admissible procedures, empirical measures, maximum likelihood and Bayes estimates, first and higher order efficiency. (F,SP) LeCam, Miller

230A-230B. Linear Models. (4,4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Statistics 110 or equivalent. A year of upper division or graduate probability and statistics. Theory of least squares estimation, interval estimation, and tests under the general linear fixed effects model with normally distributed errors. Large sample theory for non-normal linear models. Two and higher way layouts, Residual analysis. Effects of departures from the underlying assumptions. Robust alternatives to least squares. (F) Speed

232. Experimental Design. (3) New course. Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 130A. Randomization, blocking, factorial design, confounding, fractional replication, response surface methodology, optimal design. Applications. (SP) Chang

235. Large Sample Theory for Applied Statistics. (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: Calculus (at least one year, preferably three semesters) one year of probability and statistics at the undergraduate level. An introduction, with the use of advanced mathematics, to the mathematical theory of asymptotic theory. Emphasis is on intuitive understanding rather than proofs. Topics include: Limits, order comparisons, convergence in probability and in law, with applications to (approximate) asymptotic approximations to distributions, sample size determination, variance stabilizing transformations. There will be particular emphasis on robustness and asymptotic efficiency. (SP) Lehmann

240. Nonparametric and Robust Methods. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: A year of upper division probability and statistics. Standard nonparametric tests and confidence intervals for continuous and categorical data; nonparametric estimation of quantities; robust estimation of location and scale parameters. Efficiency comparison with the classical procedures. (F)


243. Introduction to Statistical Computing. (4) Course may be repeated for credit. Three hours of lecture and two to four hours of laboratory per week. Prerequisites: Knowledge of a higher level programming language. Algorithms in statistical computing: random number generation, generating other distributions, random sampling and permutations. Make computers in linear and nonlinear optimization with applications to statistical procedures. Other topics of current interest, such as issues of efficiency, and use of graphics. (SP) Breiman

244. Statistical Computing. (4) Three hours of lecture and two to four hours of laboratory per week. Prerequisites: 102 or equivalent. Frequent topics: techniques of time series analysis, spectral theory, linear filters, estimation of spectra, estimation of transfer functions, design, system identification, vector-valued stationary processes, model building. (SP) Brillinger

250. Applied Stochastic Processes. (3) Course may be repeated for credit. Three hours of lecture per week. Various aspects of applied stochastic processes. Offered according to student demand and faculty availability. (F,SP) Aboua

260. Topics in Probability and Statistics. (3) Course may be repeated for credit. Three hours of lecture per week. Special topics in probability and statistics offered according to student demand and faculty availability. (F,SP) Mital, Staff

272. Statistical Consulting. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of class per week and individual meeting(s). Prerequisites: Some course work in applied statistics and permission of instructor. To be taken concurrently with service as a consultant in the department's drop-in consulting service. Participants will work on problems arising in the service and will discuss general ways of handling such problems. There will be working sessions with researchers in substantive fields and occasional lectures on consulting. (F,SP) Shaffer, Hafner

278B. Statistical Research Seminars. (1-4) Course may be repeated for credit. Two or more hours per week. Special topics, by means of lectures and informational conferences. (F,SP) LeCam

286. Directed Study for Graduate Students. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Special tutorial or seminar on selected topics. (F,SP) Staff

299. Individual Study Leading to Higher Degrees. (2-12) Course may be repeated for credit. (F,SP) Staff

601. Individual Study for Master's Candidates. (1-6) Course may be repeated for credit for a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with graduate advisor, intended to provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for the Ph.D. degree. Units may not be used to meet either unit or residence requirement for a master's degree. (F,SP) Staff

602. Individual Study for Doctoral Candidates. (1-6) Course may be repeated for credit for a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. May not be used for unit or residence requirements for the doctoral degree. Prerequisites: One year of full-time graduate study and permission of the graduate advisor. Individual study in consultation with the graduate advisor, intended to provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for the Ph.D. degree. (F,SP) Staff

Professional Courses

300. Professional Preparation: Teaching of Probability and Statistics. (2-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Offered to two or four hours of laboratory per week. Prerequisites: Graduate standing; appointment as a graduate student instructor, or consent of instructor. Discussion, problem review and development, grading, course development, supervised practice teaching. (F,SP) Purves

391A. Experimental Course in Teaching Elementary Statistics. (1-4) Must be taken on a passed/not passed basis. Ten to twelve hours of meetings with instructors and students per week. Prerequisites: Consent of instructor only. Experimental course in teaching elementary statistics. For tutors working under close supervision of a instructor in a self-paced course. (SP)

The Statistical Laboratory

When founded in 1938, the Statistical Laboratory was a unit of the Department of Mathematics and combined research with an extensive instruction in mathematical statistics. This instruction program led to A.B., M.A., and Ph.D. degrees in statistics. In 1955, the instruction activities in statistics were taken under the newly established Department of Statistics.

In recent times the laboratory has been the administration center for sponsored projects of the department. In addition, the laboratory offers a consulting service in statistics for graduate students and faculty in other disciplines. The consultants are graduate students in statistics or biostatistics working under the supervision of a faculty member. The laboratory is currently developing a variety of interdisciplinary research projects involving collaborative work between faculty and students in statistics and other departments.

The Statistical Computing Facility

The Statistical Computing Facility provides computing support for the department. It currently houses over 30 SUN networked workstations, 9 VAX 11/750s, and many terminals, printers and other peripherals. These are all heavily used in both the graduate and undergraduate instructional programs. In addition, the facility offers high-quality consulting assistance in statistical computing and is active in developing advanced statistical software.
proficiency in expository writing preparatory to work in Subject A.1. (F.SP)

Staff

35A. Oral Communication. (0) Recognized as two work-load units in computing the study list. Two 11/2-hour lecture/discussion classes per week. Work on oral communication skills used in academic settings. (F.SP)

Staff

35B. Oral Communication. (0) Prerequisites: Subject A.35A. Recognized as two work-load units in computing the study list. Two 1 1/2-hour lecture/discussion classes per week. Work on oral communication skills used in academic settings. (F.SP)

35C. Oral Communication. (0) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1 1/2-hour lecture/discussion classes per week. Prerequisites: Appropriate as a graduate student instructor. For G.S.T. whose native language is not English. Work on pronunciation and grammar, discussion of the culture of the American classroom, and videotaped teaching practice. (F.SP)

Interdepartmental Studies Courses

IDS 140. Technical Communication for Non-native Speakers of English. (3) Two 1 1/2-hour lectures per week, plus three 1-hour discussion classes per week. Prerequisites: Academic Setting (upper-division or graduate standing). Emphasis on improving language skills and use of the rhetorical conventions of technical writing (see course description for Engineering 180). Also, some work with oral presentations. This course is designed to prepare non-native speakers for the more advanced work in Engineering 190. Sponsoring department: Subject A and College of Engineering. (F.SP)

Wildland Resource Science

(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 145 Mulford Hall, 642-3765
Chair: Joe R. McBride, Ph.D.

Professors:

David L. Brink, Ph.D. (Forestry and Resource Management; Forest Products Lab)
Lawrence S. Davis, Ph.D. (Forestry and Resource Management)
Don C. Erman, Ph.D. (Forestry and Resource Management)
William J. Eubanks, Ph.D. (Forestry and Resource Management)
William J. Eubanks, Ph.D. (Forestry and Resource Management; Genetics)
Robert E. Martin, Ph.D. (Forestry and Resource Management)
Robert J. McBride, Ph.D. (Forestry and Resource Management; Forest Products Lab)
Dale R. McCullough, Ph.D. (Forestry and Resource Management)
William L. McKillop, Ph.D. (Forestry and Resource Management)
Arno P. Schindelwein, Ph.D. (Forest Products Laboratory; Forestry and Resource Management)
Arnold M. Schulte, Ph.D. (Forestry and Resource Management; Conservation and Resource Studies)
Edward C. Stine, Ph.D. (Forestry and Resource Management; Landscape Architecture)
David E. Treadway, Ph.D. (Acting Director, Forestry and Resource Management)
W. Wayne Wibbels, Ph.D. (Forestry and Resource Management; Forest Products Lab)
Eugene Zavoina, Ph.D. (Forestry and Resource Management; Forest Products Lab)
Harold S. Biawal, Ph.D. (Emeritus) (Forestry and Resource Management)
Robert A. Cockrell, Ph.D. (Emeritus) (Forestry and Resource Management)
Robert N. Cotwell, Ph.D. (Emeritus) (Forestry and Resource Management)
Emerson Fritz, M.F. (Emeritus) (Forestry and Resource Management)
Manolo J. Vaca, Ph.D. (Emeritus) (Forestry and Resource Management)
Herman H. M. Karssen, Ph.D. (Emeritus) (Entomology and Parasitology; Forestry and Resource Management)
John A. Donaldson, Ph.D. (Emeritus) (Forestry and Resource Management; Forest Products Lab)

Associate Professors:

Reginald H. Barrett, Ph.D. (Forestry and Resource Management)
James W. Bartolomei, Ph.D. (Forestry and Resource Management)

Gregory S. Basing, Ph.D. (Forestry and Resource Management)
Jeffrey Romm, Ph.D. (Forestry and Resource Management)
Lea C. Weneal, Ph.D. (Forestry and Resource Management)
Paul J. Zinke, Ph.D. (Forestry and Resource Management)

Assistant Professors:

Barbara H. Allen, Ph.D. (Forestry and Resource Management)
Russel G. Congdon, Ph.D. (Forestry and Resource Management)
Richard S. Dold, Ph.D. (Forestry and Resource Management; Forest Products Lab)
Louise F. Fortinham, Ph.D. (Forestry and Resource Management)
J. Keith Gillies, Ph.D. (Forestry and Resource Management)

Michael L. Morrison, Ph.D. (Forestry and Resource Management)
Stephan L. Quariesi, Ph.D. (Forest Products Lab; Forestry and Resource Management)
Timothy L. Rissi, Ph.D. (Forest Products Lab, Forestry and Resource Management)

Lecturer:

Donald P. Gasser, M.S. (Forestry and Resource Management)

Graduate Adviser: Reginald H. Barrett.

This program is administered by the Department of Forestry and Resource Management, with degree programs available at the M.S. and Ph.D. levels. The Ph.D. program is designed to develop the student's critical abilities and to expand the capacity of students to conduct research on forests, woodlands, and related renewable natural resources. It is concerned with wildland ecosystems and with the vegetation, fauna, water, soil, climate, and social systems associated with them. Students in wildland resource fields may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis, two 1 1/2-hour lecture/discussion classes per week. Prerequisites: Appropriate as a graduate student instructor. For G.S.T. whose native language is not English. Work on pronunciation and grammar, discussion of the culture of the American classroom, and videotaped teaching practice. (F.SP)

Women's Studies

(College of Letters and Science)

Group Major Office: Division of Special Programs, 301 Campbell Hall, 642-9894
Women's Studies Office: 333 Campbell Hall, 642-2767
Director: Mary Ryan, Ph.D.; Academic Coordinator: Lois Heimbuch

Professors:

Evelyn Fox Keller, Ph.D. (Physiology). History, philosophy, sociology of science; gender and science
Mary Ryan, Ph.D. (History). History of American women, 19th-century U.S. social and cultural history

Associate Professors:

Elizabeth Abel, Ph.D. (English). Women writers, feminist theory
Nancy Chodorow, (Sociology). Feminist theory and methodology, psychoanalysis and feminism

Lecturers:

Lois Heimbuch, Ph.D. (History). History of women in 20th-century U.S.: race, class, and gender; women and work

Affiliated Faculty:

More than 70 faculty members throughout the University are affiliated with Women's Studies. For details see the Women's Studies brochure and the list of course offerings on women and gender prepared each semester.

Group Major in Women's Studies

The Berkeley Women's Studies Program was founded in 1976 to enhance the existing curriculum by introducing courses designed to reflect the complex world in which we live. Women's Studies seeks to describe the experience of women throughout history, across the world, and from different economic, ethnic, and racial groups. It engages the question of gender itself. Although all societies institute gender distinctions, how do they vary from society to society? How have definitions of male and female roles evolved, how are they perpetuated, and how might they be redefined? It examines the sexual inequality and conflict created by gender roles in society and the rapid transformation of those roles in today's society.

As we expand the content of the traditional curriculum, we re-evaluate its methods and models as they succeed or fail to account for the experience of women. We have adapted the ideas and research methods of several academic disciplines to produce our own body of feminist theory and scholarship on women. By analyzing the powerful and problematic impact of gender, differences, women's studies courses and activities illuminate our understanding of ourselves and our world.

The Women's Studies Program offers students the opportunity to study women and gender through an interdisciplinary curriculum taught by the program's own staff and members of other departments. Students learn to apply the methods and theories of social scientists, historians, literary critics, philosophers, of science, etc., to the study of women. They explore a growing body of feminist theory that revises our understanding of gender and difference. After graduation women's studies students enter professional schools in law, medicine, and business, and pursue advanced degrees in women's studies, the humanities, and social sciences. To pursue courses in health, counseling, teaching, government, business, and community work.

Major Program

The major program in women's studies requires seven core courses (two in the lower division and five in the upper division) and a choice among a minimum of four additional upper division courses. The major requires at least 30 and not more than 36 units of upper division work. Students choose either a humanities or a social science concentration.

Core courses:

Lower Division. 10, Introduction to Women's Studies (3); 20, Introduction to Feminist Theory (3).
Upper Division. 101, Feminist Literary Theory (3); 102, Feminist Perspectives in Social Science (3); 110, Contemporary Feminist Theory (4); 120, History of Women in the U.S. (3); 195, Senior Thesis (4).

Additional Requirements. These courses will be selected in consultation with an adviser in order to provide an intellectual coherence that can be applied to the thesis.

A. Ethnic Studies. One ethnic studies course, chosen from the following list: Afro-American Studies 153A, Images of Black Women in Literature; Slavery to the 20th Century (3); Afro-American Studies 153B, Contemporary Images of Black Women in Literature (3); Asian American Studies 145, Asian American Women in American Literature (3); Chicano Studies 145, La Chicana (3); Ethnic Studies 147, Third World Women (3); Native American Studies 159, Native American Women (3).

B. One Women's Studies 100 course, Special Topics (3). Topic varies from semester to semester.

C. Two electives, to be chosen from the following lists:

Humanities Courses: Afro-American Studies 153A, Images of Black Women in Literature; Slavery to the 20th Century (3); Afro-American Studies 153B, Contemporary Images of Black Women in Literature (3); Asian American Studies 161, Asian Women in America(3); Comparative Literature 185, Women's Perspective in Literature (3); English 150, O, Major Authors, when a woman writer is being considered (4); English 171, Literature and Sexual Identity (4); English 175, Women in French Literature (3); German 153, Feminist Perspectives in Literature (3); History, when relevant; Women's Studies 199, Supervised Independent Study (1-4).

*On leave, spring
**On leave, fall
†Recipient of Distinguished Teaching Award
Social Science Course: Afro-American Studies 111, Race, Class, and Gender in the United States (3); Anthropology 142, Kinship and Social Structure (3); Anthropology 147, Gender Anthropology (3); Anthropology 154, Social Inequality (3); Asian American Studies 151, Asian Women in America (3); Chicago Studies 142, Ethnic Seminars in Personality (3); Sociology 111, Sociology of the Family (3); Sociology 133, Gender and Society: The Sociology of Women (3); Sociology 134, Gender and Society: The Sociology of Men (3); Sociology 135, Gender and Society: Sexual Diversity and Social Change (3); Women's Studies 198, Directed Group Study (1-4); Women's Studies 199, Supervised Independent Study (1-4).

Honors Program. Students must have a 3.3 for honors, a 3.5 for high honors and a 3.7 for highest honors. In all cases, the senior thesis must be deemed excellent.

Minor Program

I. Social Science Emphasis:

Required: Women's Studies 10 or 20, placement to be determined by the minor adviser; Women's Studies 102, Feminist Perspectives in Sociology (3); Women's Studies 110, Contemporary Feminist Theory (4); Women's Studies 120, The History of American Women in the U.S. (3).

Electives: two courses chosen from the following list (one of which must be in one of the Ethnic Studies fields):

Women's Studies 100 (3), Special Topics (when approved by adviser) (3); Women's Studies 122, Women in the University: Gender and Higher Education (3); and all the courses listed for social science concentration for the major (above).

II. Humanities Emphasis:

Required: Women's Studies 10 or 20, placement to be determined by the minor adviser; Women's Studies 101, Feminist Literary Theory (3); Women's Studies 110, Contemporary Feminist Theory (4); Women's Studies 120, The History of American Women in the U.S. (3).

Electives: two courses chosen from the following list (one of which must be in one of the Ethnic Studies fields):

Women's Studies 100, Special Topics (when approved by adviser) (3); Women's Studies 122, Women in the University: Gender and Higher Education (3); and all courses listed for humanities concentration for the major (above).

Please Note: All courses must be completed on a letter-grade basis. A minimum of three of the five upper-division courses must be completed on the Berkeley campus of the University. A minimum overall grade-point average of 2.0 is required for the minor program.

Lower Division Courses

10. Introduction to Women's Studies. (3) Three hours of lecture and discussion per week. Introduction to Women's Studies as an academic discipline and to the feminist critique of the existing disciplines through an examination of several selected areas, such as sex role socialization, the women's movements, and female art. (F,SP) Staff

20. Introduction to Feminist Theory. (3) Three hours of lecture and discussion per week. An introduction to feminist theory from the classics of the 18th century and the 19th century to the 2nd Wave theorists of today. The development of feminist theory is treated in relation to partitional social, political, and cultural theories. (F,SP) Staff

42. Writing-Intensive Workshop—Feminist Theory. (5) New course. Three hours of seminar and two hours of section per week. Prerequisites: English 1A or equivalent. This course is only open to students who have not completed one of the other composition requirements. This course is identical to WS 20 above with two additional one hour section meetings per week devoted to writing instruction, with additional writing assignments. Fulfills second half of reading and composition requirement. (F)

39. First Year Seminar In Women's Studies. (3) Three hours of seminar per week. An introduction to feminist studies through the examination of a single problem area. Topics vary; examples include women in the city, the concept of female culture, women and work. (F,SP) Staff

40. Special Topics. (3) Course may be repeated for credit. Three hours of lecture per week. The findings of feminist scholarship as they apply to a particular problem or for existing discipline. Designed primarily for lower division students and nonmajors. Topics vary from term to semester. Students should consult the women's studies announcement of courses before the beginning of the semester for the semester offerings. (F,SP)

89. Directed Group Study for Undergraduates. (1-4) New course. Course may be repeated for credit. Must be taken on a pass/no pass basis. Seminars for the group study of selected topics not covered by regularly scheduled courses. Topics will vary from year to year. (F,SP) Ryan

Upper Division Courses

100. Special Topics. (3) Course may be repeated for credit as topics vary. Three hours of lecture per week. Prerequisites: 10 or equivalent. A course in basic social science method (e.g., participant observation, controlled experiments, in-depth interviews, closed-ended questionnaires, content analysis) and the relationship of these methods to a feminist perspective in social science. Seminar; pre-enrollment; preference to women's studies majors. (SP)

110. Contemporary Feminist Theory. (4) Four hours of lecture and discussion per week. Prerequisites: 20 or consent of instructor. A course in 20th century feminist thought, focusing on interdisciplinary theories of women, gender and sexuality in relationship to race, class, and culture. (SP) Staff

120. The History of American Women. (3) Three hours of lecture and discussion per week. Prerequisites: Upper division standing or consent of instructor. Survey of the major themes and events in the history of women from colonial settlement to the present time; how women have been affected by changes in family structure, sexual roles, employment patterns, legal and educational reforms. (F,SP) Staff

122. Women In the University: Gender and Higher Education. (3) New course. Three hours of lecture and discussion per week. Prerequisites: Upper division standing or consent of instructor. Survey of the major themes and events in the history of women from colonial settlement to the present time; how women have been affected by changes in family structure, sexual roles, employment patterns, legal and educational reforms. (F,SP) Staff

125. Race, Class, and Feminism in the United States. (4) New course. Students who have taken 100, either in fall 1986 or spring 1988, may not receive credit for 100. Three hours of lecture per week. Prerequisites: WS 10, one ethnic studies course, or consent of instructor. This course will examine the response of feminism (as an ideology and as a social movement) to the differences and commonalities of all women, the role of race, class, and the commonalities which all women share by virtue of sexism and gender. The reading will be multidisciplinary. From a social historical perspective, the course will examine the development of the feminist movement concerning race, class, and consciousness in the 20th century. (SP) Staff

131. Gender and Science. (3) New course. Three hours of lecture with discussion per week. What role has science as a social institution played in the sexual division of intellectual and emotional labor underlying our cultural history? What consequences has the division of labor had for scientific practice? In what ways has the historical exclusion of traditionally female interest affected the development of the natural sciences? What differences, if any, would the full and equal participation of women make? (F,SP) Staff

195. Senior Thesis. (4) Two 1/2-hour seminar meetings per week. Prerequisites: 10, 101, 102, 110. A seminar in which women's studies majors define the nature of feminist research (e.g., both historical perspectives and data covering the contemporary scene). A prior knowledge of the history of feminist scholarship as they apply to a particular problem or existing discipline. Designed primarily for lower division students and nonmajors. Topics vary from term to semester. Students should consult the women's studies announcement of courses before the beginning of the semester for the semester offerings. (F,SP) Staff

199. Supervised Independent Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Variable. Prerequisites: Women's studies major. Reading and conference with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable the student to write an essay based upon the student's study. (F,SP) Staff

Wood Science and Technology

(College of Natural Resources, Interdepartmental Graduate Groups)

Building 478 Richmond Field Station, 231-9432

Professors:

Daniel A. Beil, Ph.D. (Forest and Resource Management, Forest Products Laboratory)
C.D. Mote, Jr., Ph.D. (Engineering, Mechanical Engineering)
Arno Schniewind, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
W. Wayne Wilcox, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Charles R. Wilke, Ph.D. (Civil Engineering)
Robert B. Williamson, Ph.D. (Chemistry, Chemical Engineering)
Eugene Zavattini, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Robert A. Cockrall, Ph.D. (Economics) (Forest and Resource Management, Forest Products Laboratory)

Assistant Professors:

Richard D. Dool, Ph.D. (Forest and Resource Management, Forest Products Laboratory)
Stephen L. Quarles, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Timothy G. Riel, Ph.D. (Forest and Resource Management, Forest Products Laboratory)

Graduate Advisor: Arno P. Schniewind, Stephen L. Quarles.

This program is administered by an interdepartmental group drawn from faculties in chemistry, engineering, and other related departments and offers programs leading to the M.S. and Ph.D. degrees. These programs are directed particularly to students desiring a thorough knowledge of all areas of wood science as a background in research fields or areas of specialization. To be considered for admission, students must have a bachelor's degree in a natural science, forestry, engineering, wood science, or wood technology.
Graduate study directs principal attention to an understanding of the seven principal areas of zoology: (1) Animal behavior; (2) Comparative animal physiology; (3) Comparative animal chemistry; (4) Developmental biology; (5) Organismal form and function; (6) Organismal diversity; and (5) Population biology. These courses represent the common ground upon which more specialized senior programs and graduate study may be developed.

Courses for Nonmajors

In addition to a freshman course, the department offers a series of courses for students who are not specializing in zoology. These courses consider the general principles of animal biology from a variety of viewpoints, ranging from molecular and cell biology through behavior and evolution. Courses also cover areas different from those listed, providing a useful supplement for students considering a major in zoology.

The Major

Lower Division. Biology 1A, 1B; Chemistry 1A, 1B, 8A; Mathematics 16A; Physics 8A, 8B. More extensive pre-professional courses may be substituted for those listed, at the student's option. Recommended: General French, advanced mathematics, statistics, chemistry, biochemistry, and basic courses in other biological sciences.

Upper Division. A minimum of five courses, taken from at least four of the following five areas: Three of the five must be completed at Berkeley. All must be taken for 2.0 grade-point average in the course work student's major may be applied to the minor in zoology. Details of the Ph.D. program may be obtained from the department office. The program for the Ph.D. varies considerably, according to the background and interests of the individual student. All candidates for advanced degrees must pass a departmental language examination in German, French, or Russian (another language may be accepted in the minor). Students planning to enter graduate study in zoology are expected to have the equivalent of a major in zoology or biology. However, students with other appropriate back- grounds are encouraged to enter the program. Candidates for advanced degrees must pass a comprehensive examination at the end of the first year of study, and for the Ph.D. must pass an oral qualifying examination. The crucial part of the Ph.D. program is the thesis, based on original research in which the candidate demonstrates the ability to conduct independent study and to incorporate the results in a thesis. Service as a graduate student instructor is normally required as part of the Ph.D. program in zoology. Details of the Ph.D. program may be obtained from the department office.

Research Facilities

The Museum of Vertebrate Zoology is a research institute and repository for specimens and information on vertebrates. The facility includes a library and extensive collections of vertebrates, including birds, mammals, reptiles, and amphibians. The museum also houses a large collection of comparative animal physiologist.

*On leave, spring
†On leave, fall
‡Recipient of Distinguished Teaching Award

*Not offered 1988-89
‡On leave, spring
‡On leave, fall
Relative to the higher vertebrate animals, it has a large and growing collection of mammals, birds, reptiles, and amphibians. Research activities center on problems in evolutionary biology, with emphasis on systematics, ecology, functional morphology, genetics, and paleontology. The museum's many educational functions and houses a number of graduate students. The museum is run by the Smithsonian Institution, National Museum of Natural History, in the United States. It is dedicated to the study and enjoyment of nature. The museum's exhibits include animals, plants, minerals, rocks, fossils, meteorites, and other natural history specimens. The museum's collections are used to support research and education programs, and its exhibits are designed to engage and educate visitors of all ages.

13. The Dysfunction of Human Potential. (3) Three-hour lecture and one hour of discussion per week. Biological basis for understanding human performance will be discussed. Evolvolutionary, physiological and genetic determinants of human performance functions will be presented together with theoretical limits on and opportunities for improvement. (SP) Strohman

14. Primate Biology. (2) Two hours of lecture per week. An introduction to the anatomy of primates as we are members. Special emphasis on anatomy, behavioral, and reproductive biology. (SP) Streithardt

15. Animal Biology: A Behavioral View. (3) Three-hour lecture per week. Students who have taken 155 or IDS 122 will receive credit for this course. Two-hour lectures, one hour of film/demonstration and one hour of discussion per week. Prerequisites: Open to undergraduates; designed for those not specializing in zoology. Principles of biology as they relate to animal behavior, with broad coverage of animal groups. Special attention will be paid to the emerging discipline of behavioral ecology.

Upper Division Courses

104. Cell Biology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1. An introduction to the study of cell biology. The assembly and function of organelles; cell structure and function; the cell surface; cytoplasmic membranes; the cytoskeleton and cell motility; the eukaryotic genome, chromatin, and gene expression; the cell cycle; organelle biogenesis. (SP) Wilt

105. Developmental Biology. (3) Three hours of lecture, one hour of discussion per week. Prerequisites: Biology 1; Zoology 104 recommended. An introduction to the principles and processes of embryonic and post-embryonic development, stressing mechanisms of cell and tissue interactions, morphogenesis and regulation of gene expression. Zoology 155 must be taken concurrently. (F) Wilt

106. Evolutionary and Functional Vertebrate Anatomy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1; Zoology 11 (or equivalent) and 105 recommended. The structure and function of vertebrates; analysis of patterns of evolution of vertebrates using morphological data and the comparative method. Zoology 176 required concurrently. (SP) Streithardt

107. Natural History of the Vertebrates. (3) Three hours of lecture per week. Prerequisites: Biology 1. Biology of the vertebrates, exclusive of fish. Must be taken concurrently with Zoology 167. (SP) Johnson, Greene, Patton

108. Invertebrate Zoology. (3) Three hour lectures per week. Prerequisites: Biology 1A. An introductory survey of the biology of invertebrates, stressing comparative functional morphology, phylogeny, natural history, and aspects of Physiology and development. Must be taken concurrently with Zoology 188. (SP) Staff

109. Animal Evolution. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1 or equivalent. Cell structure, function, and evolution. Methods of studying cells and their organelles from a historical perspective. Mitosis, meiosis, sex determination, introduction to cyto genetics, chromosome changes in evolution. (SP) Staff

110. Cytozoology Laboratory. (2) Two 3-hour laboratories per week. Prerequisites: A course in cytology or genetics. Microscopic study of cell types and organisms; determination of cell cycle; selected staining and preparatory methods. (SP) Staff

112. Cellular Aspects of Development. (3) Three 1-hour lecture sections per week. Prerequisites: Biology 1. An examination of embryonic development as it affects and is affected by the leactures and projects of individual students. A particular emphasis will be placed on the analysis of cell fates and how they are determined by early events in embryogenesis.

114. Regulation in Cells and Cell Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 104 or equivalent course in cell biology. Lectures and laboratory work will be devoted, with special emphasis on the relationships of the cell to control of intracellular activities. A comparative approach is used in uncovering regulatory mechanisms of cellular and organelle activities, cellular stimulations, cell secretion, inter-cell interactions, and cell-cell communication. (SP) Steinhardt

115. Cell/Developmental Biology Laboratory. (2) Two 3-hour laboratories per week. Prerequisites: Zoology 104 or equivalent. (Designed for advanced undergraduates and beginning graduate students. An intensive treatment of methods of analysis of the classical problems of cell and developmental biology, including methods of biochemical analysis of cells, optical microscopy, tissue culture, microinjection and microsurgery on embryos. Must be taken concurrently with Zoology 175.

118. Tumor Biology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Open to graduate and undergraduate students. A course in cell biology, genetics, or molecular biology recommended. Lectures, assigned reading, and individual reports on biological aspects of experimental cancer research. Topics covered may include: tumor viruses; viral transduction; oncogenes; antioncogenes; teratomas and teratocarcinomas; chemical carcinogenesis; hormonal carcinogenesis; tumor immunology; plant tumors. (SP) Nagi

119. Biology of Human Cancer. (2) One 2-hour lecture per week, and assigned readings. Prerequisites: Biology 1 or consent of instructor. A survey of the current concepts of and research dealing with human cancer. (F) Nagi

120. Biology of Chemical Mediation. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1; organic chemistry recommended. Hormonal and neurotransmitter mechanisms, emphasis on general principles and comparative vertebrate endocrinology. (F) Bern

124. Invertebrate Physiology. (4) Three hours of lecture and one hour of individual conference per week. Prerequisites: Biology 1 or consent of instructor; 106 or 162 or a course in enzymology or biochemistry, recommended. Topics in the comparative physiology of major invertebrate groups, including introduction to nutrition, respiration, excretion, salt and water balance, nervous and hormonal control, effects, and associated regulatory mechanisms. Lectures and laboratory projects may be arranged instead of some term paper and examination. (SP) Staff

125. Perspectives in Biology and Medicine. (3) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. Two hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Designed for seniors planning to enter medicine or other areas of health care. Lectures, reading, and discussion of the impact of medicine on health, health policy, genetic, and environmental aspects of medicine. Research in specific diseases. Students group analyzes recent medical literature and evaluate progress in understanding fundamental disease etiology and prevention. (SP) Strohman

127. The Mechanics of Organisms. (3) Three hours of lecture per week. Prerequisite: An introductory course to Biology 1. Functional morphology in terms of mechanical design principles; basic of fluid and solid mechanics with examples of their biological implications, stressing the dependence of mechanical behavior on the structure of molecules, tissues, structural elements, whole organisms, and habitats. (F) Koehl

128. Physiological Zoology. (3) Two 1½-hours lecture per week. Prerequisites: Biology 1A-1B, or equivalent. Comparative animal physiology with emphasis on adaptation to the various aspects of the physical environ-
ment, such as gases, temperature, water, and one. (F)

*129. Vertebrate Reproductive Biology. (3) Two 1-hour lectures per week. Prerequisites: Biology 1A-1B. A survey of morphological, developmental, physiological, behavioral, ecological and evolutionary aspects of the reproductive biology of vertebrates. Zoology 179 must be taken concurrently. (F)

135. Animal Behavior. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1; Zoology 109 and Genetics 102 strongly recommended. An introduction to the study of naturally occurring behavior in an evolutionary context; the phenomena and concepts in their physiological and ecological correlates. (SP) Barlow, Caldwell

135L Laboratory and Field Studies of Animal Behavior. (3) Two 1-hour laboratories per week; one hour of discussion per week. Prerequisites: Biology 1; Zoology 125 recommended. Laboratory study of the principles and processes of embryonic and post-embryonic development, stressing developmental anatomy, and principles of morphogenesis, tissue interactions and gene expression. Zoology 105 must be taken concurrently. (F) Keller, Will

161. General Animal Parasitology. (3) Two 1-hour lectures per week. Prerequisites: Biology 1A-1B or equivalent. Introduction to the life histories and metazoan parasites; general and comparative features of parasitism, including properties common to diverse groups. Zoology 181 required concurrently. (SP) Simmons

162. Biology of Marine Invertebrates. (7) Full-time study at Bodega Marine Laboratory; field work, and individual study projects. Prerequisites: Biology 1, Biology 11 or consent of instructor. Full-time field-oriented study of marine invertebrates, including aspects of systematics, development, behavior, physiology, ecology, and evolution of invertebrate types. First six weeks of summer session.

163. Mammalogy. (2) Two hours of lecture per week. Prerequisites: Zoology 107. An advanced course in the biology of mammals. Must be taken concurrently with Zoology 183. (F) Johnson

164. Ornithology. (2) Two hours of lecture per week. Prerequisites: Zoology 107 or consent of instructor; Zoology 184 recommended. An advanced course in the biology of birds. (F) Johnson

165. Herpetology. (2) Two 1-hour lectures per week. Prerequisites: Zoology 107. Lectures and assigned research will be devoted to a variety of amphibians and reptiles on a world-wide basis, with emphasis on behavior, ecology, functional morphology, and evolutionary history. Grade is based on two examinations (midterm and final) and an independent research paper. Must be taken concurrently with Zoology 186. (F) Barlow

175. Cell/Developmental Biology. (3) Two 1-hour lectures per week. Prerequisites: Zoology 105 or 104 or equivalent. Analysis and background of cell biological techniques to be used in Zoology 115. Must be taken concurrently with Zoology 115. (F) Barlow

176. Evolutionary and Functional Vertebrate Anatomy Laboratory. (3) Two 3-hour laboratories per week. Prerequisites: Biology 1A, 1B or equivalent; previous or concurrent enrollment in Zoology 128. An introduction to the measurement of physiological responses to environmental stresses. (SP) Full

179. Vertebrate Reproductive Biology Laboratory. (1) One 3-hour lab per week. Prerequisites: Biology 1A-1B, 105 or 104. Laboratory study of the structure and function of vertebrates; analysis of patterns of evolution of vertebrates using morphological data and the comparative method. Zoology 108 must be taken concurrently.

181. General Animal Parasitology Laboratory. (2) Two 3-hour laboratories per week. Prerequisites: Biology 1, 11 or equivalent. Identification, morphology and biology of protozoan and metazoan parasites; selected experiments. Zoology 161 required concurrently. (SP) Simmons

183. Mammalogy Laboratory. (3) Two 3-hour laboratories per week plus two 3-day field trips. Prerequisites: Zoology 107. An advanced laboratory and field course in the biology and diversity of mammals. Must be taken concurrently with Zoology 163. (F) Liddicker, Patton

184. Ornithology Laboratory. (2) Two 3-hour laboratories per week plus one weekend field trip. An introduction to the diversity, morphology, and general ecology of birds of the world. Must be taken concurrently with Zoology 164. (F) Johnson

*185. Herpetology Laboratory. (2) Two 2-hour laboratories per week plus two field trips. Laboratories will teach students the diagnostic characteristics and some methodological attributes of amphibians and reptiles on a world-wide basis. Field trips will acquaint students with techniques for collecting, preserving, identifying, and studying amphibians and reptiles. Must be taken concurrently with Zoology 165.

186. Laboratory in Ichthyology. (3) Two 3-hour laboratories per week plus three days of field trips. Prerequisites: Zoology 166 (may be taken concurrently) and consent of instructor. An introduction to the diversity of fishes, with emphasis on local species, and unusual aspects of fish biology. (F) Barlow

187. Vertebrate Natural History Laboratory. (2) One 3-hour laboratory and one 4-hour field trip per week plus special field projects. Prerequisites: Biology 1. Laboratory study of local vertebrates exclusive of fish. Must be taken concurrently with Zoology 107. (SP) Johnson, Greene, Patton

188. Invertebrate Zoology Laboratory. (2) Two 3-hour laboratories per week plus several weekend field trips. Prerequisites: Biology 1A. Laboratory study of invertebrate diversity and functional morphology, and field study of the natural history of marine invertebrates. Must be taken concurrently with Zoology 108, Invertebrate Zoology. (SP) Staff

198A-198B. Thesis Course. (3-3) Course may be repeated for credit. Prerequisites: Open only to students in Honors Program. Individual study experiment under the supervision of one academic year on a problem to be chosen in consultation with a member of the staff; preparation of the thesis on broader aspects of this work: No final exam.

199. Extracurricular Work. (1-4) Course may be repeated for a maximum of 10 units total credit. Must be taken on a passed/not passed basis. Individually arranged. Supervised experience relevant to specific aspects of Zoology in off-campus organizations. Regular individual meetings with faculty sponsor and written report required. (F,SP)

Staff

Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent. Prerequisites: Background courses in chosen subjects. Enrollment is restricted by regulations listed on page 87 and 82 of this catalog. (F,SP)

Staff

Graduate Courses

*202. Cell Development Research Reviews. (1) Course may be repeated for credit. Prerequisites: open only to graduate level students; limited to unsatisfactory basis. One 1/2-hours of lecture per week. Prerequisites: Consent of Instructor. Review of current research in modern aspects of cell and developmental biology. One or two topics selected each semester; topics may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. (F,SP)

Graduate Courses
to experimental methods and research approaches in particular areas in zoology. (F,SP) Staff

210. Seminar In Cytology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: A course in cell science. Critical discussion of basic principles and recent developments in descriptive cytology and cytochemistry. (F)

214. Seminar In Cell Biology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 104 or equivalent. Reports and discussion of current literature on the regulation of cell function. Topics will vary and may include regulation of cell metabolism, cell surface characteristics, cell-cell interactions, cell cycles, secretion, and hormonal activation. (F)

215. Seminar: Neuronomuscular Interactions and Muscle Gene Expression. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 104 or consent of instructor. Reports and discussion of recent research literature.

216. Extracellular Matrix: Growth and Development. (2) Two hours of lectures per week. Prerequisites: Consent of instructor. The molecules of the extracellular matrix will be defined and the biochemical, structural, and functional aspects of extracellular matrix components in guiding axonal growth and in determining specific sites of nerve-muscle synapses, the efficiency of nerve impulse propagation, and the clustering of acetylcholine receptors and other transcellular signaling molecules will be discussed.

218. Tumor Biology Research Reviews. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Basic course in biology of neoplasia and consent of instructor. Graduate standing and consent of instructor. Report and discussion of current research and defense of research proposals. (SP) Mandi

219. Seminar on Biology of Neoplasia. (1) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Preparation and discussion of current research in biology of neoplasia.

220. Special Topics in Biochemistry of Chemical Mediation. (1) One 2-hour lecture per week. Prerequisites: Consent of instructor. Topics will vary from year to year.

221. Seminar in Comparative Endocrinology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 120 or Physiology 141. Topics to vary. (SP) Barn

229. Seminar in Marine Biology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary.

231. Seminar in Physiological Ecology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary.

232. Seminar on Controversies In Comparative Physiology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Consent of instructor. Topic to vary. Report and discussion of current literature. (F) Full

236. Seminar in Integrative Neurobiology. (2) Course may be repeated for credit. One 2-hour meeting per week. Prerequisites: Consent of instructor. Reports and discussion of current research literature. (SP) Miller

237. Seminar In Animal Behavior. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 135 or consent of instructor. Topics to vary. Report and discussion of current literature. (F)

240. Research Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week for 7½-weeks. Review and discussion of topics of current interest. Topics to vary. Staff

241. Seminar in Population Ecology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 140 or consent of instructor. Topics to vary.

244. Seminar In Animal Ecology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 140 or 141 or equivalent consent of instructor. Topics to vary. (F,SP) Slàtkin, Licklider, Greene

245. Ecological Research Reviews. (1) Course may be repeated for credit. Review taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Prerequisites: Graduate standing and consent of instructor. Reports and discussion of current research. (F,SP) Caldecott, Caldecott, Licklider, Root, Rowan.

246. Seminar In Marine Ecology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Participation will involve the selection of current research and presentation of results. The topics for each seminar will be determined prior to the first meeting and announcements will be posted. (F) Sousa

249. Seminar on Evolutionary Genetics. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Recent developments in evolutionary genetics will be discussed in a seminar format.

251. Invertebrate Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour seminar per week. Prerequisites: 108 (or equivalent); senior or graduate standing; consent of instructor. Reports and discussion of original research in invertebrate zoology. (F,SP) Koehi, Sousa, Simmons

259. Seminar in Invertebrate Zoology. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 108 or 157 or 124 and consent of instructor. Topics in a selected area of invertebrate biology. Individual student reports on topics selected in consultation with the instructor, and centered around a currently-active field of invertebrate biology, which will vary from year to year.

260. Seminar in Evolutionary Biology of the Vertebrales. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Review and discussion of current research and literature in evolutionary biology, development, and theory. (F,SP) Greene, Johnson, Udickcer, Patton

261. Seminar on Parasitism. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Review and discussion of topics of current interest and importance in intimate animal associations. (F,SP) Simmons

263. Advanced Mammalian Biology Reviews. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Prerequisites: Graduate standing; consent of instructor. Discussion of mammalian biology in an interdisciplinary format. (F,SP) Licklider, Patton

265. Seminar in Biology of Amphibians and Reptiles. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Prerequisites: Graduate standing; consent of instructor. Topics to vary. Reading or other advanced study by arrangement. (SP) Licklider, Patton

266. Seminar on Evolution of Animal Behavior. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Prerequisites: Consent of instructor. Presentation and discussion of current research and literature in evolutionary animal behavior. (F) Full

267. Seminar on Evolution of Invertebrates. (1) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 107; graduate standing or consent of instructor. Review of problems of speciation and isolating mechanisms in vertebrates, with emphasis on current literature.

268. Vertebrate Review. (1) Course may be repeated for credit. One 1½-hour seminar per week. Review of current literature on ecology and evolution of higher vertebrates. Offered irregularly.

269. Seminar In Avian Biology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Prerequisites: Graduate standing or consent of instructor. Reviews of original research and recent literature. To be given irregularly according to demand. (SP) Johnson

280. Research Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour seminar per week. Prerequisites: Consent of instructor. Seminar on presentation and evaluation of results in area of student's individual research interests. (F,SP) Staff

294. Principles and Concepts of Modern Zoology. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture/discussion per week. Prerequisites: Graduate standing and consent of instructor. Beginning graduate students are expected to attend. (F) Flower

296. Special Study for Graduate Students. (1-4) Course may be repeated for credit. Individual conferences. Reading or other advanced study by arrangement with a staff member. (F,SP) Staff

299. Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Credit awarded according to work planned and accomplished. (F,SP)

601. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Credit awarded according to work planned and accomplished. (F,SP)

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individually arranged. Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations, or language requirements in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP) Staff

Professional Courses

301. Preparation in Graduate Teaching. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Designed for graduate student instructors. Discussion of questions and problems in the graduate student instructors' practice of teaching, and of current literature on theories and methods of science teaching at the university level.

302. Practice of Teaching Zoology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Theories and practical problems. Reading assignments, or language requirements in consultation with the graduate adviser. (F,SP) Staff

Interdepartmental Studies Courses

Lower Division Courses

IDS 16. Evolutionary Biology—An Introduction for Non-Biology Majors. (2) Formerly Zoology 16. Two 1-hour lectures per week. This course assumes no background in science. It will cover the major theories of evolution and the major features of the fossil record. Particular attention will be paid to recent controversies in evolutionary biology. (F) Slàtkin
Upper Division Courses

IDS 113. Developmental Neurobiology. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Zoology 121 or Psychology 110 or consent of instructor. A survey of research concerning the ontogeny of the nervous system in both invertebrates and vertebrates, including cell lineage analysis, directed neurite outgrowth, axon regeneration, death of cells during development, and the influence of hormones. The significance of these phenomena will be discussed in both evolutionary and behavioral contexts. Sponsoring departments: Zoology and Psychology. (SP) Weisblat, Bentley.

IDS 115. Microcomputer Data Acquisition and Control in the Biology Laboratory. (2) One hour of lecture and one 3-hour lab per week. Prerequisites: Consent of instructor. Introduction to the use of microcomputers for the acquisition, analysis and control of data in biological systems. Background in engineering digital systems not required. Programming will be minimal. Transduction, A/D conversion, statistical analysis, Fourier transforms, digital filtering. Laboratory projects will include: real-time data acquisition, on-line control of biological processes, data analysis, report generation. Sponsoring departments: Zoology and EECS.

IDS 121. Neurobiology. (3) Formerly Zoology 121. Three hours of lecture per week. Prerequisites: Biology 1 or 11, or Zoology 11, or Entomology 100. Genetics 102 strongly recommended. An introductory course designed to provide a general understanding of current knowledge of the nervous system. Critical properties of nerve cells, cell-to-cell junctions, and nerve circuits are analyzed. Operation of these components in sophisticated nervous systems and the state of understanding of complex nervous phenomena are then considered. (F) Miller, Winr

IDS 122. Animal Behavior. (3) Three hours of lecture, one hour demonstration, plus one hour of discussion per week. Prerequisites: Biology 1 or 11, or Zoology 11, or Entomology 100. Genetics 102 strongly recommended. An introduction to comparative animal behavior and behavioral physiology to evolutionary perspective. Topics include analysis of behavioral genetics and development, learning, aggression, reproduction, adaptiveness, physiological substrates. Sponsoring departments: Entomological Sciences, Psychology, and Zoology.

IDS 120. Seminar on Social, Political and Ethical Issues in Health and Medicine. (2) Must be taken on a pass/no pass basis. One hour of lecture and one hour of discussion per week. An interdisciplinary approach to health and medicine. Guest lecturers will speak on the social, political and ethical aspects of health and medicine; students will then discuss and present analyses of the reading materials as well as issues raised by the speakers. An optional SAHS 197G field study will place senior health professionals in the community. Sponsoring departments: Social and Administrative Health Sciences, Education, and Zoology.

Graduate Courses

IDS 200B. Integrative Neurobiology. (3) Two 1 1/2-hour lectures and one 1-hour recitation per week. Prerequisites: IDS 111 or Zoology 121. In-depth consideration of current research questions central to the understanding of the organization of nervous systems, and of the behavior mediated by these systems. When appropriate, these questions are illustrated with examples drawn from both the vertebrate and invertebrate literature. Circuit, networks, or system analogs and analysis will be emphasized where these approaches lend clarity. Sensorimotor integration is discussed in small systems or neurons to more complex ensembles, including mammalian cortex and cerebellum. Sponsoring departments: Physiology, EECS, and Zoology. (SP) Miller, Werblin.

IDS 200L. Neurobiology Laboratory. (5) Two 6-hour laboratories plus one 3-hour demonstration per week. Prerequisites: IDS 200A-200B (200A may be taken concurrently) or consent of instructor. Intended to provide the graduate and advanced undergraduate students with a working knowledge of current anatomical, physiological and biophysical techniques in neurobiology through demonstrations, exercises, and individual research problems. Topics include synaptic transmission, excitable membranes, sensory reception, and circuits of neurons generating behavior. Sponsoring departments: Physiology/Anatomy, Biophysics and Medical Physics, and Zoology. (F) Miller, Werblin.

IDS 201. Research Topics in Neurobiology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour lecture per week. Prerequisites: Consent of instructor. Neurobiology faculty will present current research topics in seminar form. Emphasis on design and rationale and directions of the work as well as the experimental results. Sponsoring departments: Zoology and EECS. (SP) Bentley-Werblin.

IDS 202. Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Zoology 121 or equivalent. Discussion of research papers and original research reports on current problems in neurobiology. Sponsoring departments: Zoology and EECS. (F,SP) Miller, Werblin.

IDS 203. Developmental Neurobiology Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Discussion of research papers and original research reports on current problems in developmental neurobiology, including cell lineage, axonal pathfinding, synaptic connectivity, and competition. Sponsoring departments: Zoology and Psychology. (F,SP) Webster, Bentley.

IDS 204. Animal Behavior Research Reviews. (1) Course may be repeated for credit. One 1 1/2-hour seminar per week. Prerequisites: Graduate standing. Basic course in animal behavior; consent of instructor. Reports and discussions of original research or views, completed or in progress. Not all participants need report, but all are expected to attend and enter into the discussions. Sponsoring departments: Zoology and Psychology. (F,SP) Caldwel, Rowell, Barlow.

IDS 205. Development Review. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Seminar devoted to the analysis of major problems in animal and plant embryology including cell type determination, pattern formation, cell and tissue interactions, and mechanisms of morphogenesis with emphasis on regulation and integration of developmental events at the cellular, molecular and tissue levels of organization. Sponsoring departments: Molecular Biology and Zoology. (SP) Weisblat.

IDS 282. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture and discussion per week. Prerequisites: Consent of instructor. Reviews and reports of current research in tumor biology. Sponsoring departments: Biomedical and Environmental Health Sciences, Zoology, Physiology, and Microbiology. (F) Martin, Nandi, Bern.

\*Not offered 1988-89
\*On leave, spring
\*On leave, spring, fall
\*On leave, fall

**On leave, spring
**Recalled to active service
**Recipient of Distinguished Teaching Award
Appendix and Index
Criteria Used in Selecting Freshmen

As noted above, Berkeley is not able to admit as freshmen all qualified applicants. So that prospective applicants will know how the five colleges and schools make admissions decisions, the criteria and procedures have been described in detail below. (Please note that the criteria and procedures described apply to admission during the 1988-89 academic year; because the admission process is under review, the criteria and procedures may be revised for the 1989-90 academic year. Any changes will be announced in California Notes and will be available, upon request, from the Office of Admissions and Records.)

The College of Letters and Science and the College of Natural Resources

This statement describes the criteria that will be used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Letters and Science or the College of Natural Resources during the 1988-89 academic year.

Applicants who are California residents will be reviewed separately from nonresidents. Although the selection criteria for both groups are identical, guidelines have been established to give preference to California residents.

Selection Criteria

A. Admission on the Basis of Academic Index Scores. Approximately 40 percent of the applicants offered admission are selected according to their ranking among UC-eligible applicants for the fall semester with respect to the academic index score. The academic index score is calculated in the following manner:

1. The first component of the applicant's academic index score is calculated by multiplying his or her grade-point average (GPA) for academic courses taken in high school by 1000. (Note: In computing the academic index score, Berkeley uses the "Preliminary Academic Grade-Point Average" reported by the applicant on Item 70 of the University of California Undergraduate Application Packet; it may include extra weight for designated honors courses taken during the applicant's junior year in high school.)

2. The second component of the applicant's academic index score is calculated by adding the scores on five standardized admission tests. The five test scores are the verbal and mathematics sections of the Scholastic Aptitude Test (SAT) (or the American College Test (ACT) converted to the SAT scale) and three required College Entrance Examination Board achievement tests.

Since each of these five tests has a maximum score of 800 points, a total of 4000 points is possible on this component of the academic index score.

3. The scores on the two components (calculated in steps 1 and 2, above) are combined to produce the applicant's academic index score.

The highest academic index score possible is 8000 points.

4. To give preference to applicants who are California residents, the minimum academic index score for consideration in this group has been set higher for nonresidents than for residents.

Supplemental Criteria

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
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<tbody>
<tr>
<td>Completed four years of mathematics or three years of laboratory science in high school</td>
<td>100</td>
</tr>
<tr>
<td>Completed four years of one foreign language or two years of two foreign languages in high school</td>
<td>100</td>
</tr>
<tr>
<td>Satisfied the Subject A requirement by scoring at least 600 points on the English Achievement Test</td>
<td>100</td>
</tr>
<tr>
<td>Being a legal resident of California</td>
<td>200</td>
</tr>
<tr>
<td>Qualified for the Educational Opportunity Program (EOP)</td>
<td>200</td>
</tr>
<tr>
<td>Attended a high school that does not offer two honors courses in the junior year</td>
<td>100</td>
</tr>
<tr>
<td>A variety of other factors (such as leadership, character, motivation, accomplishments in extracurricular activities, and economic hardship) revealed in the applicant's essay and in his or her response in the Honors and Activities section of the application</td>
<td>504</td>
</tr>
</tbody>
</table>

B. Admission on the Basis of Academic Index and Supplemental Criteria. The members of the next group of applicants offered admission have slightly lower academic index scores than the group discussed above. Because there are so many applicants within a narrow range of academic index scores, other factors (called supplemental criteria) are considered along with the applicants' academic index scores.

A total of 1104 points may be added to an applicant's academic index score on the basis of the seven supplemental criteria listed in the chart above.

After the points are assigned for the supplemental criteria, the applicants are ranked according to the sum of their academic index and the supplemental criteria. The applicants with the highest combined score (called the supplemental index score) are offered admission.

C. Admission in Complementary Categories. To ensure that the undergraduate student body reflects the diversity of California, a number of qualified applicants who have special qualities and who were not admitted on the basis of their academic index scores are offered admission. Berkeley conducts a separate review for each of the categories listed below.

1. Applicants Who Are Members of Underrepresented Minority Groups. UC-eligible applicants who are members of ethnic groups that have been historically underrepresented in higher education are admitted. The ethnic groups include black, Chicano, Latino, and Native American.

2. Filipino Applicants. All UC-eligible applicants of Filipino descent are ranked according to their supplemental index scores. Enough Filipinos are admitted to ensure that their representation at Berkeley approximates their presence among recent high school graduates in California.

3. Disabled Applicants. All UC-eligible applicants with physical or learning disabilities are admitted following evaluation and verification of their disability by the staff of the Disabled Students' Program.

4. Students from Rural High Schools. All UC-eligible applicants attending high schools located in rural areas of California are ranked according to their supplemental index scores.

5. Recruited Athletes. All UC-eligible applicants who are recruited and referred to the Office of Admissions and Records by men's and women's intercollegiate athletic teams are admitted.

6. Applicants with Exceptionally High Test Scores. Applicants who scored in the top one percent on a combination of either (a) the verbal section of the SAT and the English Achievement Test or (b) the mathematics section of the SAT and the Mathematics Achievement Test (or their ACT equivalents) are admitted.

7. Applicants Admitted after Administrative Review. Applicants admitted in this category include those with special talents (for example in art, forensics, or music), international students, applicants from high schools with nonstandard grading systems, and other administrative appeals.

D. Admission by Special Action. Applicants who do not satisfy the University's eligibility requirements but who have special qualities or talents may be admitted after review by the Committee on Special Action Admissions. By University policy, the number of applicants admitted in this category may not exceed six percent of the total admitted to freshman standing. Most of those admitted in this category are athletes or members of underrepresented minority groups.

E. Admission by Deferral to the Spring Semester or the Junior Year. All UC-eligible California residents who are not admitted for the fall semester are offered three options: applying for deferred admission in the following spring semester, applying for admission to the University Extension Program during the fall semester with regular admission in the following spring semester, or attending a local community college through the Cooperative Admissions Program and transferring to Berkeley as a junior.

The number of applicants admitted through the first two options is adjusted each year to reflect the number admitted for the fall semester, the campus's capacity to provide course opportunities in the spring semester, and the number of spaces available in the Extension Program. (In 1987, for example, 1380 applicants were admitted through these two options. It is anticipated that a similar number will be admitted in 1988.) All applicants must take one of these options. Applicants who qualify for the Educational Opportunity Program (EOP) are admitted; other applicants are ranked and admitted on the basis of their academic index scores.

The third option is attending one of the Bay Area community colleges that is participating in the Cooperative Admissions Program. If the applicants complete specified courses and attain an agreed-upon grade-point average, they will be assured of admission to Berkeley as juniors. Unfortunately, admission to Berkeley's accelerated programs of study at Berkeley cannot be guaranteed.

Note: Admission for the spring semester is considered for a very small number of applicants who did not apply for the fall semester. Applicants are usually recruited athletes or members of underrepresented minority groups who were unable to attend in the fall semester or were unable to submit their applications in time for admission in the fall.

The College of Chemistry

This statement describes the criteria that will be used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Chemistry during the 1988-89 academic year.

Selection Criteria

A. Admission on the Basis of Academic Index Scores. Approximately 60 percent of the applicants offered admission to each of the College of Chemistry's two departments are selected according to their ranking among UC-eligible applicants for the...
B. Admission on the Basis of Academic Index and Supplemental Criteria. The remaining 40 percent of the applicants offered admission are selected following a holistic examination of the files of all applicants. This examination takes into consideration the student's academic index score, which is (a) within 1000 points of the cut-off for the top 60 percent or (b) above 6000 points, whichever is higher. It is expected that most applicants offered admission will have academic index scores above 6500 points.

Each applicant's file is evaluated initially by two members of an admissions team composed of faculty members from the college. The admissions team considers three factors, which are given equal weight: (a) academic index score, (b) extracurricular record, and (c) the essay, extracurricular activities, and residence. If the two evaluations of an applicant's file differ significantly, the file is reexamined by all members of the admissions team. Points are assigned for each of the factors.

Academic Index Score. The admissions team will consider both the applicant's academic index score and whether the component scores indicate promise of success in college programs.

Academic Record. The admissions team considers the applicant's academic record, the breadth of extracurricular activities in which they have engaged, and the grades they have earned. Positive indicators include (a) grades of "A" in mathematics, science, and English courses; (b) completion of course requirements in mathematics, English, chemistry, or physics; and (c) scores of more than 600 points on the mathematics and verbal sections of the Scholastic Aptitude Test and the Mathematics and English Achievement Tests.

Essay. Extracurricular Activities, and Residence. In reading the applicant's essay and record of extracurricular activities, the admissions team looks for indications of motivation, creative abilities, and interest in the major which suggest that the applicant would be successful in college. Applicants from rural California areas and Northern California (especially the Bay Area) are given positive consideration. To be admitted, applicants from other states must have higher scores.

C. Applicants Who Are Members of Underrepresented Minority Groups. The college has a strong commitment to admitting all members of underrepresented minority groups who are UC-eligible and have reasonable prospects for success in its programs. UC-eligible members of underrepresented minority groups who are not UC-eligible and have reasonable prospects for success in programs are admitted to the College of Environmental Design.

The College of Engineering

This statement describes the criteria that will be used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Engineering during the 1988-89 academic year.

Selection Criteria

A. Admission on the Basis of Academic Index Score. Applicants to each department and program in the College of Engineering are ranked separately with respect to the academic index score. (See item A under the College of Letters and Science for a description of the academic index score.) Approximately 50 percent of the admissions to each department and program are based solely on the applicants' academic index scores and residency.

To give preference to applicants who are California residents, the minimum academic index score for consideration in this group has been set higher for nonresidents than for residents.

B. Admission on the Basis of Academic Index and Supplemental Criteria. The members of the next group offered admission have slightly lower academic index scores than the group discussed above. Because there are so many applicants within a narrow range of academic index scores, the college's associate dean of undergraduate affairs establishes, for each department and program, the range of academic index scores that qualifies applicants for consideration. The applicants' essays are reviewed by the professional staff of the Office of Admissions and Records.

The applicants' essays are reviewed by the professional staff of the Office of Admissions and Records. After the points are assigned for the supplemental criteria, the applicants are ranked according to the sum of their scores on the academic index and the supplemental criteria. On the basis of this ranking, the college has admitted one-third of the applicants admitted from this category to each department and program in the college. The remaining two-thirds of the admissions decisions in this category are made by the college's Undergraduate Admissions Committee, using all the information available to it.

C. Applicants Who Are Members of Underrepresented Minority Groups. The college has a strong commitment to admitting all members of underrepresented minority groups who are UC-eligible and have reasonable prospects for success in its programs. UC-eligible members of underrepresented minority groups who are not UC-eligible and have reasonable prospects for success in programs are admitted to the College of Environmental Design.

The College of Environmental Design

This statement describes the criteria that will be used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Environmental Design during the 1988-89 academic year.

Selection Criteria

A. Admission on the Basis of Academic Index Score. Approximately 40 percent of the applicants offered admission to the College of Environmental Design are selected according to their ranking among UC-eligible applicants for the fall semester with respect to the academic index score. (See item A under the College of Letters and Science for a description of the academic index score.) To give preference to applicants who are California residents, the minimum academic index score for nonresidents is set higher than that for residents.

B. Admission on the Basis of Academic Index and Supplemental Criteria. The process for this review is similar to that used by the College of Letters and Science, and the supplemental criteria are the same for both colleges. (See item B under the College of Letters and Science for a description of the supplemental criteria.) In reading the essays of applicants to the College of Environmental Design, the admissions team looks for indications of interest in and knowledge of the intended major, social involvement at home or in the community, demonstrated excellence in some extracurricular activity (such as sports, music, or dance), and indications of creative ability—all of which suggest that the applicants would succeed in the college. The essays are reviewed by the professional staff of the Office of Admissions and Records. After the points are assigned for the supplemental criteria, the applicants are ranked according to the sum of their scores on the academic index and the supplemental criteria. Among applicants with the highest combined scores, offers are made for admission.

C. Applicants Who Are Members of Underrepresented Minority Groups. The college has a strong commitment to admitting all members of underrepresented minority groups who are UC-eligible and have reasonable prospects for success in its programs. UC-eligible members of underrepresented minority groups who are not UC-eligible and have reasonable prospects for success in programs are admitted to the College of Environmental Design.

Criteria Used in Selecting Advanced-Standing Students

The Colleges of Chemistry, Engineering, Environmental Design, Letters and Science, and Natural Resources; the Schools of Business and Optometry; and the Department of Ethnic Studies

Lower Division Advanced Standing (Sophomores). Generally there are very few openings for applicants who wish to transfer to Berkeley as sophomores. Only members of underrepresented minority groups, applicants with demonstrated financial need, and recruited athletes are considered for admission.

Upper Division Advanced Standing (Juniors). Applicants who wish to transfer to Berkeley as juniors must have completed 56 transferable semester units of college credit before the summer after their junior year. Applicants who were eligible for admission to the University through the high school must have a minimum grade-point average of 2.0. UC-eligible students who are not eligible after high school must have a minimum grade-point average of 2.4 in college courses; and applicants who are not residents of California must have a minimum grade-point average of 2.8 in college courses.

In recent years, all programs have turned away qualified applicants because there was not enough space. Applicants to the most competitive programs should complete the lower division prerequisites for the intended major and fulfill the breadth requirements. Preference is given to applicants who are members of underrepresented minority groups, are attending a community college in California, or are residents of California. Applicant...
who have met the unit, prerequisite, and breadth requirements are selected on the basis of their grade-point average in college courses.

Personalized System of Instruction

A number of self-paced courses, also known as Keller Plan or PSI (Personalized System of Instruction) courses, are currently offered at Berkeley. If you do not find the material imposed by dormitory hours or your ability to profit from these courses. While each course is unique, they typically have the following characteristics:

1. Few lectures are given. You learn the material through study guides, workbooks, and textbooks. In some language courses, laboratory attendance may be required.

2. You work at your own pace within the limits of the semester.

3. You must demonstrate mastery of the material covered, usually through a quiz or an assignment, before proceeding to more advanced topics.

4. You meet periodically with your instructors or tutors to ask questions or discuss problems.

5. In some courses, variable amounts of credit may be granted: you enroll in 2 units but complete only 4, the instructor will in general increase the unit value on the grade sheet. If, however, you enroll in 4 units but complete only 2, units of earned grade will be recalculated and 2 units of F for the uncompleted work. You should thus enroll for as few units as possible.

This method of instruction is most popular in introductory language and science courses. The following courses are currently taught in this format: Astronomy 7; 103; Computer Science 7S; 85; 9A; 9B; 30, 9C; 9D; East Asian Studies 100; Electrical Engineering 401; 41F; Italian 14A, 14B; 14C; Landscape Architecture 112; Latin 14; Mathematics 1P; 14B, 19A-14B-188; Slavic 11A, 11B, 11C, 14A, 14B, 14C, 14D; Spanish 14A, 14B.

Professional Development Program

Program Office: 230B Stephens Hall, 642-5881

The Professional Development Program (PDP) is an honors program designed to increase the access of gifted minority and women students to higher education, especially in the fields of science, mathematics, and engineering, where they are particularly under-represented. PDP serves gifted secondary school minority and women students as well as Berkeley undergraduate and graduate students. High school students with outstanding academic ability are brought to the Berkeley campus, given intensive preparation for university study, and motivated to seek professional careers. Instruction is provided in diverse academic disciplines, counseling and advising are offered, and field trips, guest lectures, theatrical events, and workshops aid pre-college students in defining their career goals.

PDP offers Berkeley undergraduate students special academic assistance and counseling and the opportunity to participate in faculty-supervised laboratory research in a broad range of academic disciplines. The program for undergraduates students maximizes access to the wealth of educational resources at Berkeley through individual faculty advising and curriculum planning in the school of the student’s major. In addition, seminars and tutorials which augment regular course offerings: laboratory and field placement opportunities as training for research; peer teaching and research assistantships. Students who are about to begin graduate study are also provided with intensive instruction designed to acquaint them with the methodology of graduate work in their disciplines. PDP provides graduate students with individualized faculty orientation workshops, seminars, and lectures by distinguished minority and women scholars. PDP helps students to locate jobs that will advance their professional careers. For further information, please contact the program office or call 642-5881.

University Research Expeditions Program

Program Office: 2223 Fulton Street, Basement Suite, 642-5886

The University Research Expeditions Program (UREP) was established on the Berkeley campus to help provide funds for field research in the natural and social sciences while simultaneously offering students, staff, and members of the general public the opportunity of joining domestic and foreign research projects sponsored by the University. Through UREP, University scientists with field research projects involving techniques that can be learned with minimal training are brought together with individuals interested in actively participating in field work. Participants become short-term members of a field research team and assist in wildlife habitat studies, botanical collecting expeditions, ethnographic field work, ecological surveys, fossil excavations, historical studies, and other types of field research.

UREP projects are open to students, staff, and members of the general public. No previous academic or field experience is necessary to participate; instruction in field techniques is provided after participants arrive at their research site. Participants are selected for their interests, skills, experience, and willingness to work and learn. A tax-deductible donation to the University is required to help subsidize the research costs of the projects. Partial scholarships are available to UC students.

Past UREP projects have included animal behavior observations in Cameroon, Guatemala, and St. Kitts; archaeological excavations in Italy, California, and Ghana; a museum collecting expedition to the Rendille, a nomadic tribe in Northern Kenya; an anthropological study of Carnival in Brazil; the preparation of an archaeological map of the Valley of the Kings, Egypt; marine studies in Hawaii, Jamaica, and Honduras Bay; and plant collecting or insect studies in Costa Rica, Ecuador, Mexico, Mt. Kenya, New Caledonia, and Surinam. Some of the projects planned for 1988-89, each approximately two to three weeks in duration, are marine biology studies in the South Pacific and Australia; animal behavior studies in Africa; archaeological detective work in Chile and Hawaii; and bird behavior studies in Alaska. Other projects

California Residency and the Nonresident Tuition Fee

If you have not been a resident of California for more than one year immediately before the residence determination date for each term in which you propose to attend the University, you must pay a nonresident fee in addition to all other fees. The residence determination date is the day instruction begins for the semester.

General

If you are an adult student and you want to be classified as a resident for tuition purposes, the time of admission you must have established residence in California for more than one year immediately preceding the residence determination date for the term during which you propose to attend the University, and you must have lived in any previous residence. You must also present objective evidence that you intend to make California your permanent home. The periods are delayed, the one-year residential period will be extended until proof of presence and intent have been demonstrated for one full year. Physical presence within the state solely for educational purposes does not constitute establishment of California residence for state tax purposes. If you intend to make California your permanent home, the following conditions must be fulfilled: you must have lived in California for at least one year immediately before the residence determination date, and you must have established domicile in the U.S. on non-immigrant status.

Indications of your intent to make California your permanent home are included in registering and voting in California elections; designating California as your permanent address on all school and employment records, including military records; obtaining a California driver's license or California identification card; and obtaining California vehicle registration; paying California income taxes as a resident, including income earned outside the state from the date of residence was established; establishing a residence where your permanent belongings are kept within California; licensing for professional practice in California; and the absence of any indications of another state during any period for which you claim residence in California. Documentation may be required. No single factor is
controlling or decisive; all relevant indications will be considered.

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered your residence. If you live with neither parent, your residence is that of the parent with whom you last lived. You may establish your own residence if both your parents are deceased and a legal guardian has not been appointed. If you are an unmarried minor who have a parent living, your residence cannot be changed by your own actions, by the appointment of a legal guardian, or by relinquishment of a parent's right of control. The California residence of the parent from whom you derive California residency must satisfy the one-year durational requirement. The rules outlined above do not apply to minor aliens in the U.S. on nonimmigrant visas that prevent them from establishing domicile in the U.S. Husbands and wives each establish their own residence; neither derives residence from the other.

Exceptions

1. If you are a minor U.S. citizen or eligible alien whose parents lived in California for at least a year and then, within one year of the residence determination date, left to establish residency in another state, you are entitled to residency status as long as you remain in California for at least a year after you reach age 18 and are continuously enrolled at an educational institution.

2. If you are a U.S. citizen or eligible alien and either a minor or aged 18 and can prove that you lived in California for the entire year before the residency determination date, that you were entirely self-supporting for that year, and that you intend to make California your permanent home, you may be eligible for resident status.

3. If you are a minor U.S. citizen or eligible alien and lived in California for at least a year before the residence determination date, if you are a resident adult or adults who were not your parents but who were responsible for your care and control, you are entitled to resident status. This exception continues until you have reached the age of 18 and have resided in the state long enough to become a resident student, so long as you continuously attend an educational institution.

4. Resident status is available to you if you are natural or adoptive child, stepchild, or dependent spouse of a member of the U.S. military stationed in California on active duty. You may retain this special classification until you have lived in California long enough to become a resident in your own right. If you are attending an educational institution and the serviceperson is transferred outside California or retires just after serving in California, you may retain your resident classification.

5. If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education, you are entitled to resident classification until you have lived in California long enough to become a resident.

6. If you are the child of a resident deceased public law enforcement or fire suppression employee who was killed in the course of duty, you may be entitled to resident classification.

7. If you are the spouse or dependent child of a University of California employee whose permanent assignment is outside California, you may be entitled to resident classification.

Reclassification

If you are a continuing student who is classified as a nonresident for tuition purposes and believe that you will be eligible for resident status next term, you must petition to the Office of Admissions and Records and interview to have your residence status changed before submitting your registration fee payment. You must initiate all changes of status before the late registration period of the semester for which you want to be reclassified. In addition to the indications of residency listed above, California law requires that financial independence be included among the factors considered in your parents' residency status. Financial independence will not be considered if you are a graduate student assistant or research assistant employed on a 0.40 or more time basis, or for which you have received reclassification. For detailed information regarding reclassification, contact the residence deputy.

Procedures

New and returning students are required to complete a Statement of Legal Residence. Your status is determined by the residence deputy, who is located in the Office of Admissions and Records. We caution you that this summary is not a complete description of the law regarding residence. You should also note that changes may have been made in the rate of nonresident tuition and in the residence requirements since this catalog was published. Regulations adopted by the Regents are available for inspection in the Office of Admissions and Records.

If you are classified incorrectly as a resident, you are subject to recalcification and to payment of all nonresident fees. If you conceal facts or furnish false ones in order to be classified as a resident, you are also subject to university discipline. Resident students who become nonresidents must immediately notify the residence deputy.

Inquiries from prospective students regarding resident requirements for tuition purposes should be directed to the Residence Deputy, 120 Sproul Hall, University of California, Berkeley; Berkeley, CA 94720. No other campus personnel are authorized to supply information about residence requirements for tuition purposes. Following a final decision on residence classification by the residence deputy, you may appeal in writing to the Legal Analyst—Residence Matters, 590 University Hall, University of California, Berkeley; Berkeley, CA 94720, within 90 days after the residence deputy notifies you of the final decision.

Waivers of Nonresident Tuition

To the extent funds are available, nonresident tuition waivers may be granted to spouses and dependent, unmarried children under age 21 of a University faculty member who is a member of the Academic Senate, and to certain foreign students. Waivers are subject to reclassification and to payment of all nonresident fees. Following a final decision on residence classification by the residence deputy, you may appeal in writing to the Director of the Academic Senate, and to certain foreign students. The exception who are designated University Fellows and Distinguished Scholars may be eligible for nonresident tuition waivers or fellowships. Contact the Graduate Division at your campus for further information.

Organized Research Units

School of Business Administration Center for Research in Management College of Chemistry Laboratory of Chemical Biodynamics College of Engineering Earthquake Engineering Research Laboratory Electronic Research Laboratory Engineering Systems Research Center Institute of Transportation Studies Sanitary Engineering and Environmental Health Research Laboratory College of Environmental Design Center for Environmental Design Research Graduate Division Center for Studies in Higher Education Institute of Business and Economic Research Center for Real Estate and Urban Economics Institute of East Asian Studies Center for Chinese Studies Center for Japanese Studies Center for Korean Studies Institute of Human Development Institute of Industrial Relations Institute of International Studies Center for Latin American Studies Center for Slavic and East European Studies Center for South and Southeast Asia Studies Institute for the Study of Social Change Institute of Urban and Regional Development Spatial Sciences Laboratory Survey Research Center School of Law Earl Warren Legal Institute Center for the Study of Law and Society College of Letters and Science Archaeological Research Facility Cancer Research Laboratory Center for Pure and Applied Mathematics Field Station for Behavioral Research Institute of Cognitive Studies Institute of Governmental Studies Institute of Personality Assessment and Research Laboratory of Radio Astronomy Lowe Museum of Anthropology Museum of Vertebrate Zoology Theoretical Astrophysics Center Virus Laboratory Vice Chancellor for Undergraduate Affairs Lawrence Hall of Science Research Facilities Under Systemwide Administration Agricultural Experiment Station Giannini Foundation Forest Products Laboratory Wildland Research Center

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